



AUTOMATIC SLIDING DOOR

Install Manual

[MODEL : ST-10 Series
ST-20 Series]



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1. Overview

ST-10 and ST-20 are automatic sliding door operators that have been developed by STWORLD Co., Ltd and designed to considerate customers safety and security with a top priority.

Read this installation manual conscientiously before your installing.

Wiring, electrical connections and welding must be performed by professionally competent personnel only.

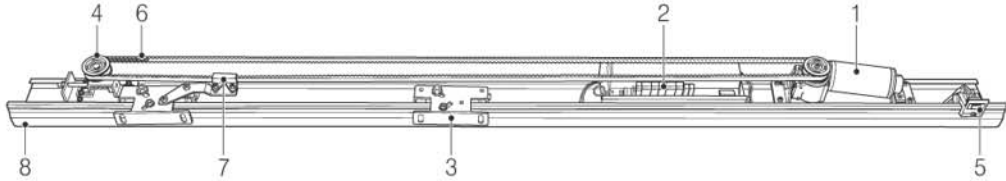
2. Specifications

	Single door	Double door
Model	ST-10S, ST-20S	ST-10D, ST-20D
Maximum Door Weight	180kg	160kg x 2
Run Stroke	500 ~ 3,000mm	1,000 ~ 6,000mm
Power Supply	180 ~ 240V (SMPS Typed)	
Control Type	PI (Proportional-Integral) control	
Motor	100Watt, DC MOTOR (DC24V, Dunker motor from Germany)	
Open / Close Speed	(Ex, Door weight: 70kg...) Open Speed: 135mm/sec ~ 550mm/sec Close Speed: 75mm/sec ~ 350mm/sec	
Opened Hold Time	Max. 999 seconds	
Main Functions	<ul style="list-style-type: none"> - Counting Function (Opening, Bumping and Power on) - Side Screen Safety Function. - Including Safety sensor Controller. - Including Self Lock System function. - One way mode. - One Touch Function. - Door Weight Setting Mode. 	

3. Characteristics

- SMPS power circuit with 240W moment maximum power: Stabilized operation on variable AC input power and current load.
- Improve workability with removing linear transformer.
- Improve reliability with OCL (Isolated function against Over Current) function.
- It can make quickly brake door action with regenerative braking circuit.
- One body typed controller. (controller function + transformer function)
- Including safety sensor function in the controller.
- Side screen safety function for customers safety.

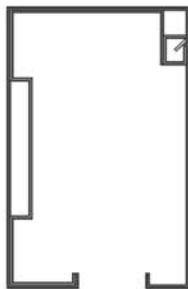
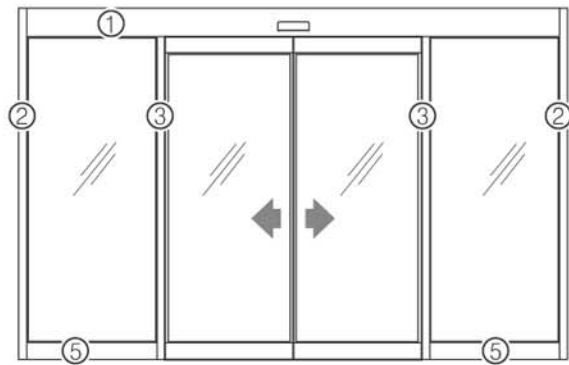
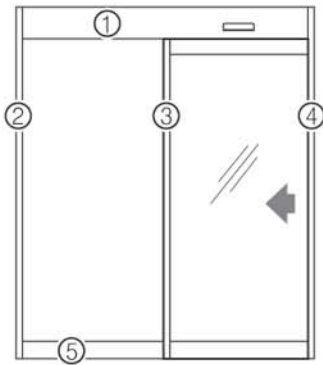
4. Main Components



- | | | | |
|------------------|----------------|-------------------|------------------|
| 1. DC Motor | 2. Controller | 3. Hanger Roller | 4. Fixed Pulley |
| 5. On/Off Switch | 6. Timing Belt | 7. Belt Connector | 8. Aluminum Rail |

5. Installation Frame

5-1. ST-10



1. Operator box



2. Side bar for fixing glass



3. Middle bar



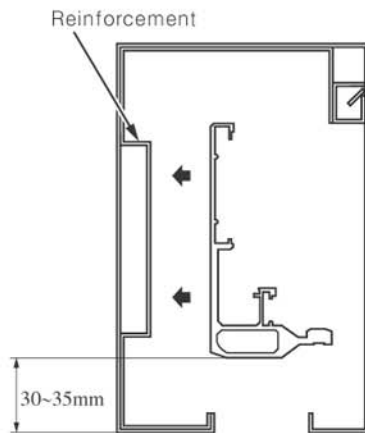
4. Side bar



5. bottom bar

- Frame must be installed horizontal and vertical error range within less than $\pm 2\text{mm}$.
- Use EGI steel plate in reinforcing in the case of stainless steel frame.
- Use anchor bolt for fixing frame.

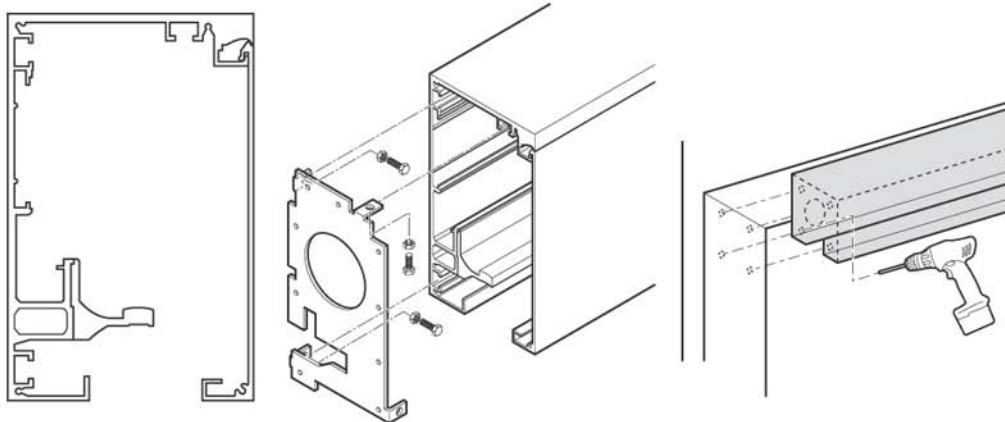
Vertical bar: over 3 spots, Horizontal bar: over 2 spots boltat least within 200mm in both end of frame.



- The reinforcement of operator box is fixed solidly with welding machine.
- Aluminum rail must be mounted on the reinforcement part with solid.
- The height of rail is 30~35mm from the bottom of operator box.
- Track that is the part of passing hanger roller has to be clean with dried cloth.

5-2. ST-20

※ ST-20 need not operator box.



- Assemble brackets on the both of frame as the figure, and attaching operator box solidly on the frame.



NOTICE

Attach the operator box without removing the cover.

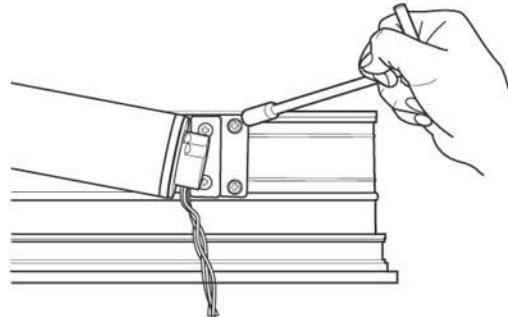
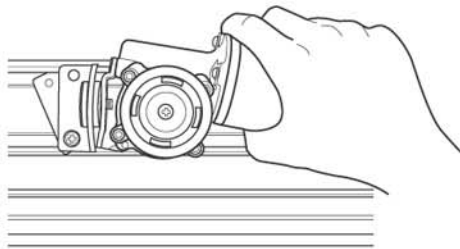
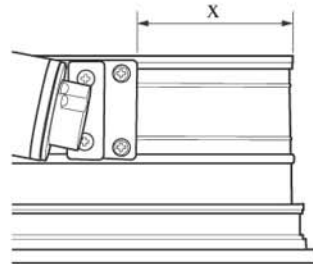
6. Assembly main components

6-1. Assembly Motor

- It is so one pivot of timing belt that it has to be fixed solidly.
- Motor is positioned right side of frame.
- If it is not fixed with solid, it may cause to trouble of automatic door.

<Positioning>

- Total Rail Length (mm) = L
- Single or Double Door : X (mm) = $0.25 \times L - 70\text{mm}$



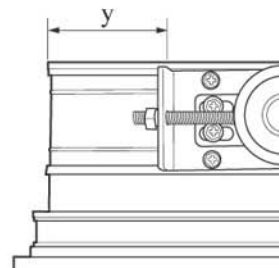
- Insert plate nut in the rail.
- Fasten the bolt with plate nut and bracket of motor by T shape box spanner.

6-2. Assembly Pulley

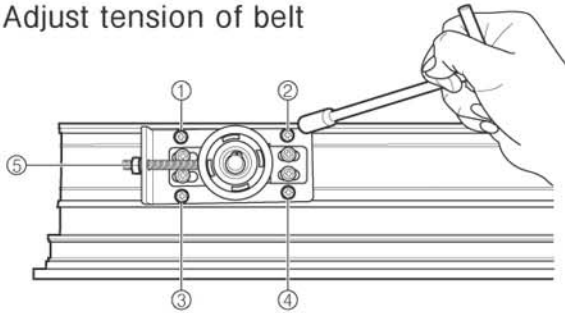
- Pulley is also one pivot of timing belt.
- This has to be also fixed by T shape box spanner with solid.
- Pulley is positioned left side of rail.

<Positioning>

- Total Rail Length (mm) = L
- Single Door : y (mm) = 100mm
- Double Door : y (mm) = $0.25 \times L - 200\text{mm}$



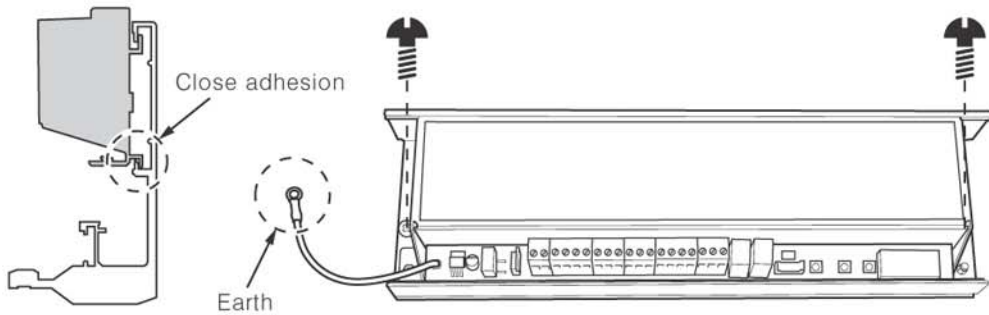
※ Adjust tension of belt



- You can adjust belt tension with a built-in.
- Unfastened ①~④ bolt first, and then adjust tension with ⑤ bolt to be fastened or unfastened.

6-3. Assembly Controller

- Controller is fixed on the rail directly without using plate nut.
- Adhere closely to the bottom of rail like a figure with taking hold of controller with one hand, and fasten it with screw driver.



- Controller is positioned approximately 50mm from the left side of motor.



NOTICE

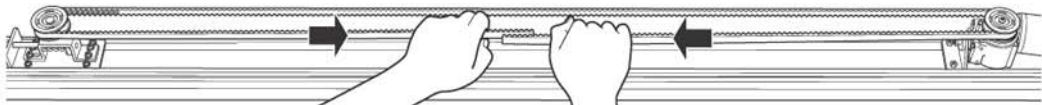
Connect the earth line invariably.

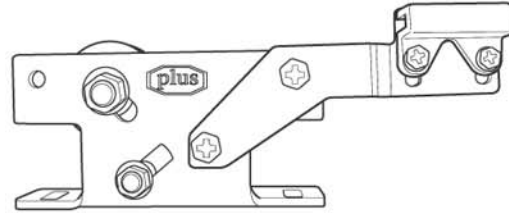
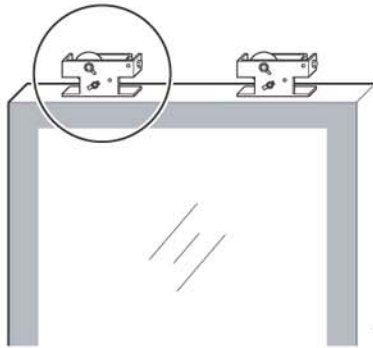
6-4. Timing Belt & Door

- Tension of belt is the main factor of life span and noise.
- So, it is important thing the adjustment of belt tension.
- It is cut carefully on account that mis-cut belt is hard to be reused.

6-4-1. Single Door

- Put the belt on the both of motor and pulley, and pull with all your force.



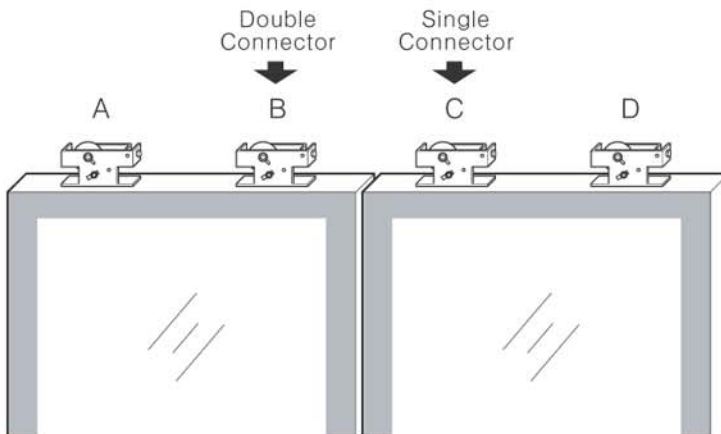
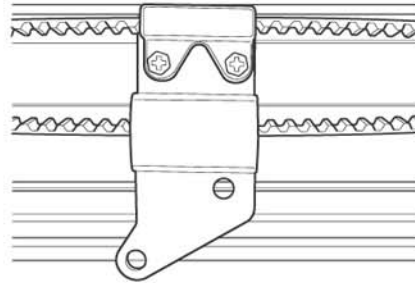


- Connect single belt connector with left hanger roller like figure.

6-4-2. Double door

- Installation of double door is the same as single door except addition double belt connector.

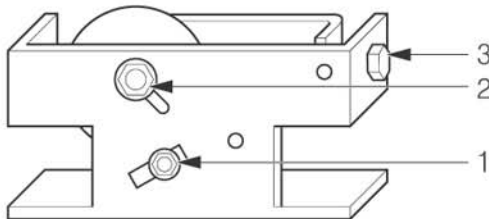
- Double belt connector has to be connected with upper belt.
- In case of double door, single belt connector is connected with left hanger of right door (C), double belt connector is connected with right hanger of left door (B) as below figure.



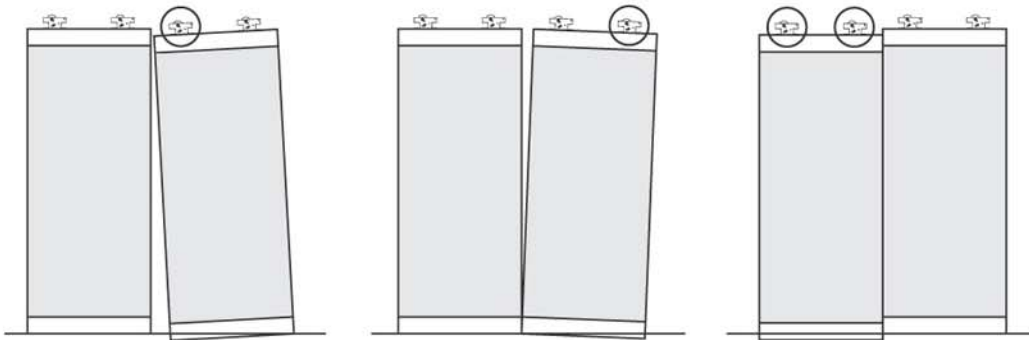
- First of all connect single belt connector, and check the position of right hanger of left door (B) for double belt connector with closed door.
- And connect double belt connector with the hanger.

6-4-3. Balancing door

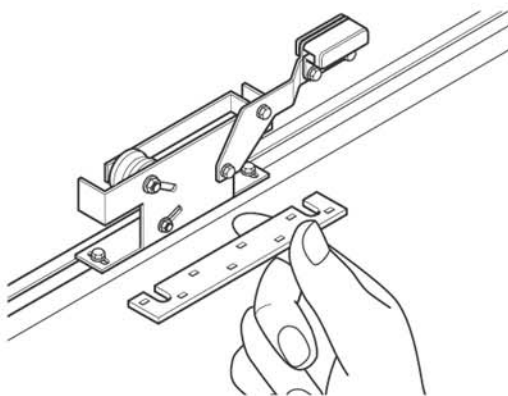
- It has to be used hanger roller for adjusting balance of door.
- Balance of door is one of the most important thing.
- If it is not, it can lead to derailment of door, break down of automatic door, and noise, etc.



※ In case of mis-matching height of door

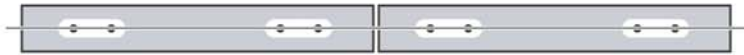


- Lift up hanger roller in the circle.
- First of all, unfasten the bolt ① and ②.
- Balancing a door with adjustment the bolt ③.
- After matching, fasten the bolt ① and ② again.

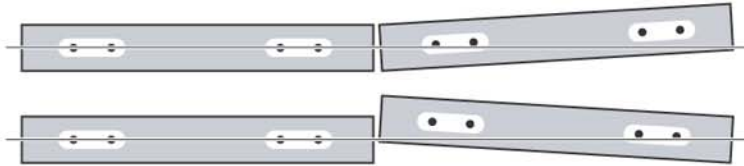


- You can make door to a low level with using this Liner.

※ Standard application

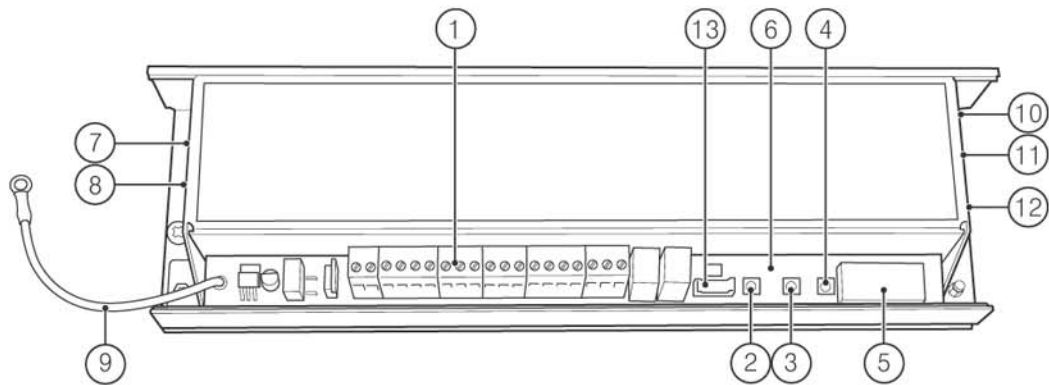


※ Misaligned application



7. Controller

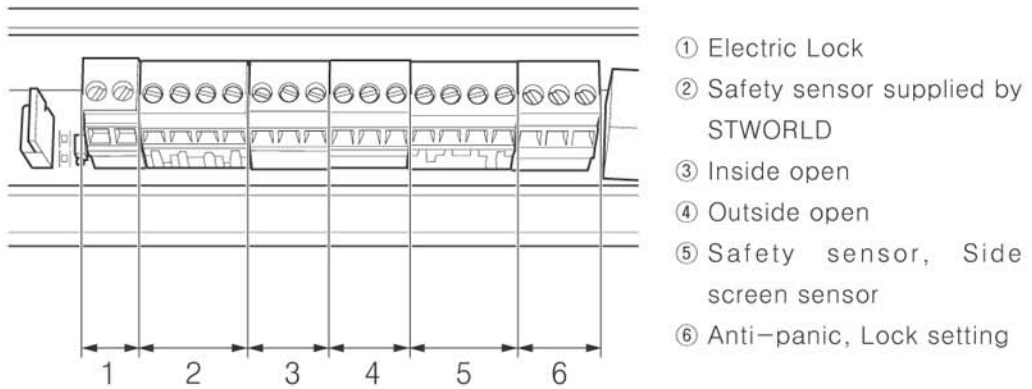
7-1. Main Components of Controller



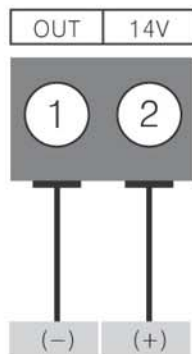
- ① Terminal board for connecting
- ③ Down (Close) button
- ⑤ Signal display
- ⑦ Socket for power in
- ⑨ Line for earth
- ⑪ Socket for communication line
- ⑬ Socket for data in

- ② Mode (Lock) button
- ④ Up (Open) button
- ⑥ Signal lamp
- ⑧ Socket for backup battery
- ⑩ Socket for motor
- ⑫ Socket for expansion function

7-2. Wiring

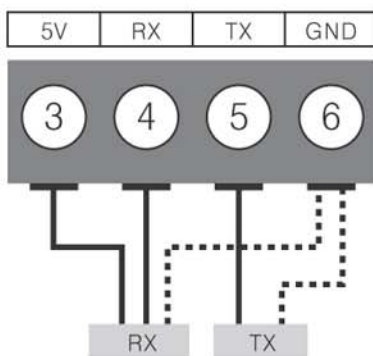


7-2-1. Electric Lock



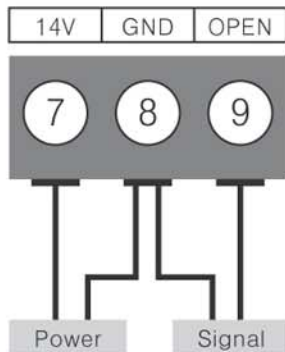
- Use dead bolt
- ① connect (-) line, ② connect (+) line.
- It can be used with expansion mode E5.

7-2-2. Safety sensor supplied by STWORLD



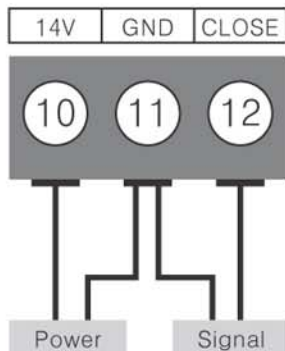
- This terminal board is for connecting safety sensor from STWORLD.
- You have to only to connect two eyes (RX: Receiver and TX: Transmitter) because there is including safety sensor function in the controller.
- Receiving eye (RX: 3-line): ③+④+⑥
- Transmitting eye (TX: 2-line): ⑤+⑥

7-2-3. Inside open



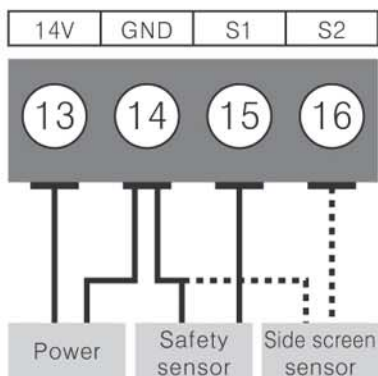
- This terminal board is for connecting inside sensor or inside touch switch.
- Power: ⑦+⑧ (14V, GND)
- Signal: ⑧+⑨ (GND, OPEN)

7-2-4. Outside open



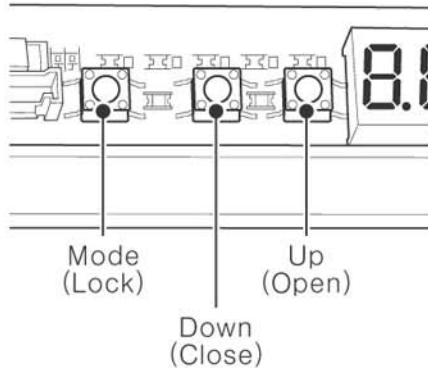
- This terminal board is for connecting outside sensor or outside touch switch.
- Power: ⑩+⑪ (14V, GND)
- Signal: ⑪+⑫ (GND, CLOSE)

7-2-5. Safety sensor, Side screen sensor



- This terminal board is for connecting safety sensor or side screen sensor.
- Safety sensor
 Power: ⑬+⑭ (14V, GND)
 Signal: ⑭+⑮ (GND, S1)
- Side screen sensor
 Power: ⑬+⑭ (14V, GND)
 Signal: ⑭+⑯ (GND, S2)

7-3. Controller setting



- Press Mode button for select function, and adjust a value with Down (Close) button and Up (Open) button.
- Normal Mode: Press mode button for 3 seconds.
- Counting Mode: Press mode button for 5 seconds.
- Expansion Mode: Press mode button for 10 seconds.



NOTICE

After setting the value, press mode button for 3 seconds to return. It will be appeared Lock LED signal lamp after finishing setting, you have to press Up or Down button to release operator lock.

8. Function

8-1. Normal Mode

※ Press mode button for 3 seconds to open normal mode

Sign	Function	Description
n-	Open Hold Time	<ul style="list-style-type: none"> - Waiting time until re-operation to close the door after opened. - Setting range: 1 ~ 999 seconds, Change unit: 1 - Factory setting: 3 seconds.
n1	Opening Speed	<ul style="list-style-type: none"> - Setting range: 00 ~ 90, Change unit: 10 - Factory setting: 60 - (Door weight = 70kg), min: 135mm/sec ~ max: 550mm/sec
n2	Partial Open	<ul style="list-style-type: none"> - Setting range: 20 ~ 95, Change unit: 05 - Factory setting: 50 - This function is only applied with N5 function (Opening Direction: setting [03], [04] or [05]).
n3	Closing Speed	<ul style="list-style-type: none"> - Setting range: 00 ~ 90, Change unit: 10 - Factory setting: 40 - (Door weight = 70kg), min: 75mm/sec ~ max: 350mm/sec

n4	Driving Setting	<ul style="list-style-type: none"> - Setting range: 00 ~ 02, Change unit: 01 - Factory setting: 00 - [00] normal mode : <OPEN and CLOSE automatically : inside or outside signal> If it is taken signal from inside or outside (sensor or touch switch, etc.), door will be opened, and after passing opened hold time (n-), the door will be closed automatically. But, if there is set the lock (ex, lock device, lock button in the controller, etc), door will be opened only by inside signal. It can't be opened by outside signal in this case. [01] semiautomatic : <OPEN → only inside signal> <CLOSE → only outside signal> The door will be closed when it has input CLOSE signal. But, it is not taken CLOSE signal directly, the door will be close automatically after passing Door Hold Time(n-). (But, if you set Door Hold Time to 000 value, the door is not closed though passing Door Hold Time) [02] toggle mode : <OPEN → inside or outside signal> <CLOSE → inside or outside signal> If it is taken signal from either inside or outside, door will be opened. And it has to be taken signal again from either inside or outside in order to close the door. But, if there is set the lock (ex, lock device, lock button in the controller, etc), door will be opened only by inside signal. It can,t be opened by outside signal in this case. But, you can use one of both signal for closing. The door will be closed when it takes CLOSE signal. But, it is not taken CLOSE signal directly, the door will be close automatically after passing Door Hold Time (n-). (But, if you set Door Hold Time to 000 value, the door is not closed though passing Door Hold Time)
n5	Open Direction	<ul style="list-style-type: none"> - Setting range: 00 ~ 05, Change unit: 01 - Factory setting: 00 - [00] Left open [01] Right open [02] Double door [03] Partial left open [04] Partial right open [05] Partial double door

8-2. Counting Mode

※ Press mode button for 5 seconds to open counting mode

Sign	Function	Description
SEc	Opening number	<ul style="list-style-type: none"> - Indicate number of opening. - Countable maximum 99,999,999 times. - In order to check from thousand unit to ten million unit, press DOWN button in the controller.
cdc	Bumping number	<ul style="list-style-type: none"> - Indicate number of bumping. - Countable maximum 99,999,999 times. - In order to check from thousand unit to ten million unit, press DOWN button in the controller.
Poc	Power on number	<ul style="list-style-type: none"> - Indicate number of Power on. - Countable maximum 99,999,999 times. - In order to check from thousand unit to ten million unit, press DOWN button in the controller.

8-3. Expansion Mode

※ Press mode button for 10 seconds to open expansion mode

Sign	Function	Description
E1	End-Gap	<ul style="list-style-type: none"> – Set the position of ending gap – Setting range: 02~25, Change unit: 01 (0.33mm) – Factory setting: 15 – End-Gap (Cushion section): Door is not reverse turned, though there is obstacle in this section.
E2	Reduce speed	<ul style="list-style-type: none"> – Set the position of reducing speed – Setting range: 00~32, Change unit: 01 – Factory setting: 16 – If it is changed value of reducing speed, it is changed slope (Reducing power) of graph also.
E3	Closing Safety	<ul style="list-style-type: none"> – Set the position of closing safety. – Setting range: 00~90, Change unit: 01 – Factory setting: 10 – Door is reverse turned if there is obstacle in this section. – Although it is changed value of closing safety, it is not changed slope (Reducing power) of graph.

E4	Opened by hand (Lock option)	<ul style="list-style-type: none"> - Lock option when it is opened by hand. - Setting range: 00~03, Change unit: 01 - Factory setting: 00 - [00]: Lock, Power-off in the end-gap section. [01]: Lock, Power-on in the end-gap section. [02]: Open, Power-off in the end-gap section. [03]: Open, Power-on in the end-gap section. - In case of door open [02] or [03], the door is opened automatically after pass through the end-gap section by hand. - Signal display [00], [02]: Door close "HOLD", after 1 second "END" [01], [03]: Door close "HOLD"
E5	Electric Lock	<ul style="list-style-type: none"> - Electric lock setting - Setting range: 00~02, Change unit: 01 - Factory setting: 00 - [00]: No setting [01]: N.C. [02]: N.O.
E6	Reopen Distance	<ul style="list-style-type: none"> - Set reopen distance when the power off. - [00]: Never Open [01]: 100mm Open [02]: Full Open (Option: Battery Pack) - Factory setting: 01
E7	Door Weight	<ul style="list-style-type: none"> - Set as door weight. - Setting range: 00~02, Change unit: 01 - Factory setting: 01 - [00]: Light and narrow door [01]: Standard door [02]: Heavy and broad door <div style="text-align: center;"> </div>

9. Troubleshooting

Trouble	Check / Factor	Action
Door is not operated at all.	Misconnection	<ul style="list-style-type: none"> • Check ON/OFF switch lamp. • Check motor and power socket of controller
	In case of lock signal lamp on in the controller	<ul style="list-style-type: none"> • Release lock signal lamp with press down or open button.
	Misaligned of door	<ul style="list-style-type: none"> • Align the door with adjusting hanger roller
	Door derailment	<ul style="list-style-type: none"> • Put the hanger roller of door on the running track of rail.
	In case, sensor is connected with outside open terminal and set [01] semiautomatic mode of N4(Drive setting).	<ul style="list-style-type: none"> • Change terminal to Inside open or, set [00] normal mode of N4.
Door is not closed with opened. (or, reopen repeatedly)	Wrong setting of open direction	<ul style="list-style-type: none"> • Resetting N5 [Open direction]
	Put something on the receiver or transmitter of safety sensor.	<ul style="list-style-type: none"> • Remove it.
	In case, N4 (Drive setting) is setting with [01] or [02]	<ul style="list-style-type: none"> • Set to normal mode [00]
	Upper sensor is detecting something	<ul style="list-style-type: none"> • Adjust sensitivity • Move obstacle
Noise	Dust in the running track.	<ul style="list-style-type: none"> • Clean the track with dried cloth.
	Loose the belt.	<ul style="list-style-type: none"> • Tight the belt
	Door reached on the ground	<ul style="list-style-type: none"> • Lift up the door with adjusting hanger roller
	Dust on the belt	<ul style="list-style-type: none"> • Change of new belt



WARNING

Connect the earth line invariably



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