ASY Electronics (Jiaxing) Co., Ltd

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Lift door servo controller

AIG-500E-01

User's Manual VER2.3

Please read this manual carefully before operating the controller and keep it in a safe place for future reference

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Catalogue

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Safety instructions

1. This instruction manual describes how to use the MC series door controller and the precautions to be taken. When installing or using this product, the user must thoroughly and carefully study this manual.
2. This product must be installed or operated by properly trained personnel.
3. For safety reasons, it is prohibited to use an extension cord as a power strip for more than two electrical appliances.
4. When the power cord goes to the power block, it must be determined that this voltage is less than AC250V and meets the nameplate voltage requirements.
5. The earth wire of the power cord shall be connected to the system ground of the manufacturing plant with a suitably sized wire and connector, and this connection shall be permanently fixed.
6. Repairs or high-level maintenance work can only be carried out by properly trained electro-mechanical technicians.
7. All parts for maintenance must be supplied and approved by the Company before use.

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Chapter one Product information

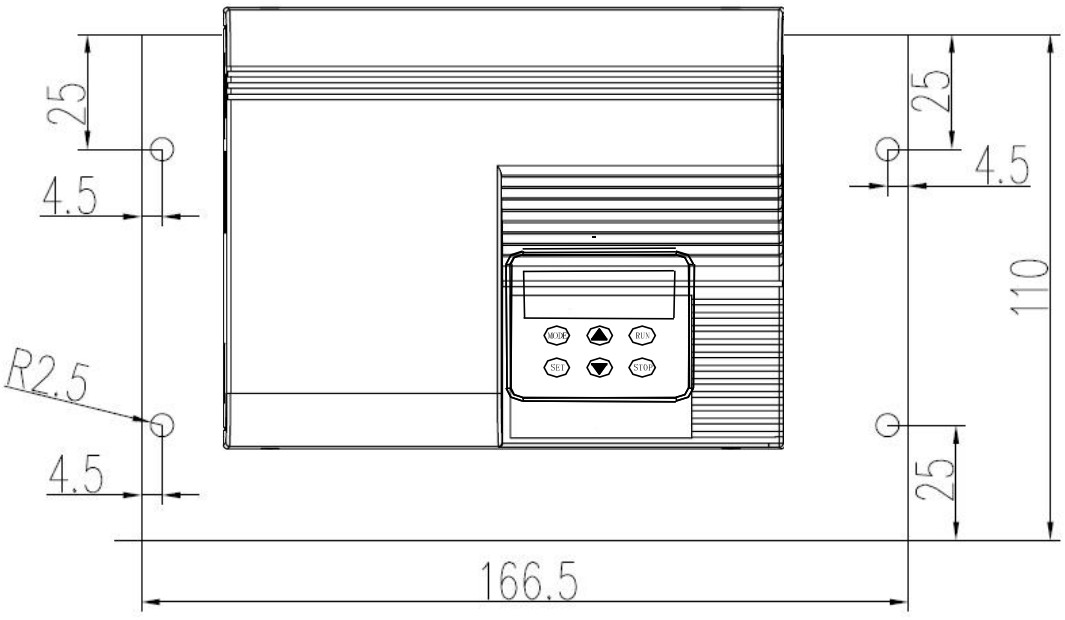
1.1. Product Model

Controller model	AIG-500E-01
Motor model	MT01-TB-120W Permanent magnet servo motor
Input voltage	Single-phase 176~264V
Power supply capacity (kVA)	1.0
Input current (A)	5.4
Output current (A)	3.0
Adaptable motor (Kw)	0.5

1.2. Electrical parameters

Standard applicable motor output		0.5 KW
Rated output	Rated output voltage	3-phase 200～230V AC
	Overload current rating	150% of rated output current, 1 minute
Input Power	Phase ・ Voltage・ Frequency	Single-phase・176～264V AC ・50/60Hz
	Voltage tolerance	+10%, -15% of rated input AC voltage
	Frequency tolerance fluctuation	±5% of rated input frequency
	Instantaneous voltage reduction capacity	Continues to operate above 165V AC, and continues to operate for 15ms when reduced to below 165V AC.
Number of revolutions per minute	Speed range	10~200rpm
	RPM indication	Digital display
	RPM Resolution	1rpm
control method		Fully closed-loop space vector PWM control

1.3. Product outline drawing



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Chapter two Door controller port description

2.1.Terminal description

The control circuit terminals are defined as follows: DIP4 interface ------ for data copying

COM	DI1	DI2	DI3	DI4	DI5	DI6	DI7	DI8	+24V

NO1	COM1	NC1	NO2	COM2	NC2	COM3	NO3

COM	A	B	Z	+24V

W	V	U

The drive circuit terminals are defined as shown below:

⏚	L	N

5V	TTL+	TTL-	GND

1.5. Description of control terminals

Categorisation	Terminal marking	Terminal function description	Relevant parameters
External control input	DI1 ～ DI8	External signal	F1.6
TTL communication	DIP4 interface	Parameter setting/debugging	
Relay output	NO1/COM1/NC1 NO2/COM2/NC2 COM3/NO3	Relay output	F1.7, F1.8, F1.9

1.6. Default definition of external control terminal

Terminal Name	Define	Terminal name	Define
COM	Input signal common	DI5	Safety sensor/fire signal input;
DI1	Open door command signal input;	DI6	Open speed signal input/safety sensor;
DI2	Closing command signal input;	DI7	Off variable speed signal input;
DI3	Open to reach the signal input;	DI8	Motor overheating protection signal

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Terminal Name	Define	Terminal name	Define
DI4	Off arrives at the signal input;	+24V	24V power supply

NO1	Normally open output of relay 1 (F1.9 default off in place)	COM2	COM terminal of relay 2 (F1.8 default open in place)
COM1	COM terminal of relay 1 (F1.9 default off in place)	NC2	Normally closed output for relay 2 (F1.8 default open position)
NC1	Normally closed output of relay 1 (F1.9 default off in place)	COM3	COM terminal of relay 3 (F1.7 default fault alarm)
NO2	Normally open output for relay 2 (F1.8 default open in place)	NO3	Normally open output for relay 3 (F1.7 default fault alarm)

Terminal Name	Define	Terminal name	Define
COM	encoder land	Z	Encoder Z
A	Encoder A	+24V	Encoder 24V power supply
B	Encoder B		

1.7. Description of drive circuit terminals

Grade	Name (of a thing)	Instructions
L, N	Single-phase power input terminal	AC single-phase 220V power input terminal
U, V, W	Controller Output Driver Terminal	Connecting a three-phase motor
⏚/PE	ground terminal	ground terminal

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Chapter three door controller operation and running

1.8. Operating and display interface

The user can modify the functional parameters of the door controller, monitor the working status and control the operation panel during operation (start and stop) through the operation panel.

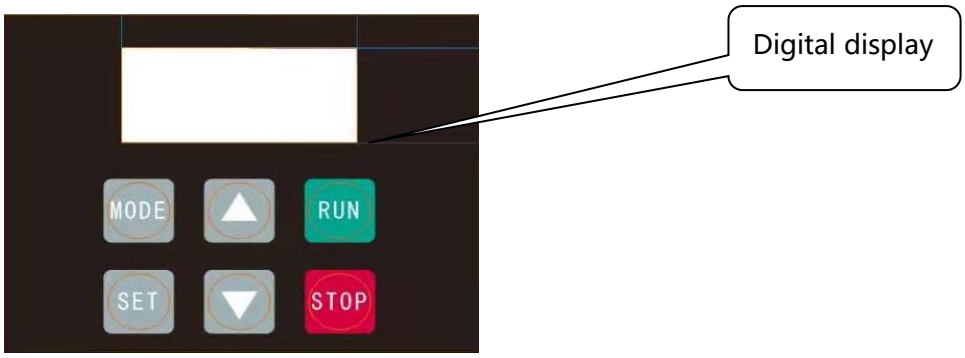

Figure 4-1 Operation panel interface

BUTTON	Name	functionality
MODE	Mode key	Switching between modes, exiting from modified mode
SET	Confirmation key	Modification of operation confirmation, switching of current and speed display
RUN	Be in motion	Running motor
△	Incremental button	Incrementing of data or function codes
▽	Decrement button	Decrement of data or function codes
STOP	Stop button	Stop motor

1.9. Menu mode operation flow:

1.9.1. One-click debugging function

Long press the "STOP" key for 5 seconds, automatically enter the one-key debugging function, the controller shows "A-c" to control the motor to close the door after the display "AE1" to test the initial position, complete the one-key debugging, it displays "P-U", you can choose F0.0=0 to enter the debugging mode, and it displays "T-U" to open the door by pressing the upper key and close the door by pressing the lower key. When one-key debugging is started, firstly close the door, if not, please set F0.4 to change the direction of motor and re-execute one-key debugging.

1.9.2. operating mode

F0.0 = 1 display: P-U, external control signal control door action. Software version (n16) 4.24 or above Long press "△" or "▽" for more than 5 seconds to open or close the door in normal curve	F1.4 > 0 to enter demo mode Press "RUN" to start DEMO. Press "STOP" to stop. Press "SET" to switch between speed and current display.	F0.0 = 0 Display: T-U Press "△▽" to open and close the door slowly. Press "STOP" to stop, press "SET" to switch between speed and current display.

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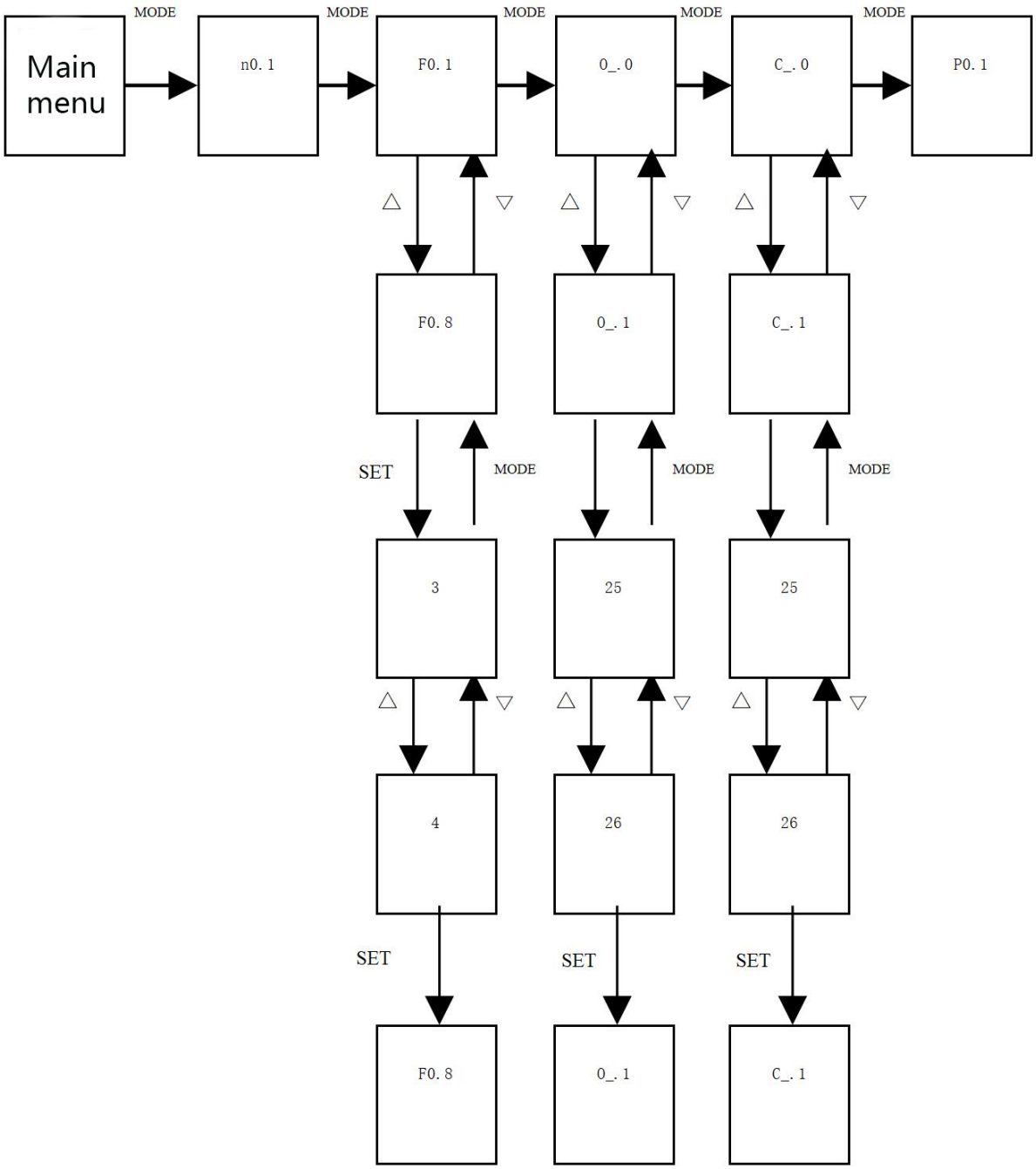
1.9.3Digital structure

P-U: Main Interface
N parameter: Monitoring parameter
Parameter F: Technician parameter
O parameter: Open door curve
Parameter C: Closing curve
P parameters: R&D parameters

1.9.4Example of parameter setting



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Chapter four Parameters and description

F0 parameter group.

Serial number	Parameter name and unit	Setting range	Starting value	Instructions	Change validity period
F0.0	Operating mode	0~1	1	0 = test; 1 work	All the time
F0.1	Number of motor pole pairs	2~100	8		Power cut
F0.2	Number of encoder lines	24~4096	1024		Power cut
F0.3	Motor initial angle	0~359	213		Power cut
F0.4	Motor mounting direction	0~1	1		Power cut
F0.5	Synchronous gear pitch	2~20	5	Unit : mm	Power cut
F0.6	Number of teeth of synchronous wheel	2~50	26		Power cut
F0.7	Door width value	100~9999	320	Number of laps * 100	Location in place
F0.8	Door opening speed gear	1 to 4	3	1 = low speed; 4 = high speed	Location in place
F0.9	Door closing speed gear	1 to 4	2	1 = low speed; 4 = high speed	Location in place

F1 Parameter group.

Serial number	Parameter name and unit	Setting range	Starting value	Instructions	Change validity period
F1.0	Judgement time for door opening and blocking	1~50	30	Unit 0.1S	All the time
F1.1	Closing and blocking judgement time	1~50	10	Unit 0.1S	All the time
F1.2	Opening and closing door start-up time	1~50	10	Unit 0.1S	All the time
F1.3	Open in place timeout protection	0~999	300	0=continuous holding; unit:S, after the holding time of opening the door in place exceeds the protection value, it enters the small current holding state	All the time
F1.4	Test machine opening and closing intervals	0~10	0	0 = closed; unit: S	All the time
F1.5	Whether the door closing signal is installed effectively or not	0~1	1	0 = not valid; 1 = valid	All the time
F1.6	Switching gate signal mode	0~1	0	0=level; 1=edge	All the time
F1.7	Output 3 function selection	0~15	6	"0": Relay action during door opening "1": Relay activated during closing of the door "2": Relay action when door is opened in place "3": Relay action when closing door in place "4": Relay operation in case of anti-clamping "5": Relay action in case of controller abnormality "6": Relay action during thermal protection of the controller	All the time
F1.8	Output 2 function selection	0~15	2		All the time
F1.9	Output 1 function selection	0~15	3		All the time

F2 Parameter group.

Serial number	Parameter name and unit	Setting range	Starting value	Instructions	Change validity period

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F2.0	Starting torque for opening the door	10~500	100	Unit : %	All the time
F2.1	Limitation of opening torque	10~500	100	Blocking torque, unit : %	All the time
F2.2	Keep torque before opening the door in place	10~500	100	Also used for self-learning to open doors,unit : %	All the time
F2.3	Open the door in place to maintain torque	10~500	100	Unit : %	All the time

F3 Parameter group.

Serial number	Parameter name and unit	Setting range	Starting value	Instructions	Change validity period
F3.0	Closing actuation torque	10~500	100	Unit : %	All the time
F3.1	Closing torque	10~500	100	Blocking torque , unit : %	All the time
F3.2	Keep torque before closing the door in place	10~500	100	Also used for self-study shutdown, unit : %	All the time
F3.3	Holding torque for closing the door in place	10~500	60	Unit : %	All the time

F4 Parameter group.

Serial number	Parameter name and unit	Setting range	Starting value	Iinstructions	Change validity period
F4.0	Parameter data recovery operation	0~2	1	Please re-power up after recovery	Re-energise.

F5 Parameter group.

Serial number	Parameter name and unit	Setting range	Starting value	Instructions	Change validity period
F5.3	Continuous blocking protection times	0-99	10	After continuous blocking, the door machine enters the low speed and small current protection until the blocking point is eliminated, 0 for no protection	
F5.4	Motor rated current	50~300	110	Unit: 10mA	All the time
F5.5	Safety signal/Fire signal selection	0~1	1	0= DI5 is a safety signal, DI6 is invalid; 1= DI5 is a fire signal, DI6 is invalid; 2= DI5 is a fire, DI6 is a safety signal	All the time
F5.6	Motor overheating protection logic selection	0~3	2	0 = Protective resistor normally closed, motor runs at low speed during thermal protection; 1 = Protective resistor normally open, motor runs at low speed during thermal protection; 2 = Protective resistor normally closed, normal motor operation during thermal protection; 3 = Protective resistor normally open, normal motor operation during thermal protection;	All the time
F5.7	Motor overheating protection operating current	50~500	60	Unit : %	All the time
F5.8	Motor overheating protection Operating speed	10~200	100	Unit : mm/s	All the time

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F5.9	Opening and closing of the door in place tolerance	5~50	10	Unit: mm, in this interval in place tolerance can be judged in place after the judgement time	All the time

F6 Parameter group.

Serial number	Parameter name and unit	Setting range	Starting value	Instructions	Change validity period
F6.0	Door knife deceleration buffer length	2~20	5	Unit : mm	Location
F6.1	Open keep section speed	10~50	25	Unit : mm/s	All the time
F6.2	Closing keep segment speed	10~50	25	Unit : mm/s	All the time
F6.3	No pinch protection area	1~100	10	Unit : mm	All the time
F6.4	Door opening determination time	1~50	10	Unit : 0.1s	All the time
F6.5	Closing position judgement time	1~50	10	Unit : 0.1s	All the time
F6.6	Door knife length	10~100	38	Unit : mm	Location
F6.7	Door opening and unlocking knife speed	10~200	80	Unit : mm/s	All the time
F6.8	Closing and closing knife speed	10~200	60	Unit : mm/s	All the time
F6.9	Power up first slow opening and closing speeds, self-learning speeds	20~100	40	Unit : mm/s	All the time

P1 parameter group.

Serial number	Parameter name and unit	Setting range	Starting value	Instructions	Change validity period
P1.0	Opening and loosening knife KP	1~200	4		All the time
P1.1	Open door start buffer KP	1~200	4		All the time
P1.2	Open door high speed KP	1~200	2		All the time
P1.3	Open door reduction KP	1~200	20		All the time
P1.4	Door opening in place buffer KP	1~200	4		All the time
P1.5	Open door keep buffer KP	1~200	4		All the time

P2 parameter set.

Serial number	Parameter name and unit	Setting range	Starting value	Instructions	Change validity period
P2.0	Opening and loosening knife KI	1~500	100		All the time
P2.1	Open door start buffer KI	1~500	100		All the time

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P2.2	Open door high speed KI	1~500	50		All the time
P2.3	Open door reduction KI	1~500	5		All the time
P2.4	Door opening in place buffer KI	1~500	100		All the time
P2.5	Open door keep buffer KI	1~500	100		All the time

P3 Parameter group.

Serial number	Parameter name and unit	Setting range	Starting value	Instructions	Change validity period
P3.0	Shutdown start buffer KP	1~200	4		All the time
P3.1	Shutdown high speed KP	1~200	15		All the time
P3.2	Closing speed reduction KP	1~200	20		All the time
P3.3	Cushioning KP for closing the door in place	1~200	20		All the time
P3.4	Close the door and close the door knife KP	1~200	2		All the time
P3.5	Closing keep buffer KP	1~200	2		All the time

P4 Parameter set.

Serial number	Parameter name and unit	Setting range	Starting value	Instructions	Change validity period
P4.0	Closed door start buffer KI	1~500	50		All the time
P4.1	Shutdown high Speed KI	1~500	5		All the time
P4.2	Door Closing Speed Reduction KI	1~500	5		All the time
P4.3	Door closing in place buffer KI	1~500	5		All the time
P4.4	Close the door and close the door knife KI	1~500	50		All the time
P4.5	Closing keep buffer KI	1~500	50		All the time

Open door curve O1~O4

Parameter number	Parameter name and unit	Setting range	Starting value	Change validity period
O1.0	Buffer distance for opening the door in	1~100mm	1	All the time

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	first gear			
O1.1	First speed door opening start buffer speed	5~100mm/s	25	All the time
O1.2	Open the door at first gear speed to accelerate plus acceleration	100~500mm/s/s/s	300	All the time
O1.3	Acceleration of the door opening in first gear	100~1000mm/s/s	300	All the time
O1.4	Speed limit for opening doors in first gear	100~500mm/s	200	All the time
O1.5	First speed door opening deceleration plus acceleration	100~500mm/s/s/s	500	All the time
O1.6	Acceleration of deceleration of a door opening in first gear	100~1000mm/s/s	200	All the time
O1.7	Buffer distance for opening the door in place at first gear speed	1~100mm	5	All the time
O1.8	First speed door opening in place buffer speed	5~50mm/s	35	All the time
O1.9	Deceleration distance for opening doors in first gear	10~200mm	80	All the time
O2.0	Starting buffer distance for second speed door opening	1~100mm	1	All the time
O2.1	Second speed door opening start buffer speed	5~100mm/s	25	All the time
O2.2	Second-gear speed door acceleration plus acceleration	100~500mm/s/s/s	300	All the time
O2.3	Acceleration of second-gear door opening	100~1000mm/s/s	300	All the time
O2.4	Speed limit for second speed door opening	100~500mm/s	260	All the time
O2.5	Second-gear speed door deceleration plus acceleration	100~500mm/s/s/s	500	All the time
O2.6	Acceleration of deceleration for second-gear door opening	100~1000mm/s/s	250	All the time
O2.7	Buffer distance for opening the door in place at second speed	1~100mm	5	All the time
O2.8	Second speed door opening in place buffer speed	5~50mm/s	35	All the time
O2.9	Deceleration distance for second speed door opening	10~200mm	110	All the time
O3.0	Three-speed door opening start buffer distance	1~100mm	1	All the time
O3.1	Three-speed door opening start buffer speed	5~100mm/s	25	All the time
O3.2	Open the door in third gear to accelerate plus acceleration	100~500mm/s/s/s	300	All the time
O3.3	Acceleration acceleration of a three-speed door	100~1000mm/s/s	300	All the time
O3.4	Three-speed door opening speed limit	100~500mm/s	330	All the time
O3.5	Three-speed door opening deceleration plus acceleration	100~500mm/s/s/s	500	All the time
O3.6	Three-speed door opening and	100~1000mm/s/s	250	All the time

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	deceleration acceleration			
O3.7	Three-speed door opening in place buffer distance	1~100mm	5	All the time
O3.8	Three-speed door opening in place buffer speed	5~50mm/s	35	All the time
O3.9	Three-speed door opening and deceleration distance	10~200mm	160	All the time
O4.0	Buffer distance for four-speed door start	1~100mm	1	All the time
O4.1	Four-speed door opening start buffer speed	5~100mm/s	25	All the time
O4.2	Acceleration plus acceleration with a four-speed door opener	100~500mm/s/s/s	300	All the time
O4.3	Acceleration acceleration of a four-speed door opening	100~1000mm/s/s	300	All the time
O4.4	Four-speed door opening speed limit	100~500mm/s	390	All the time
O4.5	Four-speed door opening and deceleration plus acceleration	100~500mm/s/s/s	500	All the time
O4.6	Four-speed door opening and deceleration acceleration	100~1000mm/s/s	250	All the time
O4.7	Four-speed door opening in place buffer distance	1~100mm	5	All the time
O4.8	Four-speed door opening in place buffer speed	5~50mm/s	35	All the time
O4.9	Four-speed door opening and deceleration distance	10~200mm	200	All the time

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Closing Curve C1~C4

Parameter number	Parameter name and unit	Setting range	Starting value	Change validity period
C1.0	Buffer distance for closing the door at first gear speed	1~100mm	5	All the time
C1.1	First speed closing start buffer speed	5~100mm/s	40	All the time
C1.2	First gear speed shutdown acceleration plus acceleration	100~500mm/s/s/s	300	All the time
C1.3	Acceleration of closing door at first gear speed	100~1000mm/s/s	300	All the time
C1.4	First speed closing speed limit	100~500mm/s	160	All the time
C1.5	First gear speed shutdown deceleration plus acceleration	100~500mm/s/s/s	500	All the time
C1.6	Acceleration of deceleration at first closing speed	100~1000mm/s/s	150	All the time
C1.7	Buffer distance for closing the door in place at first gear speed	1~100mm	15	All the time
C1.8	First gear speed closing buffer speed in place	5~50mm/s	25	All the time
C1.9	Closing distance at first gear speed	10~200mm	60	All the time
C2.0	Buffer distance for second speed door closing activation	1~100mm	5	All the time
C2.1	Second speed closing start buffer speed	5~100mm/s	40	All the time
C2.2	Second gear speed shutdown acceleration plus acceleration	100~500mm/s/s/s	300	All the time
C2.3	Acceleration of 2nd gear speed closing	100~1000mm/s/s	300	All the time
C2.4	Second speed closing speed limit	100~500mm/s	210	All the time
C2.5	Second-gear speed shutdown deceleration plus acceleration	100~500mm/s/s/s	500	All the time
C2.6	Deceleration acceleration for 2nd gear speed closing	100~1000mm/s/s	200	All the time
C2.7	Buffer distance for closing the door in place at second gear speed	1~100mm	15	All the time
C2.8	Second speed closing buffer speed in place	5~50mm/s	25	All the time
C2.9	Deceleration distance for second gear speed closing	10~200mm	80	All the time
C3.0	Buffer distance for three-speed door closing activation	1~100mm	5	All the time
C3.1	Three-speed closing start buffer speed	5~100mm/s	40	All the time
C3.2	Third-gear speed shutdown acceleration plus acceleration	100~500mm/s/s/s	300	All the time
C3.3	Acceleration of closing the door at three speeds	100~1000mm/s/s	300	All the time
C3.4	Three-speed closing speed limit	100~500mm/s	260	All the time
C3.5	Three-speed door closing deceleration plus acceleration	100~500mm/s/s/s	500	All the time

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C3.6	Acceleration of closing and deceleration at three speeds	100~1000mm/s/s	300	All the time
C3.7	Buffer distance for three speeds to close the door in place	1~100mm	15	All the time
C3.8	Three-speed door closing in place buffer speed	5~50mm/s	25	All the time
C3.9	Three-speed closing and deceleration distance	10~200mm	90	All the time
C4.0	Buffer distance for four-speed door closing activation	1~100mm	5	All the time
C4.1	Four-speed door closing start-up buffer speed	5~100mm/s	40	All the time
C4.2	Fourth gear speed shutdown acceleration plus acceleration	100~500mm/s/s/s	300	All the time
C4.3	Acceleration of four-speed door closing	100~1000mm/s/s	300	All the time
C4.4	Four-speed closing speed limit	100~500mm/s	320	All the time
C4.5	Four-speed closing and deceleration plus acceleration	100~500mm/s/s/s	500	All the time
C4.6	Acceleration of closing and deceleration at four speeds	100~1000mm/s/s	150	All the time
C4.7	Buffer distance for four speeds to close the door in place	1~100mm	15	All the time
C4.8	Four-speed door closing in place buffer speed	5~50mm/s	25	All the time
C4.9	Closing and deceleration distance for four speeds	10~200mm	200	All the time

Monitoring parameters

No.	Monitoring projects	Display content	No.	Monitoring projects	Display content
n01	Output speed	(Unit: mm/s)	n13	Control terminal status (input signal)	
n02	Output current	(Unit: A)	n14	Control terminal status (relay output)	
n03	Door state		n15	Busbar voltage	(Unit: V)
n04	Current encoder value for door position		n16	Software version	
n05	Open to reach position encoder value		n21	Running time	(Unit : days)
n06	Off Arrival position encoder value		n22	Number of closures 1	Individual, 10th and 100th digits
n08	Door position		n23	Number of closures 2	Thousand, ten thousand, one hundred thousandth
n09	Exceptional display 1 (latest)	Display of Exception Contents	n24	Number of closures 3	Millions, ten millions, billion
n10	Abnormal display 2 (1 time ago)				
n11	Abnormal display 3 (2				

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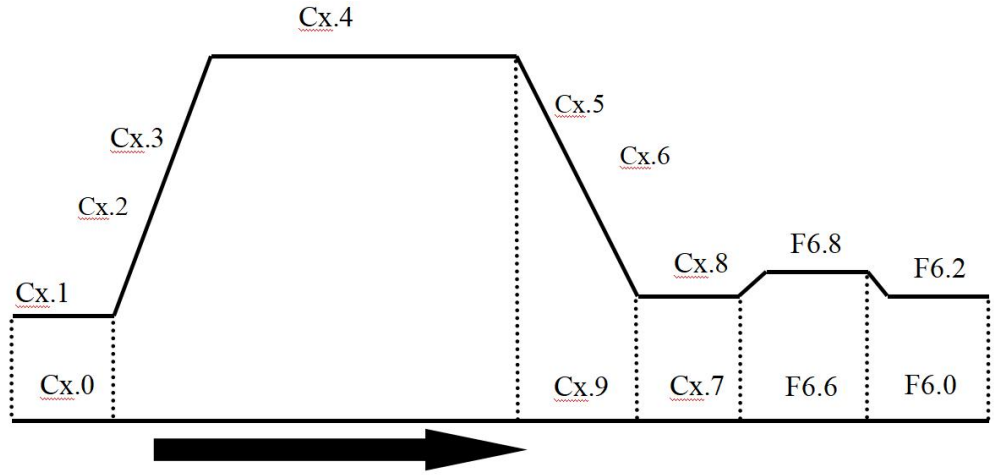
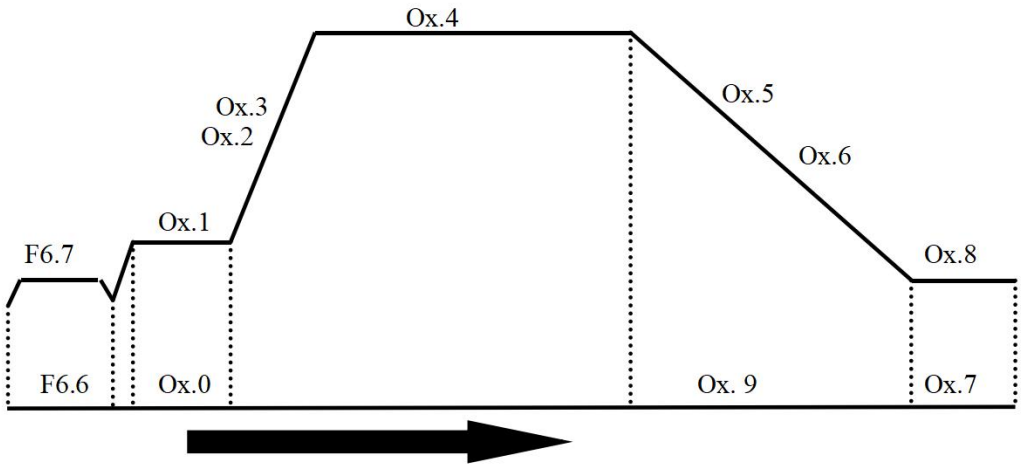
No.	Monitoring projects	Display content	No.	Monitoring projects	Display content
	times ago)				
n12	Abnormal display 4 (3 times ago)				

Chapter five Illustration of a curve

Closing curve



Door opening curve



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Chapter six Applications and debugging

1.10. Wiring Inspection

1.10.1. Peripheral wiring inspection

Peripheral wiring is checked before powering up the system to ensure component and personal safety.

1) Correct wiring according to manufacturer's drawings;
2) Each switch works properly and operates reliably;
3) Check the resistance between phases of the main circuit and check for short circuits to ground;
4) Mechanical parts are in place and will not cause damage to equipment or personal injury;

1.10.2. Encoder check

The pulse signal fed back from the encoder is an important guarantee that the system achieves precise control, and should be checked emphatically before commissioning.

1) The encoder is mounted securely and wired reliably.

(2) Encoder cable is best introduced directly from the encoder into the controller, if the cable is not long enough and needs to be wired, the extension should also be shielded wire, and the connection with the original encoder cable is best soldered with a soldering iron.

1.10.3. Ground check

Check that the resistance between the following terminals and the earth terminal PE is not infinite, if it is small check immediately

a) Between L, N and PE;
b) Between U, V, W and PE;

1.10.4. Confirm motor wiring

When one-key self-learning, the door running sequence is close-open-close-stop, if the motor running direction is opposite to the specified opening and closing direction, please set F04 parameter to change the running direction of the motor; if the motor can't be run and still can't be run after eliminating overload and blockage caused by the machinery, please replace the motor with any two phases of the motor and retest the initial angle and then run it. If the motor can't run, and still can't run after eliminating mechanical overload and blockage, please change any two phases of the three phases of the motor, and test the initial angle again and run.

Note: 1. F04 will be changed to the default value when restoring the factory parameters, so be careful when using it.

2. If you change the motor's three-phase wiring, retest the initial angle.

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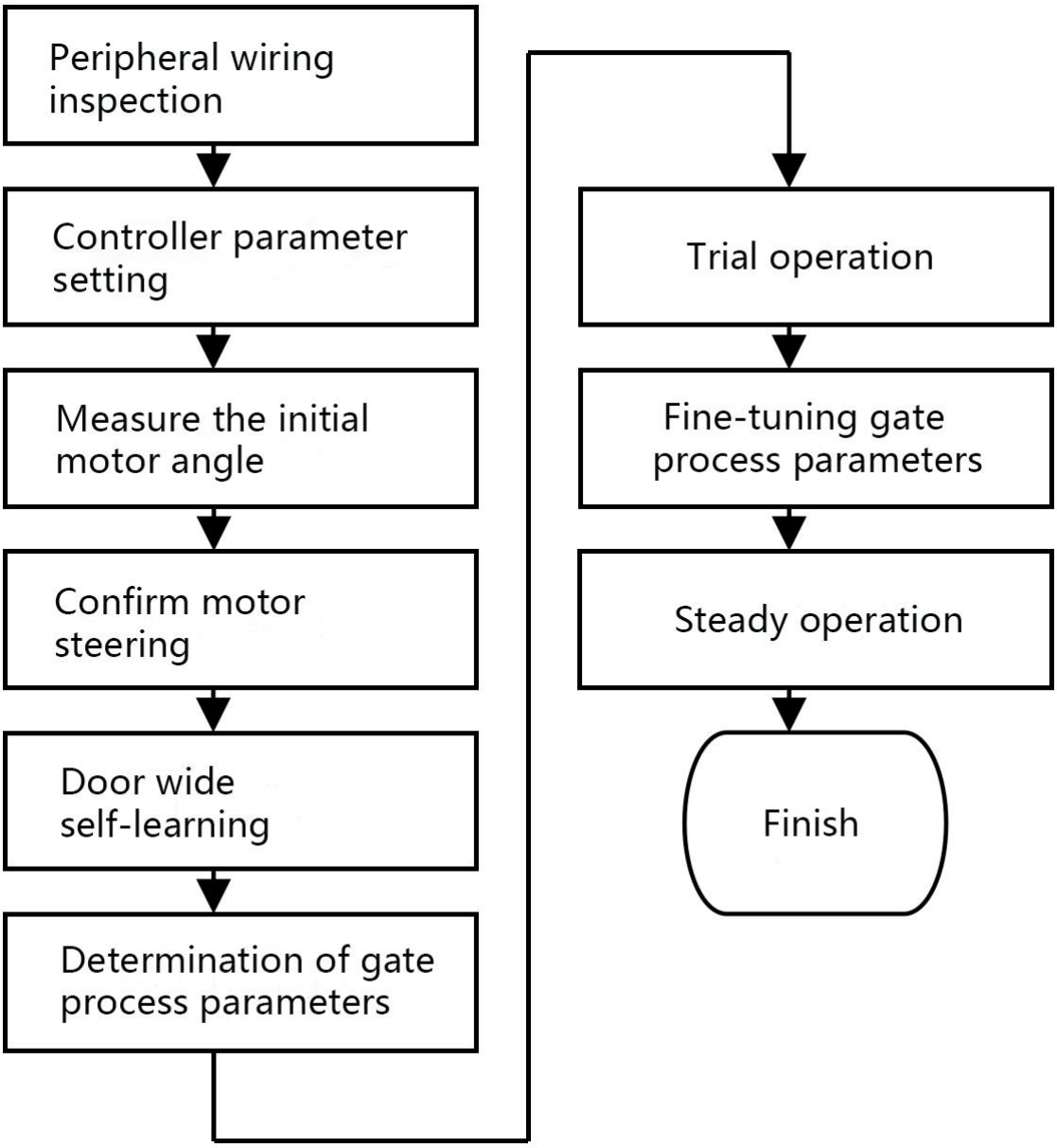
1.11. Debugging basic process



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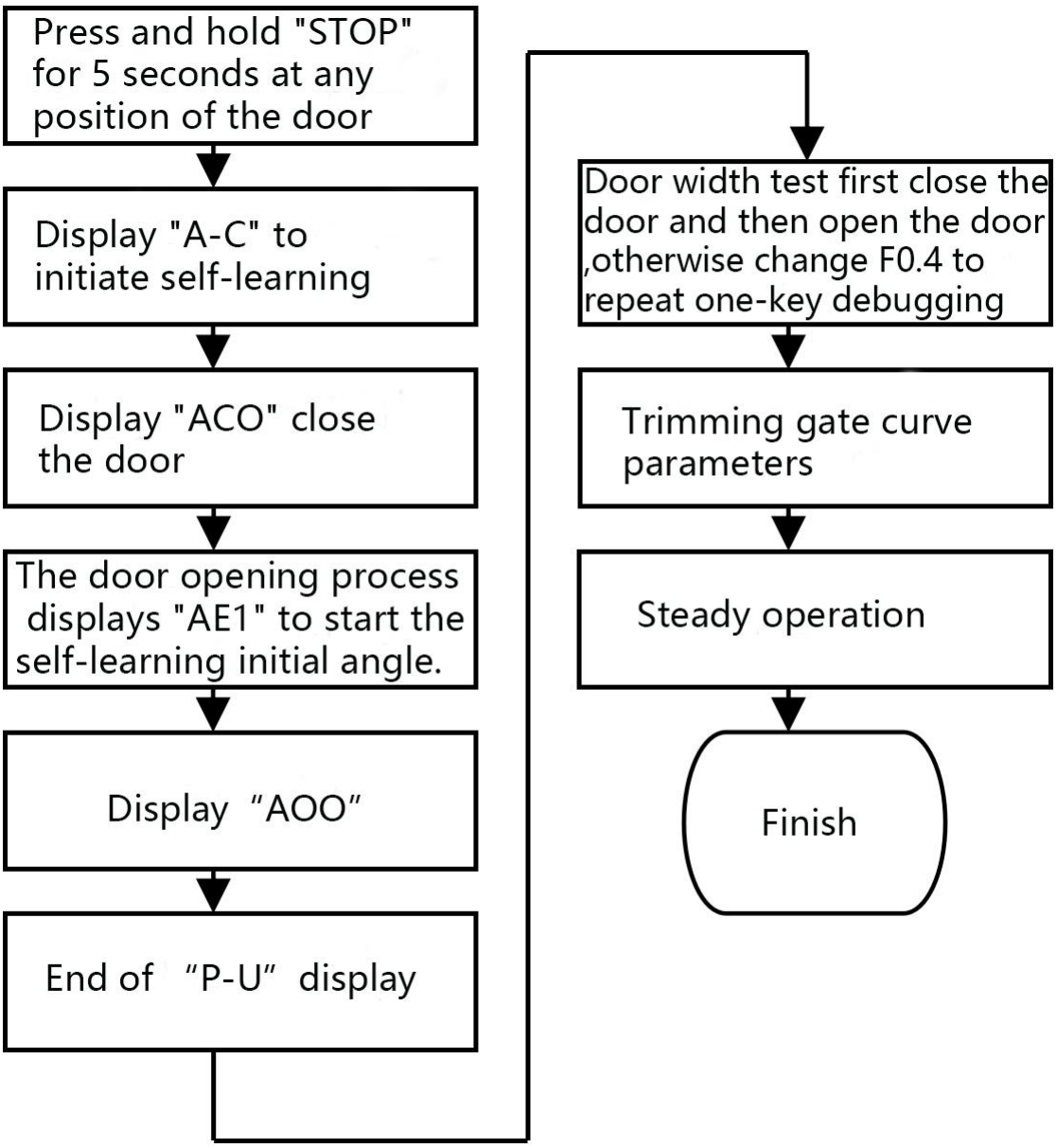
1.12. Steps for commissioning synchronous motors with one click



After the one-key debugging function is activated, there may be a shaking sound when the door machine is in place, which does not affect the performance and test results.

Restore factory settings:

Press MODE→Display FX.X→Press the upward direction button→Display F4.0→Press SET→Press the upward direction button→Press SET→The screen displays TST and then displays---, return to the factory settings successfully

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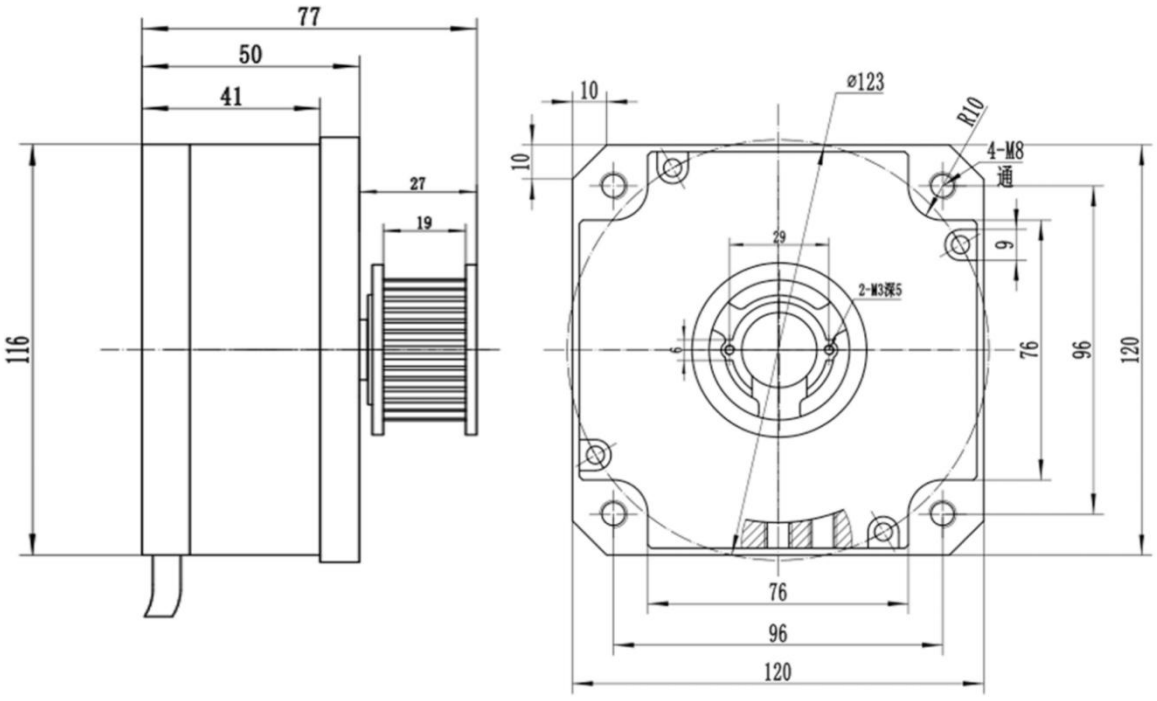
Chapter seven Motor parameters

Motor model	MT01-TB-120W	Driver type	Permanent magnet servo motor
Rated voltage	90V	Rated speed	200±5rpm
Rated torque	6 N.m	Output frequency	33Hz
Rated current	0.65A	Rating	120W
Allowable long-term blocking current (RMS)	< 0.50A	Operating temperature	-20℃~50℃
Insulation class	B	Extremity	20
Protection class	IP54	Weight(KG)	1.8KG
Working system	S3/40 %		



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Chapter eight Safety information and precautions

1.13. Security Definition:

In this manual, safety precautions are divided into the following two categories:

危险: Hazards caused by failure to operate as required, which may result in serious injury or even death.

注意: Hazards caused by failure to operate as required, which may result in moderate or minor injuries and damage to equipment.

Users are requested to read this chapter carefully when installing, commissioning and servicing this system, and be sure to follow the safety precautions required by the contents of this chapter. Any injuries and damages caused by non-compliant operation will not be related to our company.

1.14. Safety Matters :

Pre-installation	危险	◆ Do not install the controller if you find it broken when you open the box! ◆ Do not install if the packing list does not match the physical name!
	注意	✧ It should be handled gently or there is a risk of damage to the equipment! ✧ Do not touch the components of the controller with your hands, otherwise there is a risk of electrostatic damage!
During installation	危险	◆ Please install on a flame-retardant object such as metal; Keep away from combustible materials. Otherwise it may cause fire! ◆ The fixing screws of the device components must not be unscrewed !
	注意	✧ Do not allow wire heads or screws to fall into it. Otherwise it causes damage to the controller! ✧ Please install the controller in a place with little vibration and out of direct sunlight.
During wiring	危险	◆ It is essential that the guidance in this manual is followed and that the work is carried out by a professional electrical engineer, otherwise unexpected hazards may arise! ◆ The controller must be separated from the power supply by a circuit breaker or a fire may occur! ◆ Please correctly regulate the grounding of the controller according to the standard, otherwise there is a risk of electric shock! ◆ Never connect the input power supply to the output terminals (U, V, W) of the controller. Pay attention to the markings on the terminals and do not connect the wrong wires! Otherwise cause damage to the controller!
	注意	✧ Ensure that the wiring fitted complies with EMC requirements and the safety standards of the area in which it is located. Refer to the recommendations in the manual for the diameter of the wires used. Otherwise accidents may occur! ✧ The encoder must use a shielded cable and the shield must be reliably grounded at one end! ✧ Communication cables must be shielded twisted-pair cables with a stranding distance of 20 to 30 mm, and the shielding layer must be grounded!
Pre-power on	危险	◆ The controller must be covered before powering up. Failure to do so may cause electric shock! ◆ The wiring of all peripheral accessories must comply with the instructions in this manual and be wired correctly according to the circuit connection methods provided in this manual. Failure to do so causes accidents!

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	⚠ 注意	✧ Please make sure that the voltage level of the input power supply is the same as the rated voltage level of the controller; whether the wiring position on the power supply input terminals (L1, L2) and output terminals (U, V, W) is correct; and pay attention to checking whether there is a short-circuit phenomenon in the peripheral circuits connected with the controller; and whether the connected wiring is fastened. Otherwise, the controller will be damaged! ✧ In the case of controlling synchronous machines, please ensure that the motor parameters are tuned before the first run, otherwise there is a danger of the motor flying.
After power-on	⚠ 危险	◆ Do not open the cover after powering up. Otherwise there is a risk of electric shock! ◆ Do not touch any input or output terminals of the controller. Otherwise there is a danger of electric shock! ◆ If parameter identification is required, please be aware of the danger of injury during motor rotation. Failure to do so may cause an accident! ◆ Do not change the controller manufacturer's parameters at will. Failure to do so may cause damage to the equipment! ◆ Do not touch the cooling fan and braking resistor to test the temperature. Failure to do so may cause injury! ◆ Non-professional technicians should not test the signals during operation. Failure to do so may cause personal injury or equipment damage!
	⚠ 注意	✧ During operation of the controller, it should be avoided that anything falls into the device. Otherwise cause damage to the device! ✧ Do not use the contactor on/off method to control the start/stop of the controller. Otherwise cause equipment damage! ✧ The controller has been tested for safety regulations before shipment, please do not perform voltage withstand and insulation impedance tests, which may cause damage to the controller!
Maintenance time	⚠ 危险	◆ Do not carry out repairs and maintenance on the equipment with electricity. Otherwise there is a danger of electric shock! ◆ Do not repair or maintain the controller without professional training. Failure to do so may result in personal injury or equipment damage! ◆ Parameters must be set after replacing the controller, and all pluggable inserts must be plugged in and out with the power off!

1.15. Notice

1.15.1. Motor insulation check

When the motor is used for the first time, reused after a long period of time and periodically inspected, a motor insulation check should be done to prevent damage to the controller due to insulation failure of the motor windings. Insulation check must be separated from the motor wires from the controller, it is recommended to use 500V voltage type megohmmeter, should ensure that the measured insulation resistance is not less than 5MΩ.

1.15.2. The case where there is a pressure sensitive device or a capacitor to improve the power factor on the output side.

The output of the controller is PWM wave, and the output side, if installed with capacitors to improve power factor or varistors for lightning protection, etc., is prone to cause instantaneous overcurrent or even damage to the controller. Please do not use it.

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1.15.3. Lightning impulse protection

This series of controllers have some self-protection ability against induced lightning. For places where lightning is frequent, customers should also install protection on the front of the controller.

1.15.4. Motor Adaptation

To ensure optimum system performance, use matching motors.

Chapter nine Troubleshooting and Simple Solutions

Phenomenon	Fault description and troubleshooting method
E-01	Hardware overcurrent, check for proper wiring; exclude excessive loads.
E-02	Faulty encoder, check encoder wiring
E-03	System undervoltage
E-04	System overpressure during shutdown
E-05	System overpressure during operation
E-06	Current detection circuit malfunction
E-07	Boot failure
E-08	Blocked opening process
E-09	Obstruction of the closing process
E-14	EEPROM failure
E-15	Overspeed fault
E-16	Inversion fault
E-18	Motor overload
E-19	Motor stalling
E-20	Motor encoder angle deviation is too large

Revision of curriculum vitae		
Revision date	Revised version	Revision
2010-07-26	Ver 1.0	First edition
2015-06-15	Ver 1.1	Synchronous door machines asynchronous door machines all-in-one
2022-08-28	Ver 2.0	Optimisation of synchronised gantry curves and parameters
2022-09-18	Ver 2.1	Addition of motor overheating protection; errata
2023-12-08	Ver 2.2	Thermal protection output change, blocking sensitivity uniform unit
2024-01-26	Ver 2.3	Increase the number of blocking protection

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