

M-A2 (GPS) synchronization manual

Picture (Introduction):

GPS antenna



display screen

Function keys



Two output ports

Cascaded ports

SD card slot

finger show lamp

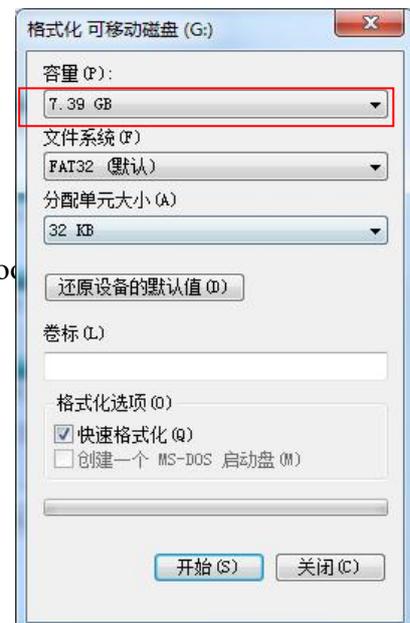
mains switch

AC220V power line

Note: Format the SD before using it

I. Specific parameters:

1. Power supply voltage: AC220V
2. Number of loads: DMX 2*512; TTL 2*1024 points
3. Synchronization mode: GPS synchronization; installation mode: outdoor
4. Load mode: SD card program;
 5. SD card format: FAT32 format
 6. SD card capacity: 4G
7. Size: 163*130*45 unit (mm)
8. Weight: 0.85Kg



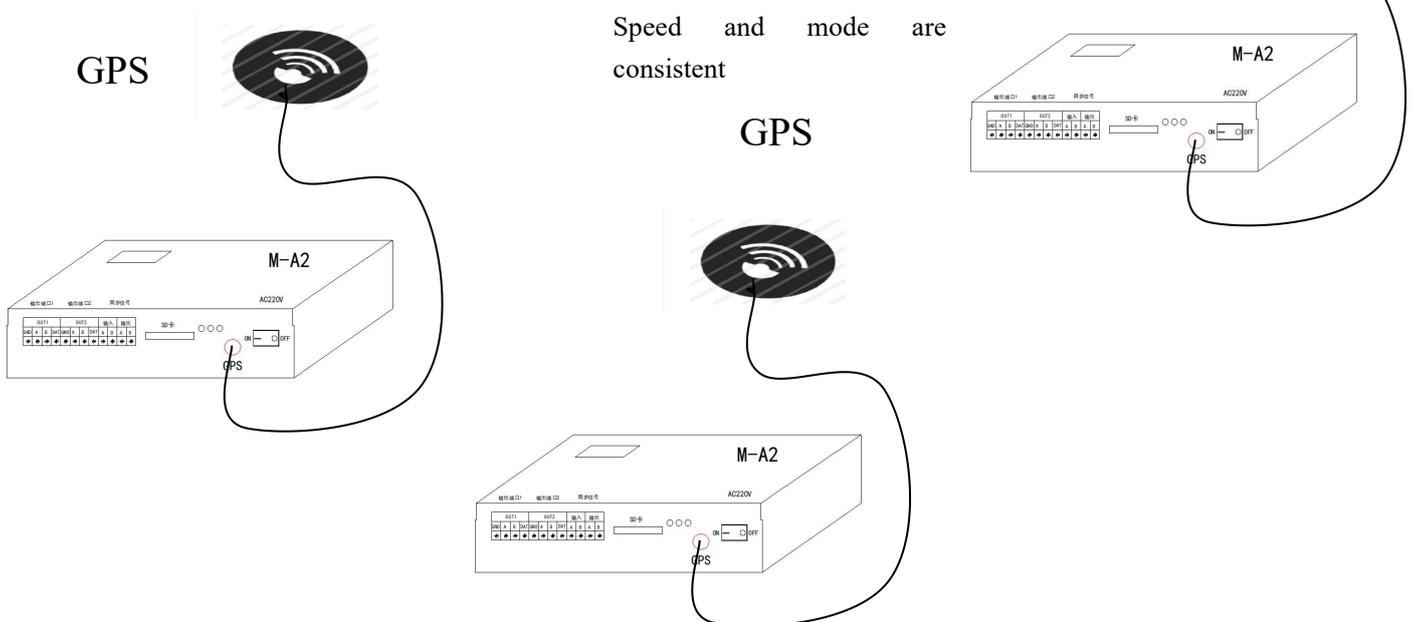
Ii. Features of GPS products:

1. Solve the problem that controllers cannot be synchronized due to the inability to install cables between buildings.
2. The GPS timing method is adopted, and the synchronization between controllers can be realized wherever satellite signals can be received, which is available worldwide.
3. External antenna, the antenna is separated from the GPS synchronization module to receive satellite signals better, faster and more stable.

Note: The antenna of GPS global synchronization module must be placed outdoors, not in indoor closed space.

Iii. Working principle:

The GPS+MA2+MA2 offline control system, or the independent offline main control synchronization of GPS+MA2, GPS+MA2, and GPS+MA2, uses software to automatically split the screen. Each controller operates independently yet uniformly, and only time synchronization between controllers is required to achieve frame synchronization across the entire screen. This provides a reliable theoretical foundation for MA2 using GPS synchronization. The offline controllers continuously receive world time from the GPS module, thus achieving frame synchronization between controllers.



Common problem

handling:

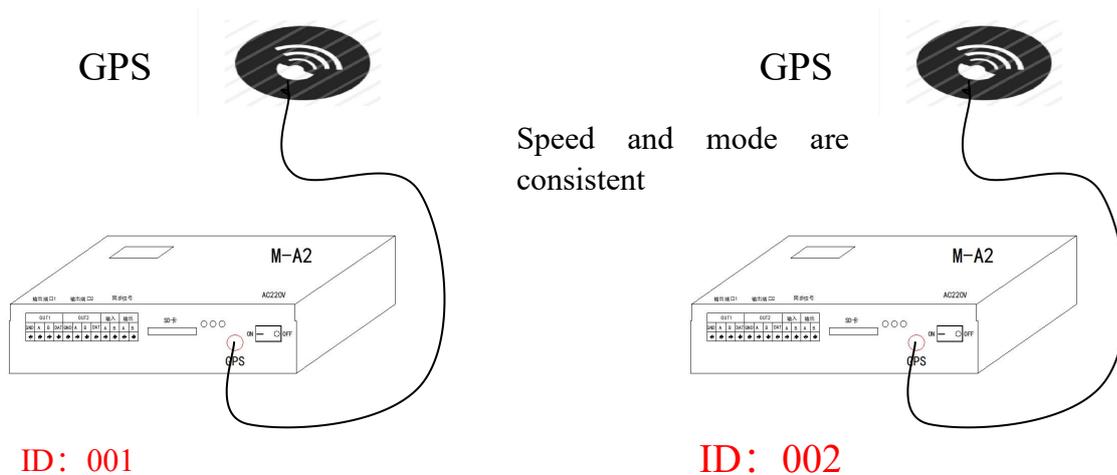
Question 1: After power on, two or more GPS are not synchronized

A: 1) The antenna of GPS global synchronization module is not pulled outdoors, so the synchronization module cannot receive satellite synchronization signal.

2) Due to the large number of pixels in the controller, the frame frequency that can be synchronized by the GPS global synchronization module cannot be achieved.

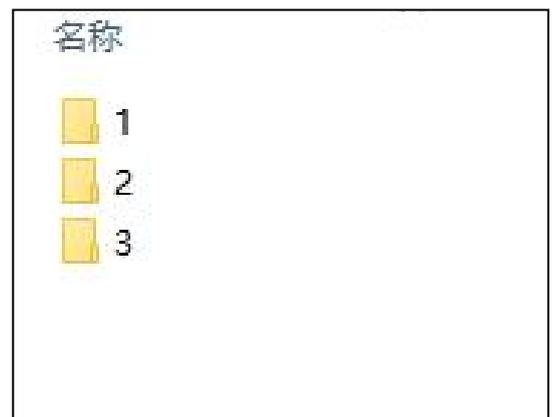
4、 Operation mode (GPS synchronization is divided into two schemes)

Solution 1: The same effect file sets different ID numbers and copies the SD card without any difference



Refer to the following controller operation steps for how to set the specific ID number

Option 2: The same ID number has different effect files (program partition) and





the SD card copies the files separately

The controller SD card copies the corresponding files respectively:

Controller 1-----Folder 1-----OFF001.arm

Controller 2-----Folder 2---OFF001.arm

Controller 3-----Folder 3-----OFF001.arm

5、 Features of the M-A2 system

1. Gray level control from level 32 to level 65536, and software Gamma correction processing.
- 2、 Supports various point, line and surface light sources, supports various rules and irregular processing.
3. The controller port can be DMX 2*512pixels; SPI 2*1024 lights.
4. Use AC220V AC power, set the corresponding controller ID number, and cascade multiple units for synchronization. When cascading, only operate the first controller; subsequent controllers act as sub-controllers. Use Simple LED software for multiple units; when using in synchronization, export multiple program files. The last digit of the file name is sequentially copied to the corresponding controller. The controller identifies the relevant program content based on the ID number.
- 5、 The files stored by M-A2 are not limited, but they cannot exceed the storage capacity of SD card. It is recommended to compress the program files to the minimum range when making the program. The two ports

are independently output without interference.

6、 When GPS satellite signals are synchronized, a single controller must be equipped with an SD card for use and multiple controllers must be used synchronously. The SD card copied from the program must be copied into the controller, and then the corresponding ID number of the controller must be set. The controller will automatically read the corresponding part of the program content from the program.

7、 Supports conventional RGB lamps (serial, DMX512) and RGBW lamps (UCS2904, SK6812, DMX512).

8、 **The controller has a new one-click reset function. On the main interface press the cycle/OK key and speed+ key at the same time.**

6. Meaning of digital display screen and key:

Menu displayed	Digital display	liquid crystal display	Chinese translation
①	1-c P	Set Chip x x x x <i>Top three numbers</i>	Set the chip
②	2-b r,g-22	Set Bright 100%	Set the brightness and gamma value
③	3-r F	Set RF Mode	Set the RF band
④	4-r g b	Set RGB Mode	Set up the lighting channel
⑤	5-R T C	RTC :1970-00-00	Timing function
⑥	6:d-0 1	ID :01	Set the ID number
⑦	7: c 150	AC Delay: 150MS	a-c cycle
⑧	8:50 HZ	WorkMode:50HZ	service frequency
⑨	9: V 605	VER 6.05	Version serial number

Vii. Main interface display instructions:

The last one represents



F: represents running in a single built-in mode; press the cycle/OK key to switch to E: represents running in all built-in cycles.

D: represents the running of a single SD card file; press the loop/OK key to switch to A: represents the loop of all SD cards

Key name	meaning
velocity +/-	Switch speed directly on the main screen, and select up and down buttons in other states.
pattern +/-	Switch the controller built-in program and SD card program directly on the main interface.
coding (ADR)	Lamp address, make the lamp sequence normal.
test (Test)	There are five kinds of test effects in total, to check whether the signal is smooth and whether the power supply is sufficient, and whether the code is correct.
recurrence (OK)	After setting the above items, you must press the OK (OK) key to confirm, save, return and exit.
Menu (MENU)	Settings: chip, brightness, RF band, channel, time, ID number, synchronization frequency, operating frequency, version number

Viii. Operation steps

1. Set the chip (CHIP):

The chip is the model of the lamp used. The commonly used chip models in the market are as follows:

UCS1903,UCS1904,UCS2909,UCS2903,UCS1912,TM1803,TM1804

TM1809, TM1914 (continuation of breakpoint), WS2811, WS2812, WS2818 (continuation of breakpoint)

SM16703, SK6812, SK6814, GS8206 (continuation of breakpoint), GS8205 (continuation of breakpoint)

UCS5603 (Breakpoint continuation) and P9883 (Breakpoint continuation) Each controller needs to select the chip model

UCS512C series, B series, D series; SM16512, TM512AC

The full color lamp is controlled by the chip. No matter what kind of full color lamp is used, there are models,

so when using it, we should first identify the specific chip model of the lamp and know the model before operating the controller.

The specific operation steps are as follows:

Step 1: Enter by pressing the MENU (MENU) key



Step 2: Press the Loop/OK key to enter the chip selection interface



Step 3: Switch the chip model according to speed+/speed-and select the corresponding model of the lamp.

Chip selection correspondence table			
01: 512H	02: 512L	03: 1903	04: 6812
05: 6703	06: 1804	07: 2904	08: 2811
09: 2812	10: 1914	11: 9883	12: 8206
13: 8205	14: 5603	15: 512P	16: 1923
17: 1814			

Step 4: Press the cycle/OK button and save it to the controller. The lamp will start to work.

2. Switch mode (MODE):

The SD card can be set to either the program mode or the built-in effects mode. These two modes can be switched between by holding down the Loop/OK button for 3 seconds. If you do not like the built-in effects that come with the controller, programmers need to design and copy programs onto the SD card; if simple outline effects are needed without much variation, you can use the built-in effects directly, totaling 86 types.

SD card program mode: it is designed through the program software, according to the customer's requirements, or the designer's own design.

The specific operation steps are as follows:

Step 1: Press the Loop/OK key for 3 seconds to switch between the SD card program and the built-in program.

The interface will display as follows



d: SD card program mode; 01: the first program; 5: speed 5

Step 2: Press the mode +/-key to switch between mode files.



Step 3: Press the speed +/-key to adjust the controller speed.



Press the cycle/OK key once to switch between a single program cycle and all program cycles.



D: represents a single cycle of the SD card program; A: represents all cycles of the SD card program.

F: represents a single loop of the built-in program; E: represents all loops of the built-in program

Built-in effect mode: (The built-in effect can be called up whether the controller is inserted or not. Simply put, it has nothing to do with the SD card.)

The controller itself has built-in effect programs, which are relatively simple and mainly used to test whether the lamp is smooth and whether the controller works normally. If you want more gorgeous effects, you need to write a program file and place it on the SD card. Some simple contours can be used with built-in

effects.

The specific operation steps are as follows:

Step 1: Long press the cycle (OK) button for 3 seconds until the interface is displayed



F: controller built-in program mode; 01: first program; 5: speed 5

Step 2: Press the mode +/-key to switch between programs, for a total of 86 modes



Step 3: Press the speed +/-key to switch the program speed.



Press the cycle/OK key once to switch between a single program loop and all program loops.



D: represents a single cycle of the SD card program; A: represents all cycles of the SD card program.

F: represents a single loop of built-in programs; E: represents a loop of all built-in programs.

3. Channel switching:

Channel refers to the front and back order of R, G and B of the lamp, there are a total of 7 orders; when the design program file and the actual color of the lamp are different, it is definitely the wrong order of RGB, so it is necessary to adjust the order of RGB through the controller.

The specific operation steps are as follows:

Step 1: Press the MENU (MENU) button four times. The interface is displayed as follows



Step 2: Press the cycle /OK key to confirm that you have entered the channel selection interface.



Step 3: Press the speed +/-key to switch channels (rgb, rbg, gbr, grb, bgr, brg, rgbw) and select the corresponding channel of the lamp.

Step 4: Press the Loop/OK button to save and return to the main screen.

4. Set ID:

When multiple controllers are used synchronously, users can choose to set the ID number for each controller themselves or write separate programs for each controller during programming. If an ID number needs to be set, it should be done in the order of precedence. When used individually, the ID number is 0001, as the program setup will include setting the port number on the drawing side; for example, ports in the range of 1-2 are definitely the first controller.

Step 1: Press the MENU (MENU) button six times. The interface is displayed as follows



Step 2: Enter the ID Settings screen by pressing the Loop/OK key.



Step 3: Press the speed +/-key, switch the number, and select the number corresponding to the controller.

Step 4: Press the Loop /OK button to return to the main interface.

5. Adjust brightness (Bright):

When the actual lamp brightness is too bright or too low, the brightness value can be adjusted appropriately. Only the overall brightness can be adjusted, and the grade is 5%--100%. The higher the percentage, the higher the brightness.

Step 1: Press the MENU (MENU) key twice. The interface is displayed as follows



Step 2: Press the cycle /OK button to enter the brightness adjustment interface.



Step 3: Switch the digital level by pressing the speed +/-key, and select the appropriate lamp brightness 005-100. The larger the number, the higher the brightness.

Step 4: Save to the controller by pressing the cycle/OK button, and the lamp will be adjusted to the selected corresponding brightness.

6、 Set the gamma value:

Step 1: Press the menu (MENU) and press key 2 to display the interface



Step 2: Press the Loop/OK key twice to enter the gamma value adjustment interface.



Step 4: Press the speed +/-key to switch the gamma value, adjust the value and press the loop /OK key to save and return to the main interface.

7. Coding Operation: (For DMX512 lamps, manufacturers may assign individual address codes to the lamps

during production testing. However, in actual construction sites, differences in installation methods and sequences can lead to duplicate or misaligned address codes for the original lamps. Therefore, it is necessary to use a controller to uniformly code the installed lamps):

Before operation, it is necessary to determine the chip model of the lamp, the chip coding channel, and check whether the wiring of the controller is correct and whether the direction of the lamp is correct. After determining these, start the operation to write code.

The specific coding operation steps are as follows:

Step 1: Press the Write code (ADR) key to enter the chip selection state



Step 2: Press the speed +/-key to switch the chip

Write the chip selection table		
01: UCS512B3	07: Hi512A4	13: SM16512P
02: UCS512C*	08: Hi512D	14: SM17500
03: UCS512D	09: TM512AC	15: SM17512
04: UCS512E	10: TM512AD	16: SM17522
05: UCS512F	11: TM512AL	17: GS8512
06: Hi512A0	12: SM16512	18: GS8512 Clear address

third step

Step 3: Press the Loop/OK key to enter the channel selection interface



Step 4: Switch the channel number by pressing the speed +/-key, and press the write code (ADR) key to return to the previous operation.

Step 5: After confirmation, press the Loop/OK key to enter the port selection interface



Step 6: Press the speed +/-key to select the port to write the address code



In turn, there are a total of 2 ports.

In the case of cascade synchronization, all the controllers behind follow the selection of the first controller.

Press the Write code (ADR) key to return to the previous operation.

Step 7: After the channel and port are confirmed to be correct:

Press the cycle/OK key to start writing code

Display content: IC: 0X Channel: CH0X Port: POAL / PO-X

The representative



The representative

In the process of writing code, we should pay attention to whether there is a change in the state of writing code for the lamp, and the measurement point interface will be automatically switched after the writing code is completed.



This interface is consistent with the measurement point operation below

Step 8: After the above coding operation is completed, if there is no need to change the lamp or repair and reset the chip channel, etc.,

The controller has a new one-key code writing function: long press the code writing (ADR) key for 3 seconds, and the controller interface will automatically display all the contents of the last code writing operation and start coding automatically.

Note: Check whether the lamp is running down one point at a time in order or manually switching to add one point at a time. If the order is normal, it is successful; if not, continue writing code or find out why the code is not written successfully

Common reasons for unsuccessful coding:

- ①、 The direction of the lamp is not right. Although DMX512 is parallel bidirectional transmission signal, the writing direction is unidirectional.
- ②、 The wiring problem of the lamp, the wrong wire sequence, check the controller port and the lamp wire sequence.
- ③、 The power supply of the lamp is insufficient to drive the chip to write code.
- ④、 The signal line of the lamp is too long and exceeds the effective distance range of the chip.

8. Set up the test (Test):

The test function is needed in the following situations: ① Not knowing the number of lamps ② Not knowing the sequence of lamp channels RGB, RBG, GRB, GBR, BRG, BGR ③ Whether there are any faulty

points in the lamps ④ Whether the power supply to the lamps is sufficient ⑤DMX512 Whether the lamp codes are written correctly or if they are corrupted) All the issues mentioned above can be detected through the test function.

Step 1: Press the Test key to enter the test interface



Step 2: Switch the lights of the 3/4 channel by pressing the speed +/-key. Take 3 channels as an example

Step 3: Press the Loop /OK key, and the interface is displayed



Step 4: Press the speed +/-key to select the corresponding port for testing



Step 5: Press the Loop/OK key to enter the manual measurement point interface



Step 6: Press the speed +/-key to manually test each one in turn, 001-1024.



Step 7: Press the MENU (MENU) key to automatically measure the point, and press this key again to

return to the manual measurement interface



To test the RGB channel sequence of the lamp, press the Test key in the manual test point interface



Press the Test key again to jump to the next color

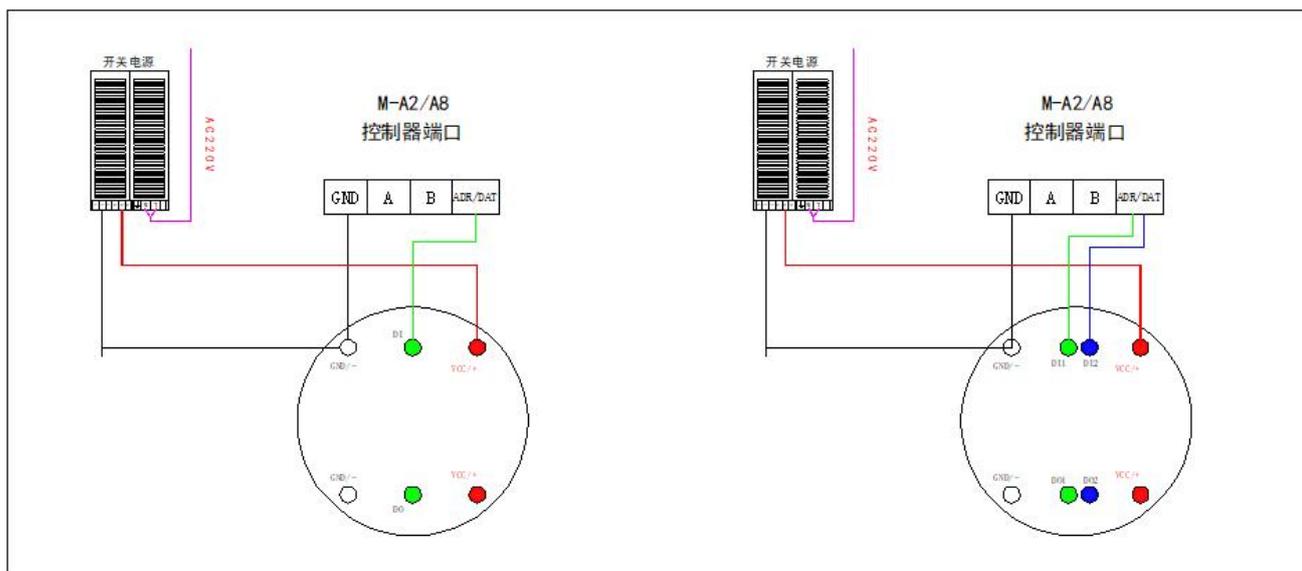


Always red, always green, always blue, always white

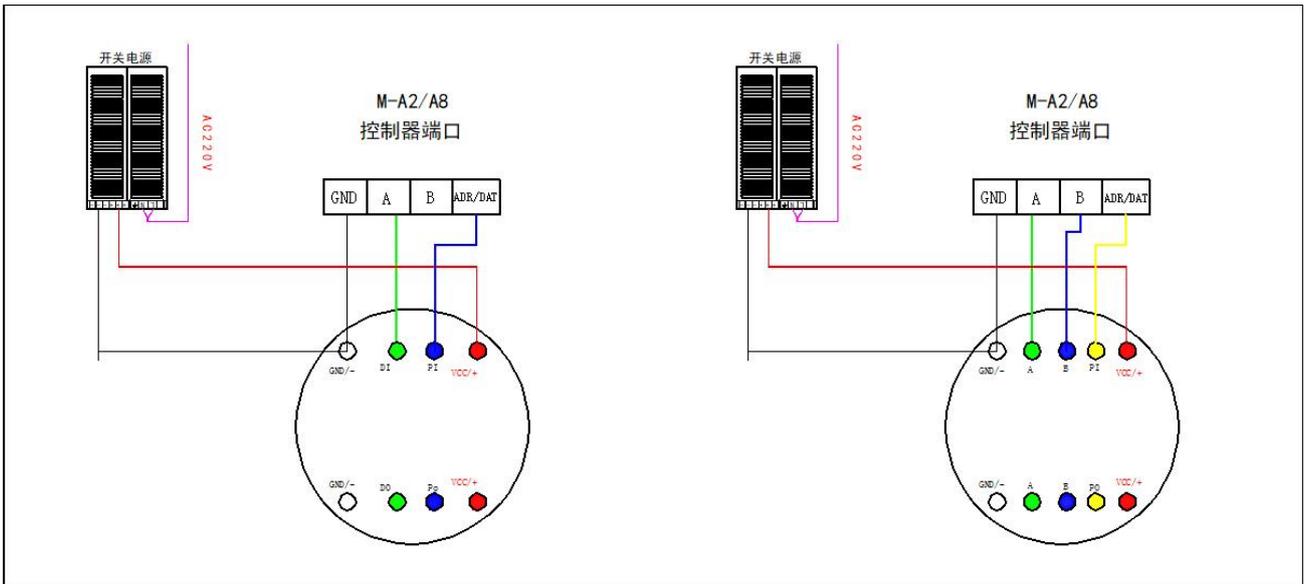
The sequence of colors in which the lamps are lit is the sequence of the lamp's passage

Step 2: After the test is completed, press the cycle/OK key to return to the main interface.

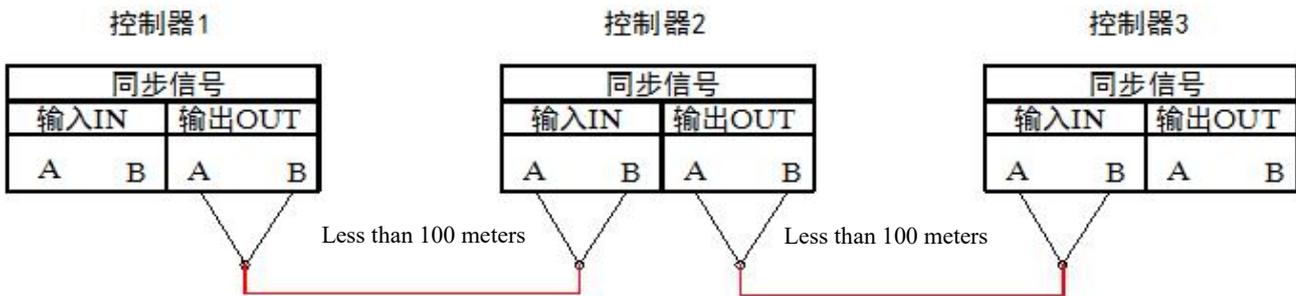
9. Wiring diagram: SPI series



DMX series:



The cascade diagram is as follows:



Line notes:

①、 Do not operate the lamp under power during the actual wiring process. The power should be cut off before connecting, changing the wire or changing the lamp.

②、 The SPI signal lamp has directionality, so the direction of the lamp should be determined before operation.



Controller port → The PI input terminal is connected to the controller and the PO output terminal is connected to the next lamp.

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③、 The controller is powered by AC220V high voltage, and pay attention to safety when using

it.

- ④、 The capacity of the controller SD card is limited. When making programs, pay attention to the file size and try to keep it below 5000 frames.
- ⑤、 The controller is suspended vertically so that raindrops can be prevented from falling into the interior.
- ⑥、 The M-A2 controller is a combination of DMX512 and differential signals, with two independent output ports for independent control without interference; according to the different chips on the market, the transmission distance of the lamp is also different.
- ⑦、 The controller is synchronized with GPS, and the packaging box is equipped with GPS antenna. Please pay attention to collecting it
- ⑧、 GPS is used for Beidou satellite positioning, so the GPS antenna needs to be placed outdoors and in an open area without solid obstructions during testing.