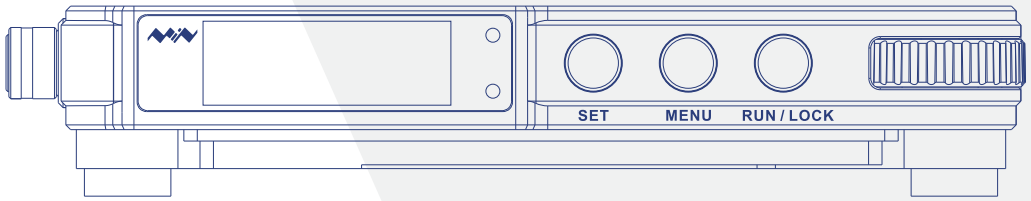
MINIWARE

MDP-P906

Digital Power Supply

User Manual V1.1



This user manual is based on MDP-P906 DFU V4.01D, APP 1.31.

Contents

《Safety Statements》

Precautions

1) DO NOT connect DC interface and USB TYPE-C interface at the same time, otherwise the connected device may be burned out!
2) Before connecting to computer, please press "RUN" Button of Mini Digital Power Supply to release the possible residual charge (the screen may turn on and then turn off), to avoid damage to the connected device;
3) It is recommended to use the manual shutdown method to turn off the power output (instead of directly cutting off the power input) to release possible residual charges;
4) Please use a reliable and certified data cable to connect the device.
5) Do not operate in humid environment;
6) Do not operate in flammable and explosive environment;
7) Please keep the product surface clean and dry;
8) Do not soak the whole product in water or use it with wet hands, beware of electricity leakage;
9) This product contains precision components, please prevent it from dropping.

Liability Statements

Any special, indirect, incidental or subsequent damage or loss caused by the operation of the product that does not follow the contents of this manual (including but not limited to the operating conditions, warnings, precautions, instructions, etc.), the liability will belong to the user.

The user is responsible for any damage or loss caused by disassembling or modifying the product without permission.

Please keep this product in a safe place to prevent children from using this product without being supervised.

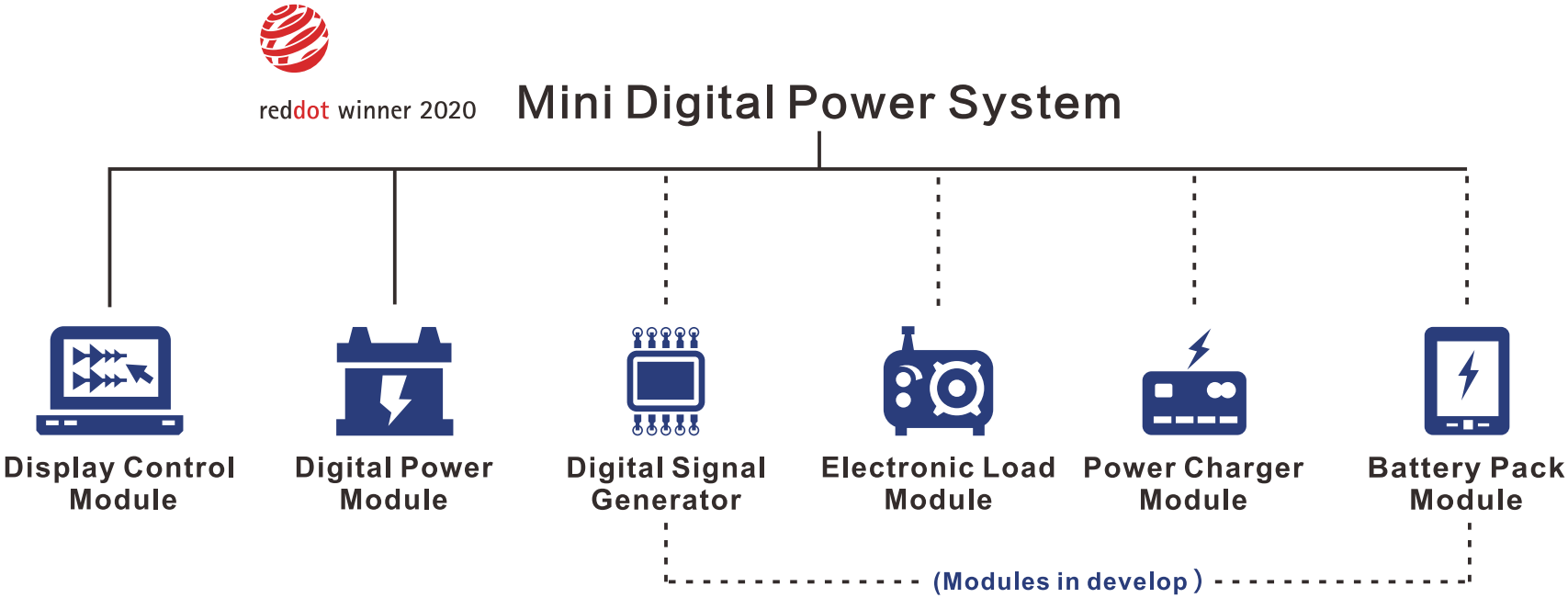
01/ Product Description

1.1 Product Introduction

MDP (Mini Digital Power System) is a system of programmable linear DC power supply based on modular design, capable of connecting up to 6 different modules for use as needed. For its novel, beautiful and trendy design, MDP won a **Red Dot in the Red Dot Award: Product Design 2020**.

Current Functional Modules: Smart Display Control Module, Digital Power Supply Module (2 models);

Modules in Develop: DC Electronic Load Module (coming soon), Digital Signal Generator Module, Power Charger Module, Battery Pack Module.



MDP-P906 is the second digital power supply module of MDP series, following MDP-P905. MDP-P906 has a built-in cooling fan, and a maximum output power up to 300W, which meets a wider range of testing needs and application scenarios. Through 2.4G wireless communication, it can be connected to MDP-M01 Smart Digital Monitor module to realize the free combination of multiple channels of 300W per channel, and it is also stackable with MDP-XP set (MDP-M01+ MDP-P905) to form a multiple modular portable Mini Digital Power System.

MDP-P906 has the index, stability and reliability comparable to a professional power supply. It can output pure current, and provide powerful functions such as programmable output, timing output, timing control, automatic compensation, boost mode, etc., making itself a real cost-effective, smart and customized programmable linear DC power supply.

MDP-P906 adopts precision CNC machined aluminum alloy shell, with fine workmanship, novel, mini and beautiful appearance, it completely subverts the rigid image of traditional desktop power supply. With stackable modular design and wireless communication function, MDP-P906 can work independently or paired, both on the workbench, and be carried out for on-site maintenance. MDP-P906 is a perfect solution for electronic engineer, especially field application engineers to meet different needs of power sources.

1.2 Product Parameters

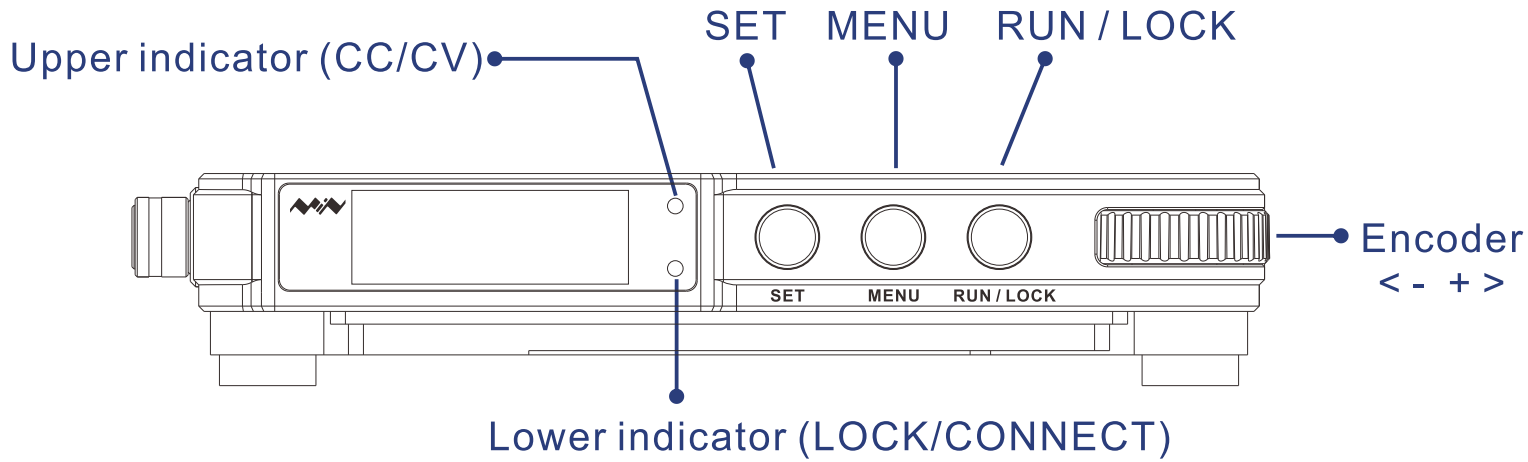
Mode	MDP-P906	
Input	DC4.2V-30V 14A (Max) QC3.0/PD2.0 20V 5A (Max)	
Output	0-30V 0-10A 300W (Max)	
Conversion efficiency	95%	
Output resolution	10mV, 2mA; up to 1mV, 1mA via Display Control module	
Output accuracy	0.03%+5mV, 0.05%+2mA	
Adjustment rate	Load adjustment rate <±0.01%	
	Power adjustment rate <±0.01%	
Ripple and noise	<250uVrms, 3mVpp; <2mArms	
Transient response	<4uS	
Safety Protections	Input over-voltage, under-voltage, reverse connection protection, output over current, back-flow protection and over temperature protection	
Others	Automatically shut down and enter micro-power mode	
	Support USB firmware upgrade	
Specification	**Size** (not include rubber feet)	**Weight**
	112mm*66mm*20mm	181g

1.3 Applications

- Universal tests and teaching experiments in R&D laboratory
- Maintenance of digital products
- Property verification and fault diagnosis of devices and circuits
- Emergency power supply for model airplanes and vehicles
- Power supply testing of RF and microwave circuits or modules
- Quality control and quality inspection
- Supply purified power for high-accuracy digital-analog hybrid circuits and Hi-Fi audio devices

02/ Button Functions

2.1 Button Instructions



Buttons	Short Press	Long Press	Other Functions
SET	Short press to switch over voltage and current regulation	Long press and at the same time, roll Encoder for coarse adjustment	Confirm parameter modification
MENU	Short press to switch over the display contents	Long press to view current setting	Set the menu of changing parameter values
RUN/LOCK	Short press to turn on the device; short press to turn on/off power output	Long press to lock parameters	
Encoder	Change numeric value, switch menus, switch over the number of pages		

2.2 Shortcut Keys

How to lock and unlock parameter:

Long press “RUN/LOCK” button for above 2 seconds to trigger parameter locking/unlocking (the lower indicator keeps on red under a locking state).

Note:

Under locking state, the function of “SET” button can not be operated. Also, voltage and current cannot be set or be remotely controlled by display control module.

How to quick set preset menu of voltage and current:

Hold “SET” button, and at the same time, short press “MENU” button to enter the preset menu of quick setting of voltage and current. Use Encoder to circularly switch over the preset value, press “SET” button to select the corresponding preset value output and switch to the interface of operating state. If there is no selection, or selection time exceeds, the interface will automatically exit, or User clicks “MENU” button to exit.

How to force to exit USB mode:

When MDP-P906 power supply module is connected to computer and the flash disk appears, and “USB MODE” is displayed on screen. User can long press any button for 3 seconds to exit USB mode.

2.3 Power Off And Sleep Mode

Auto sleep and power off:

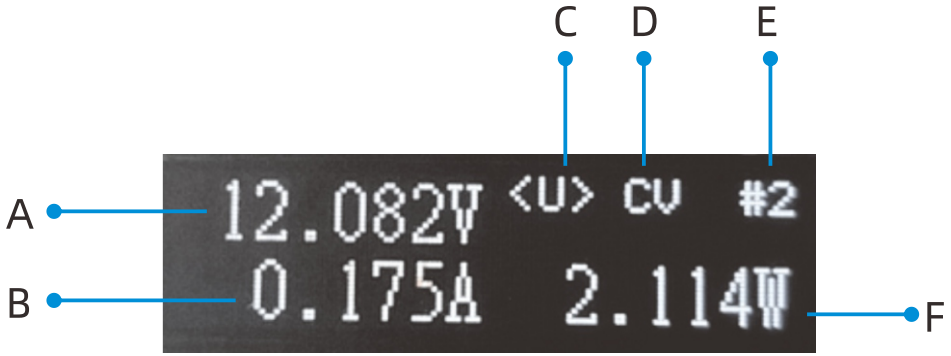
When MDP-P906 isn't connected with MDP-M01, after 1 minute since output is off, it will go to sleep mode; after 6 minutes since output is off, it will automatically turn off.

Manual shutdown:

Long press both "SET" button and "MENU" button for 3 seconds at the same time.

03/ Function Interface Description

3.1 Basic Working Interface



Menu display	Function	Menu display	Function
A	Voltage display/adjustment	D	ON: Output on
B	Current display/adjustment		OFF: Output off
C	<I>: Adjust current		CC: Constant current output
	<U>: Adjust voltage		CV: Constant voltage output
	: Locked	E	#1: The corresponding channel of the current device on display control module
F	Real-time power/ set current/ set voltage		

Select to set voltage or current

1) In the unlocked state, short press “SET” button on the main interface to select the current setting (<I> or <U>) to be modified. Select <I> to modify the set current; select <U> to modify the set voltage.

——When the setting item is <I>, roll Encoder to set the current, setting range is 0.002A-10.000A;

——When the setting item is <U>, roll Encoder to set the voltage, setting range is 0.01V-30.000V.

2) It is not possible to enter the setting mode in locked state. If Encoder is inactive for 1 second, the set value is will return to displaying power.

Coarse and accurate adjustment

1) Coarse adjustment: Hold “SET” button and roll Encoder at the same time to coarsely adjust the voltage each stepping by 0.3V, and the current by 0.1A;
2) Accurate adjustment: Roll Encoder for accurate adjustment, the voltage stepping is 0.01V, and the current stepping is 0.002A.

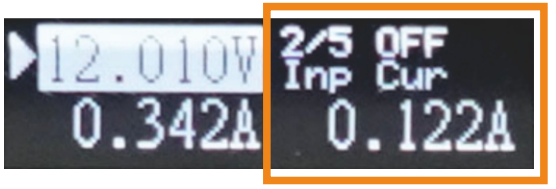
3.2 Browse Menu

【3.2.1】 Short press “MENU” button to enter browse mode, then short press again to return to the main interface;

【3.2.2】 Roll Encoder to view current power setting and state. Under browse mode, if there is no operation after 5 seconds, device will automatically return to the main interface;

【3.2.3】 The operation of “RUN/LOCK” button doesn’t influence the current display contents and category.

1) View input voltage



2) View input current

3) View input current limit

4) View device temperature

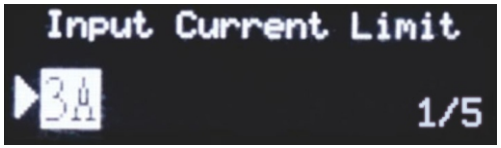
5) View version information

3.3 Setting Menu

1) Long press “MENU” button to enter setting menu;
2) Roll Encoder to select the menu item, and short press “SET” button to enter setting;

Set Menu 1: Input current limit;

Select “Input current limit”, short press “SET” button to enter setting. Roll Encoder to adjust setting value, short press “SET” button to confirm setting and return to setting menu; or short press “MENU” button to confirm setting and exit.



Set Menu 2: Wireless address auto-matching TX and RX Addr;

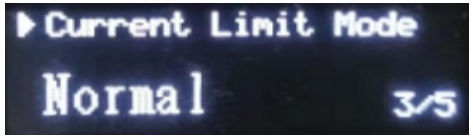
Select “TX and RX Addr”, short press “SET” button to enter setting (matching), and short press “MENU” button to exit.

The auto-matching function of wireless address and frequency can only work when matching with display control module. Please refer to “05 Configurations” in “MDP-M01 Smart Digital Monitor User Manual” for more about the pairing methods. During matching of wireless address and frequency, if power output is on, power output will be turned off compulsorily for safety protections.

Set Menu 3: Current Limit Mode;

This menu includes two modes: “Normal” mode and “Unlimited” mode.

Select “Current Limit Mode”, roll Encoder to choose “Normal” mode (default) which means setting current limit as constant current; or choose “Unlimited” mode, the current setting in main interface will be disabled, MDP-P906 will maintain constant voltage in priority, allowing over 10A output current. This setting has only one time effect, and will return to “Normal” mode in default after reboot.

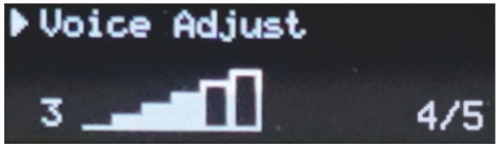


Applications: When setting the output current as 10A, yet the power supply still cannot effectively boot up the load device, User can try selecting “Unlimited” mode.

▲**Note:** In “Unlimited” mode, output current will be shown as 10A instead of the actual current value (eg. Displaying output current is 10A, but the actual output current may be 12A). In this state, short cutting the load device will generate visible sparks, User should avoid long time short cutting leading to device over temperature (over temperature will trigger over temperature protection and turn off power output).

Set Menu 4: Voice Adjust;

Select “Voice Adjust”, short press “SET” button to enter setting, Roll Encoder to adjust setting value, short press “SET” button to confirm setting and return to the setting page; or short press “MENU” button to confirm setting and exit.



Set Menu 5: Program Output;

User can edict the program output file and restore into device in advance (see blow for program output file reference), and select the file via program output menu. The format of the file name is: PRO_xx.CSV (xx is number, and other characters should be capitalized).

Select “Program Output”, device will automatically search for local file (if there is no applicable file, the menu will be in blank), short press “SET” button to enter file selection, roll Encoder to select the needed program output file, short press “SET” to confirm, and then short press “RUN/LOCK” button to output voltage and current as programmed.

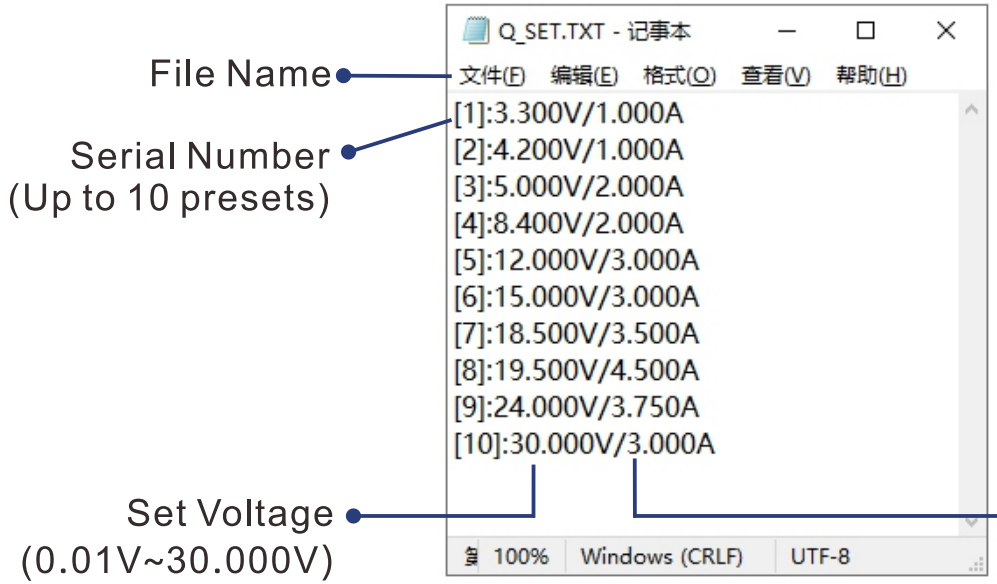
See file contents of PRO_xx.CSV:

循环次数(Cycles):	5						
##							
所有数值只支持整数，不支持小数；							
循环次数：表示本文件循环执行的次数；							
电压输出范围：10mV-30V 备注：当设置为0V时候表示关闭输出							
电流范围：1mA-5A							
提示：由于电源升降压需要时间，大电压跳动时，必须设置足够的时长；							
参考数据：1V跳变到5V稳定大约需要100ms							
All values only support integers,not decimals;							
Number of cycles:indicates the number of loops this file is executed;							
voltage output range:10mV-30V, Note: When set as 0V, it means that the output is turned off;							
Current output range: 1mA-5A;							
Tip: Since it takes time for the power supply voltage to rise and fall, there must be enough time between large voltage jumps;							
Reference data: It takes about 100ms for a transition from 1V to 5V to stabilize.							
##							
电压Voltage(V/mV)	电流Curre(A/mA)	时间Time(S/mS)					
2000mV	500mA	2000mS					
2100mV	500mA	2000mS					
2200mV	500mA	2000mS					
2300mV	500mA	2000mS					
2400mV	500mA	2000mS					
2500mV	500mA	2000mS					
2600mV	500mA	2000mS					
2700mV	500mA	2000mS					
2800mV	500mA	2000mS					

3.4 Quick Modification Of Voltage And Current

【3.4.1】 Hold “SET” button, and at the same time short press “MENU” button to enter the menu of quick setting of voltage and current. Use Encoder to circularly select preset value, press “SET” button to confirm the preset output and back to the operating interface. If there is no selection, or time exceeds, the menu will automatically exit, or User can click “MENU” button to exit.

【3.4.2】 The quick setting of default value of current and voltage can be modified through Q_SET.TXT file. Connect MDP-P906 with computer to enter USB mode, and then open Q_SET.TXT to modify corresponding contents. The file contents are as shown in the following figure. After setting is completed, disconnect USB and restart MDP-P906 to bring the modification into effect.



File Name

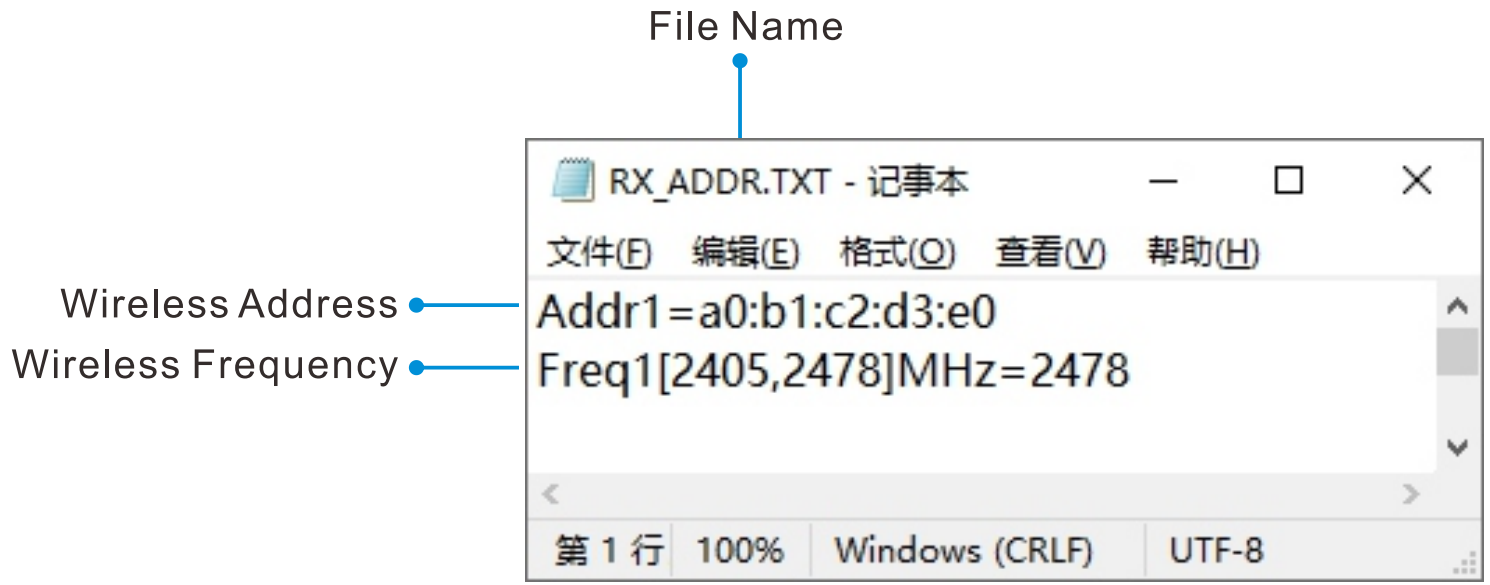
Serial Number
(Up to 10 presets)

Set Voltage
(0.01V~30.000V)

Set Current
(0.002A~10.000A)

3.5 Modification Of Wireless Address

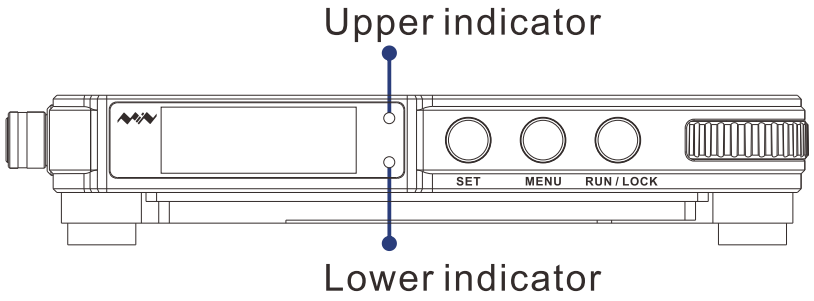
MDP-P906 can match with MDP-M01 through modifying wireless address and frequency via RX_ADDR.TXT file. Connect MDP-P906 with computer to enter USB mode, then open RX_ADDR.TXT to modify corresponding contents. The file contents are as shown in the following figure. After setting is completed, disconnect USB and restart MDP-P906 to bring the modification into effect.



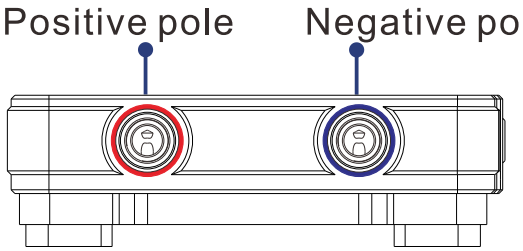
04/ Indicator Light

4.1 Indicator Interface

Display Panel:



Output Ports:



4.2 Indicator Status Description

When MDP-P906 is in different states, the panel indicator and output indicators will show different colors and states.

Indicator	Color	State	Description
Upper	Blue	Always on	Output on, constant voltage state CV
	Red	Always on	Output on, constant current state CC
		Off	Output off
Lower	Green	Always on/Flicker	Connected with display control module
	Red	Always on	Lock state
		Off	Not connect with display control module; Parameters aren't locked
Output	Positive: Red Negative: Blue	Always on	Output on
		Off	Output off, stand by; screen is off
Upper and lower	Red	Flicker	Alarm(including input overvoltage,overheating, input under power, or meeting the set output alarm conditions)

05/ Firmware Upgrade

1) Visit www.miniware.com.cn, download the applicable MDP-P906 firmware to computer;
2) Hold “SET” button, connect MDP-P906 with computer by data cable (2.5mm audio to USB A or USB C to USB A data cable), and short press “MENU” button or “RUN/LOCK” button to enter DFU mode, a virtual disk named DFU Vx_xx_x will appear on computer ;
3) Copy the .hex firmware to the root directory of the virtual disk, and after the suffix of firmware turns from .hex to into .RDY, restart the MDP-P906 to complete the upgrade.

06/ FAQ

If MDP-P906 display “Auto Checking...” when it is turned on, it means that the decive is performing hardware self-checking and releasing internal residual charge, no voltage will be output during this process.

When the temperature of MDP-P906 is lower than 0 degrees Celsius or higher than 70 degrees Celsius, the power supply will automatically shut down;

When the following situations occur, MDP-P906 will give an alarm or buzzer warning:

Display	Reason	Solution
“Factory” and relevant parameters	Errors in reading files of factory parameters	Restart the device, and the configuration file will be regenerated.
“Param Error”	Errors in reading files of power-on parameters	
“Quick Setting Error”	Errors in reading parameter files for quick setting of voltage and current	Check whether the Q_SET.TXT file in the flash disk is abnormal.
Display “INPUT ELEC ERROR” and relevant parameters, buzzer rings, and the upper and lower indicators in red flicker;	The input current exceeds 10% of the set current value	Check whether the set current value is lower than the rated current value of the input power source; or the rated current of the input power source is too high.
Display “INPUT VOLT < 3V”, buzzer rings, and the upper and lower indicators in red flicker;	An alarm will be given when voltage is lower than 3V	Replace with an input power supply whose output voltage is higher than 3V and less than 30V.
Display “INPUT VOLT> 30V ”, buzzer rings, and the upper and lower indicators in red flicker;	An alarm will be given when voltage is higher than 30V	
“Flash Error”	Errors in flash chip	Contact after-sales service for further help.
“Wireless Error”	Errors in wireless chip	
“calibrate wait usb”	Missing calibration parameters	
Display “Device ERR”, and power off	Errors in hardware device	
No connection to computer, Display “USB MODE” and the device powers off	The current power source connected through 2.5mm interface may cause internal abnormalities in MDP-P906	Please connect device to computer via USB C to USB A cable.
The fan runs automatically when power on	Device is self testing	The device will perform a self-test when it is turned on, and the fan will automatically stop after the self-test is completed.
The fan runs automatically during output, and stops after some time	Device is cooling	When the device temperature is higher than the default cooling temperature, the fan will automatically start to dissipate heat for the device. When the temperature drops to a safe temperature, it will automatically stop without setting.

07/ Legal statements

This device is complied with the regulation in the 15th part of FCC regulation.
Operation is subject to the following two conditions:
(1) This device may not cause harmful interference.
(2) This device must accept any interference received, including the interference that may cause undesired operation.

The CE mark is a registered trademark of European Community.
This CE mark shows that the product complies with all the relevant European Legal Directives.

UKCA (United Kingdom Conformity Assessed) mark is a certification mark for UK conformity.
This device complies with the standard testing and certification under British regulations required for electrical and electronic products to enter the British market.

This product contains batteries and/or recyclable electronic parts.
Please do not dispose of the product together with household garbage.
Please handle it according to your local laws and regulations.