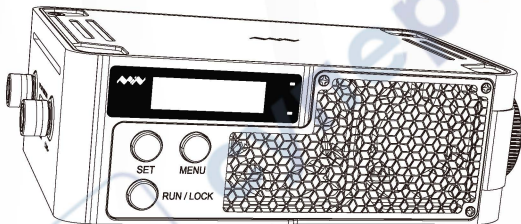


MINIWARE

CN/EN/RU



MDP-L1060 直流电子负载

DC Electronic Load

用户手册V1.0
User Manual

本手册基于MDP-L1060 DFU 4.02, APP 1.08
This user manual is based on MDP-L1060

Contents

Safety Instructions	1
01 Product Overview	2
02 Buttons & Interface	5
03 Function Interface Introduction	7
04 Panel Indicators	16
05 Working Modes	17
06 Advanced Functions (Work With MDP Display Control Module)	19
07 Safety Protections	25
08 Firmware Upgrade	26
09 FAQ	27
10 Legal Statements	29

Safety Instructions

Precautions

- 1) Please use a reliable and certified data cable/power supply to connect the device;
- 2) When using, please ensure that the front and rear of the device are not blocked, and do not insert foreign objects into the air outlet;
- 3) After the device is turned on, please keep away from the air outlet on the back of the device to avoid burns.
- 4) When the device shows an over-temperature warning, do not touch it with your hands to avoid burns;
- 5) There is a danger of high voltage at the load input port of the device, please avoid circuit exposure. Do not touch exposed connectors and components when powered on;
- 6) When it is suspected that the product is malfunctioning, do not operate it;
- 7) Do not operate the device with the cover open;
- 8) Do not operate in humid environment;
- 9) Do not operate in flammable and explosive environment;
- 10) Please keep the product surface clean and dry;
- 11) Do not soak the whole product in water or operate it with wet hands, and be careful to prevent leakage;
- 12) This product contains precision components, please prevent it from falling.

Use Responsibility Statement

For any special, indirect, incidental or consequential damage or loss caused by operating the product without following the contents of this manual (including but not limited to operating environment, warnings, precautions, and instructions), the manufacturer shall not be responsible.

Any damage or loss caused by unauthorized disassembly and modification of the product shall be the responsibility of the user.

Please keep this product in a safe place to prevent children from using this product unsupervised.

Operating Environment

	Working state		Non-working state
Temperature	+0°C~+40°C		-20°C~+70°C
Humidity	High temperature	40°C~50°C 0%~60%RH	40°C~60°C 5%~60%RH
	Low temperature	0°C~40°C 10%~90%RH	0°C~40°C 5%~95%RH

Note: When the internal temperature reaches 80°C, the device will activate over-temperature protection, and turn off with load.

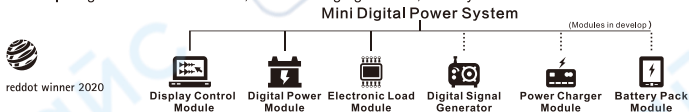
1/Product Overview

1.1 Product Introduction

MDP (Mini Digital Power System) is a programmable linear DC power supply system based on modular design, capable of connecting up to 6 different modules as needed. For its innovative 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), DC Electronic Load Module;

Modules in Develop: Signal Generator Module, Power Charging Module, Battery Pack Module.



DC Electronic Load MDP-L1060 is the first programmable intelligent DC electronic load module of MDP (Mini Digital Power System) series. MDP-1060 has four working modes as constant current (CC), constant voltage (CV), constant resistance (CR) and constant power (CP). It can test 60V 10A, up to 100W load input, and provide over-voltage (OVP), over-current (OCP), over-power (OPP), over-temperature (OTP), Anti-Reverse (polarity) and other comprehensive intelligent safety protection functions. It is a portable smart solution for various test scenarios of AC/DC power supplies, DC/DC converters, chargers, batteries, adapters and power electronic components.

MDP-L1060 continues the stackable design of MDP series, small in size and portable as a whole. The built-in 600mAh battery can meet a short-term emergency load test cordless. The main body of the load module adopts a CNC aluminum alloy frame with built-in high-efficiency brass heat sinks and high-speed cooling fans, which can automatically adjust the wind speed for heat dissipation according to the load consumption. The hollow decorative pieces on the front and rear of the module can maximize the air intake and ensure the heat dissipation speed. The load input port adopts a 4mm three-purpose gold-plated standard port, and is equipped with an XT30 input port for remote compensation, which can complete a more accurate load test.

As the electronic load module of MDP series, after matching with the display control module (MDP-M01) for wireless communication, MDP-L1060 can perform complex advanced functions via remote control, such as battery (capacity) test, internal resistance test, factory test, dynamic test, over-current protection test and flexible triggering options, thus enhancing usability of the device.

- Stackable design of MDP series, miniaturized, convenient and easy to use;
- 4 Working modes: constant current (CC), constant voltage (CV), constant resistance (CR) & constant power (CP);
- 5 Advanced functions: battery (capacity) test, internal resistance test, factory test, dynamic test & over-current protection test;
- 5 Major intelligent safety protections: over-voltage (OVP), over-current (OCP), over-power (OPP), over-temperature (OTP) & anti-reverse protection;
- Intelligent fan/wind speed control, efficient heat dissipation, energy saving;
- Better accuracy with 4mm three-purpose gold-plated standard input port, XT30 remote compensation input port;
- 2.4G wireless communication, realizing complex remote control and advanced functions through MDP display control module;
- Support programmable loading test.

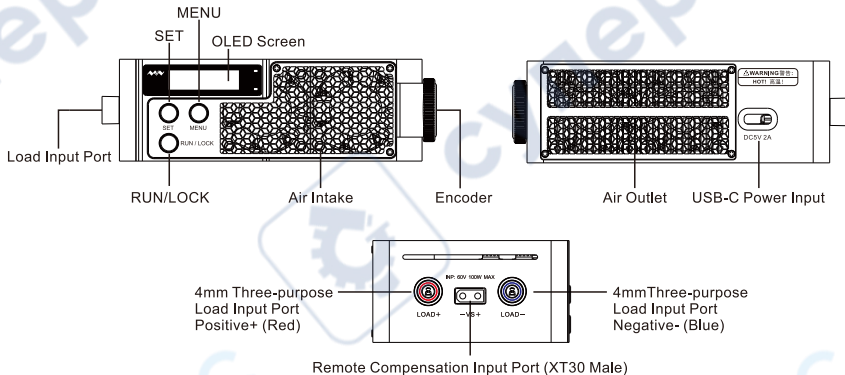
1.2 Product Parameters

Mode	MDP-L1060
Power input	DC 5V 2A
Battery capacity	3.7V 600mAh
Input Interface	USB TYPE-C
Maximum load input voltage	60V
Maximum load input current	10A
Maximum load input power	100W
Safety protections	Over voltage protection (OVP), over current protection (OCP), over power protection (OPP), over temperature protection (OTP), anti-reverse protection
Size	112*66.5*34mm
Weight	323g

Working mode	Range	Resolution (Device adjustment)	Resolution (Via display control module)
CC	15mA~10A	1mA	1mA
CV	0.1V~60V	10mV	1mV
CR	10mΩ~4KΩ	10mΩ	10mΩ
CP	3mW~100W	10mW	1mW

2/Button & Interface

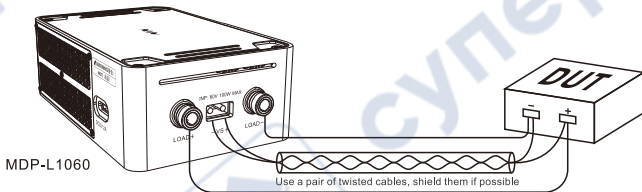
2.1 Button Introduction



Note: When using the device, do not block the air intake and outlet, or insert foreign objects to ensure air circulation.

Notice:

1. When the voltage of MDP-L1060's built-in battery is lower than 3.2V, generally only a simple setting operation can be performed, and it is not recommended to enter working mode.
2. Remote compensation: When the device consumes a large current, there will be a voltage drop on the connection cables between the device under test (DUT) and itself. please connect the XT30 remote compensation port for voltage compensation. The schematic diagram of the wiring is as follows:



2.2 Power ON & Power OFF

Power on: Press and hold both SET and MENU Button;

Power off: Press and hold both SET and MENU Button, and release the buttons when "SHUT DOWN" appears on the screen.

Automatic shutdown: If the device is not connected to power source and is not connected to MDP display control module,

1. After turning on the device, if no operation is performed, the device will start to calculate the standby time after 1 minute, and it will automatically shut down after 1 minute of standby;
2. After the load input is turned off, the device will automatically shut down after 1 minute of no operation.

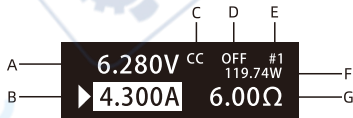
2.3 Button Functions

Buttons	Main Function	Secondary Function
SET	(When input is off) Switch between 4 working modes: CC, CV, CR and CP	(Long Press) Select coarse adjustment to enable the function of setting parameters
MENU	Switch display content; View current settings	(Long Press) Enter setting menu
RUN/LOCK	Turn on or off the load input (highest priority)	(Long Press) Lock parameters
Encoder	Adjust value	Switch menu

Note: When the parameters of the electronic load are locked, User cannot operate SET Button function or set the value of each working mode, and the display control module cannot remotely control the device.

3/Function Interface Introduction

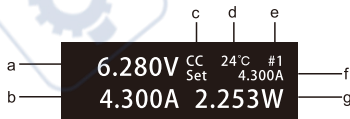
3.1 Main interface (Input Off)



Area	Parameter Description
A	Constant voltage setting value
B	Constant current setting value
C	Working mode (CC/CV/CR/CP)
D	Device status (display "OFF" when not pulling load; Display device temperature when working)
E	(After connecting with MDP display control module) device channel number
F	Constant power setting value (When parameter is locked, display  before value)
G	Constant resistance setting value

Note: The setting value displayed in reverse in the interface corresponds to the currently selected working mode. Please refer to 3.3 for how to modify setting value and working mode.

3.2 Working interface (Input On)



Area	Parameter Description	
a	Real-time voltage	
b	Real-time current	
c	Working mode (CC/CV/CR/CP)	
d	Device real-time temperature	
e	(After connecting with MDP display control module) device channel number	
f	Power setting value; Display different content in different status	When parameter is unlocked, display "set" before value
		When parameter is locked, display  before value
		When programmable loading, display "P" before value
g	Real-time power	

3.3 Parameter Setting

[3.3.1] Working Mode Parameter Setting

1) In the unlocked state, press SET Button on the main interface to switch working mode (CC/CV/CR/CP), the cursor will jump to the setting value of the corresponding mode and show in reverse;

When working mode is set to CC, roll Encoder to adjust the current setting value, the setting range is 0.015A ~ 10A;

When working mode is set to CV, roll Encoder to adjust the current setting value, the setting range is 0.01V ~ 60V;

When working mode is set to CR, roll Encoder to adjust the current setting value, the setting range is 0.01Ω ~ 4000Ω;

When working mode is set to CP, roll Encoder to adjust the current setting value, the setting range is 0.003W ~ 100W.



In non-working state, the modified parameters will be displayed in reverse at the corresponding position on the interface.



In working state, "Set Cur/Vol/Resis/Power" will appear in the middle right of the interface, and the modified parameters will be displayed in reverse at the lower right corner.

2) Factory default parameter settings:

Working Mode	Default Setting Value
CC	1.000A
CV	3.300V
CR	1.000Ω
CP	5.000W

3) The setting value cannot be modified if the device is in locked states. After no operation of Encoder for 1 second, the setting value will return to former display content;

[3.3.2] Safety Protection Parameter Setting

Safety Protection Parameters		Set Range	Default Setting
OCP	Over-current Protection	1A~10A	5A
OVP	Over-voltage Protection	1V~60V	30V
CPP	Over-power Protection	1W~100W	50W

[3.3.3] Coarse And Fine Adjustment

- 1) Fine adjustment: Roll Encoder directly;
- 2) Coarse adjustment: Press and hold SET Button and roll Encoder at the same time;
- 3) Each parameter adjustment stepping:

Parameter	Fine Stepping	Coarse Stepping
Constant Current	1mA	60mA
Constant Voltage	10mV	0.6V
Constant Resistance	1Ω (over 1000Ω)	10Ω (over 1000Ω)
	100mΩ (100Ω~1000Ω)	5Ω (100Ω~1000Ω)
	10mΩ (less than 100Ω)	1Ω (less than 100Ω)
Constant Power	10mW	200mW

3.4 Display Menu

In standby state, press MENU Button to enter browse mode, and roll Encoder to turn the page. In browse mode, if there is no operation for 5 seconds, it will automatically return to main interface, or press MENU Button to return to main interface.

Note: RUN/LOCK Button operation will not affect the current display content and category.



1) Input voltage (Inp Vol);



2) Internal battery level (Battery);



3) Device version information.