

Lead-acid & Lithium Battery Universal Charge-discharge Tester

User Manual

Model: DK-DSF20

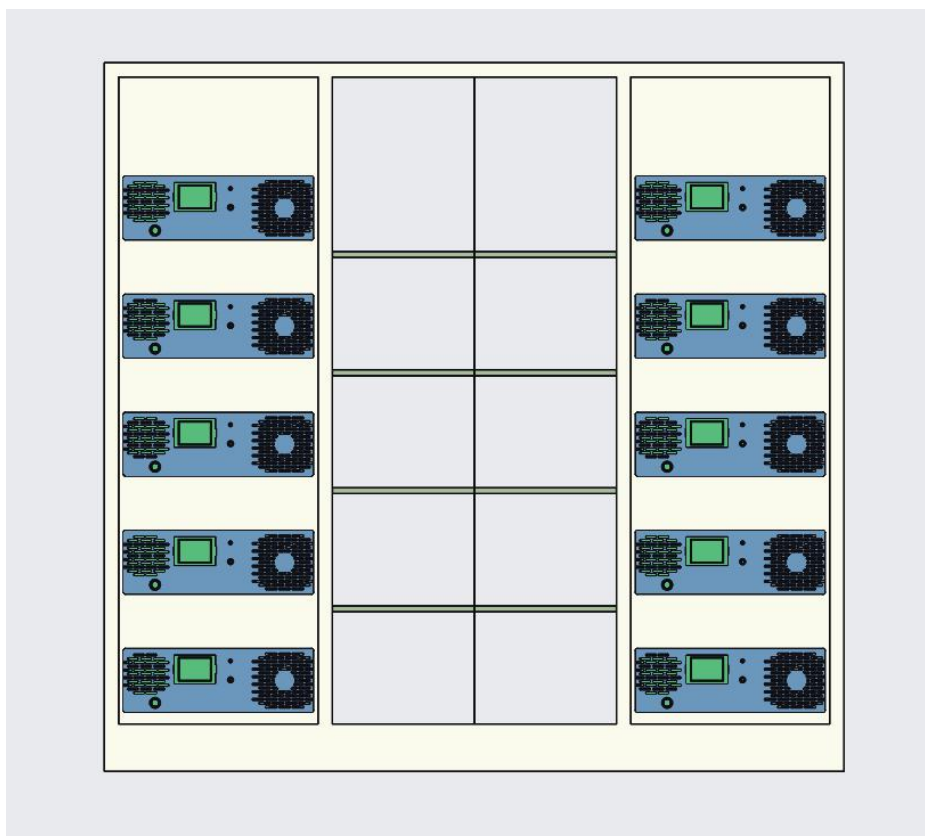
Description:

The lead-acid & lithium battery universal series tester integrated with the function of a high-precision capacity series discharging test and high-precision series charging test. Charging test and discharge test can be performed for lead-acid batteries, lithium batteries and other types of batteries. It is also a high-precision specific instrument suitable for electric vehicle dealers and battery manufacturers to test the performance of battery pack.

The device provides two operation modes for the convenience of customers, **Panel** operation and **Online** operation. After installing the specified software, the device can be managed and operated through the computer: charge-discharge setting, data sampling, test report import and export, test data analysis, charge-discharge curves drawing. One computer can manage multiple devices simultaneously through a switch.



10-Channel testing cabinet composed of DSF20 single machine can meet the needs of large-scale testing and aging:



10-Channel Testing Cabinet

Model No.: DSF20-10

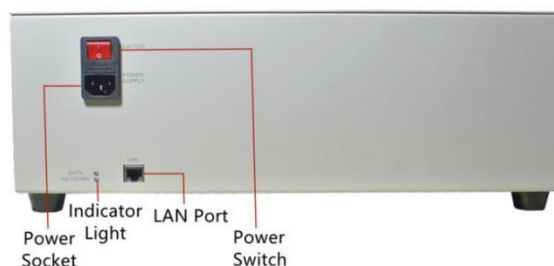
Technical Parameter:

Input Voltage:	AC 220V \pm 10% 50Hz/60Hz	Maximum Power:	900W
Charging Method:	Constant current & constant voltage charge	Discharging Method:	Constant current discharge
Charging Test Max. Voltage:	9V-99V adjustable 0.1V stepping	Discharging Test Cut-off Voltage:	9V-99V adjustable 0.1V stepping
Charging Current:	0.5-10A adjustable	Discharging Current:	9V-21V: 0.5-10A adjustable 21V-99V: 0.5-20A adjustable
Charging Cut-off Current:	0.1-5A adjustable	Voltage/Current Errors:	<0.03 V/A
Discharging Stepping Current:	0.1A	Charging Stepping Current:	0.1A
Max. Loop No.:	16 times	Loop Idle Interval:	0-20 MINS adjustable
Communication Port:	LAN	Operation Methods:	Panel/Software

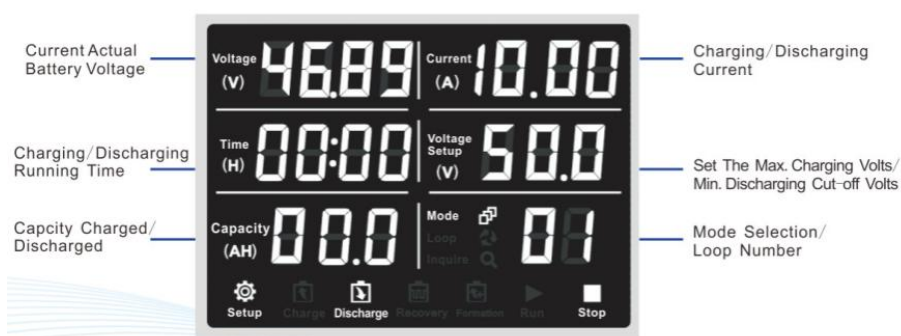
Illustration:



Front



Back



(LCD)

Panel Operation Introduction

Working Mode

- 7 working modes:

Mode Code	Function
00	Inquire
01	Discharge
02	Charge
03	Loop mode 3: Starting with discharge and ending with charge Max. loop number: 16 times
04	Loop mode 4: Starting with charge and ending with charge Max. loop number: 16 times
05	Loop mode 5: Starting with discharge and ending with discharge Max. loop number: 16 times
06	Loop mode 6: Starting with charge and ending with discharge Max. loop number: 16 times
07	Networking mode (When the computer starts the device, it automatically changes to this mode).

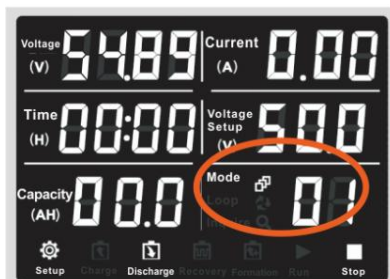
Usage:

Mode "01"-Discharge (The detailed steps refers to the discharge figure 1 -4)

Discharging Current: 0.5-10A adjustable (9V-21V)

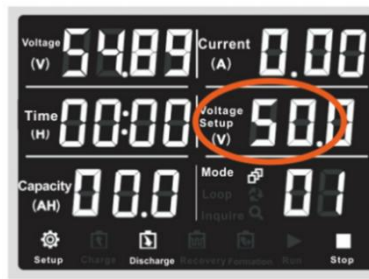
0.5-20A adjustable (21V-99V)

Discharging Cut-off Voltage: 9V-99V 0.1V adjustable(Stepping: 0.1A)



After power on, press the black setting knob and the mode selection bar in the bottom right flashes, rotate the black setting knob to set to mode "01"

Discharge Figure 1



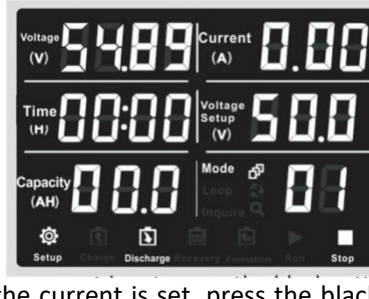
After the mode is set, continue to press the setting knob, the voltage setting bar flashes, rotating the black setting knob to set the discharging cut-off voltage.

Discharge Figure 2



After the voltage is set, continue to press the setting knob and the current bar flashes, rotating the black setting knob to set the discharging current.

Discharge Figure 3



After the current is set, press the black setting knob again, all the setting bars stop flashing, and the current display "0.00", the setting is completed. Press the red start knob to discharge. Judging whether the battery is good or bad according to the discharging time of the battery.

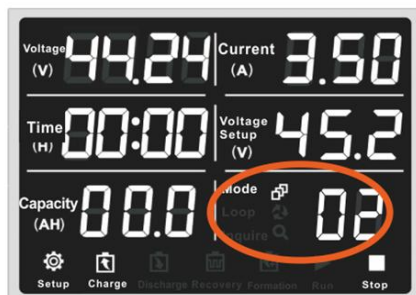
Discharge Figure 4

Mode "02"-Charging (The detailed steps refers to the charge figure 1 -5)

The charging constant voltage: 9V-99V adjustable, 0.1V stepping

Charging cut-off current: 0.1-5A adjustable

Charging current: 0.5-10A adjustable (stepping: 0.1 A)



Press the black setting knob, the mode selection bar in the lower right flashes, rotate the black setting knob to set to mode "02".

Charge Figure 1



After the mode is set, continue press the setting knob, the voltage setting bar flashes, and rotates the black setting knob to set charging constant voltage.

Charge Figure 2



After the voltage is set, continue to press the setting knob, the current bar flashes, and rotate the black setting knob to set the charging current.

Charge Figure 3



After the current is set, press the black setting knob again, the current bar displays "0.10", and rotate the black setting knob to set the charging cut-off current

Charge Figure 4



After the charging cut-off current is set, press the black setting knob again, all the setting bar stop flashing, the current display "0.00", the setting is completed. Press the red start knob to charge, it will automatically stop after the charging is completed.

Charge Figure 5

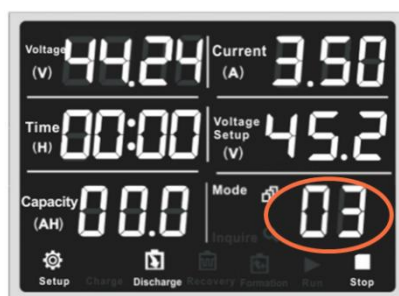
Mode "03"-Loop (The detailed steps refers to the loop figure 1 -10)

Description: Starting with discharge and ending with charge

Max. Loop index: 16 times

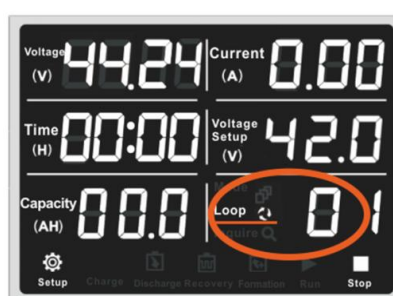
Loop idle interval: 0-20mins adjustable

The preset charging capacity of the last loop: 0-99.9AH(If "0" is set, it means the charging capacity of last loop is not preset.)



Press the black setting knob, the mode selection bar in the lower right flashes, rotate the black setting knob to set the mode to "03".

Loop Figure 1



After the mode is set, continue press the setting knob, the loop number bar in the lower right flashes, rotate the black setting knob to set the loop index of charging and discharging(1-16 times at option)

Loop Figure 2



After the loop number is set, continue press the setting knob, the voltage bar flashes, rotate the black setting knob to set the discharging cut-off voltage.

Loop Figure 3



After the voltage is set, press the setting knob again, the current bar flashes, rotate the black knob to set the discharging current.

Loop Figure 4

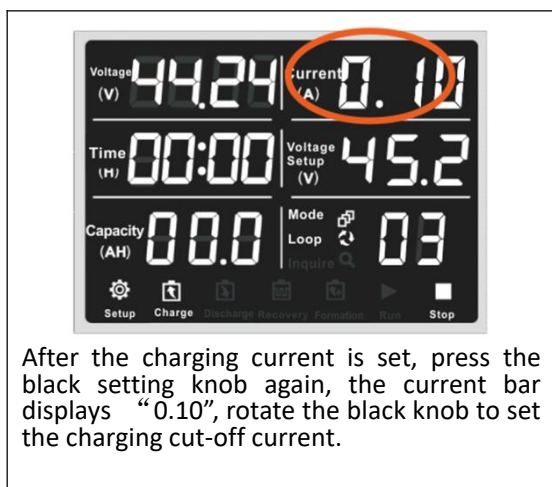


After the discharging current is set, press the black setting knob again, the voltage setting bar flashes, rotate the black knob to set the charging constant voltage.

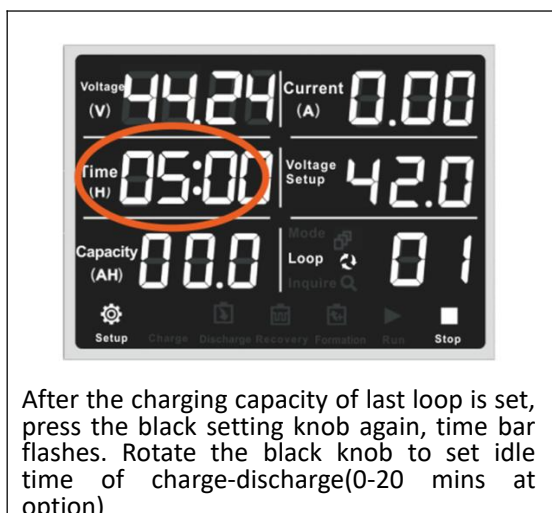


After the voltage is set, continue to press the setting knob, the current bar flashes, rotate the black setting knob to set charging current.

Loop Figure 5

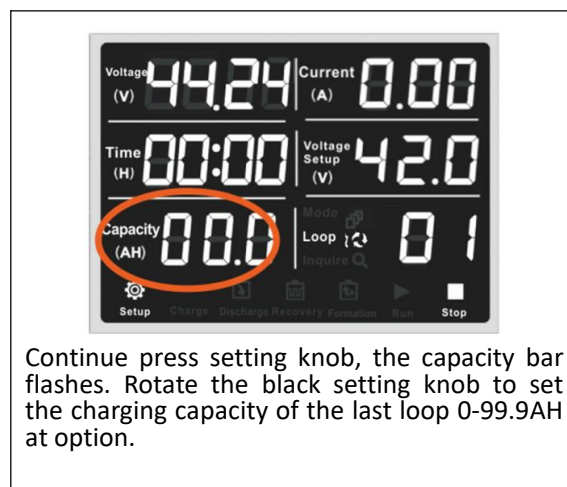


Loop Figure 7

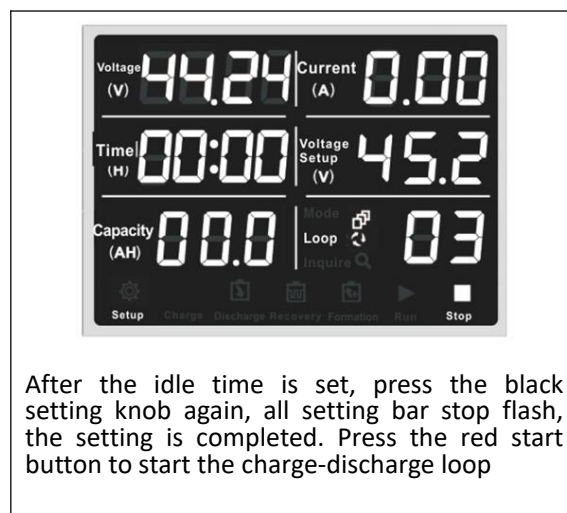


Loop Figure 9

Loop Figure 6



Loop Figure 8



Loop Figure 10

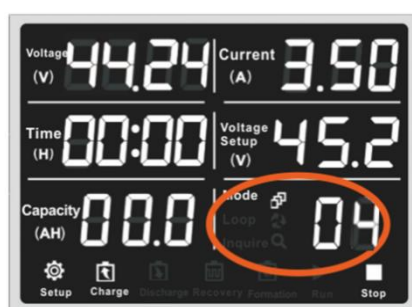
Mode "04"-Loop (The detailed steps refers to the loop figure 1 -10)

Description: Starting with charge and ending with charge

Max. Loop index: 16 times

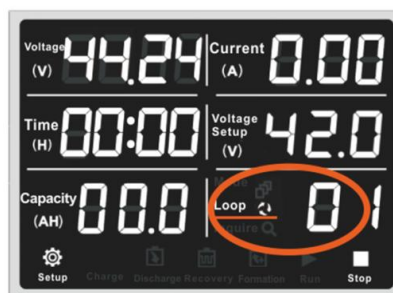
Loop idle interval: 0-20mins adjustable

The preset charging capacity of the last loop: 0-99.9AH(If "0" is set, it means the charging capacity of last loop is not preset.)



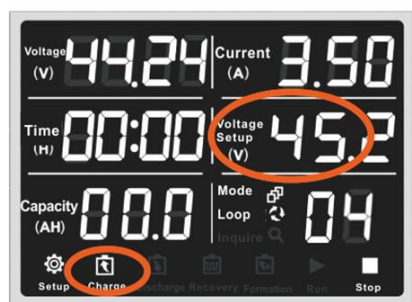
Press the black setting knob, the mode selection bar in the lower right flashes, rotate the black setting knob to set the mode to "04".

Loop Figure 1



After the mode is set, continue press the setting knob, the loop number bar in the lower right flashes, rotate the black setting knob to set the loop number of charging and discharging(1-16 times at option).

Loop Figure 2



After the loop number is set, continue press the setting knob, the voltage bar flashes, rotate the black setting knob to set the charging constant voltage.

Loop Figure 3



After the voltage is set, continue press the setting knob, the current bar flashes, rotate the black setting knob to set charging current.

Loop Figure 4



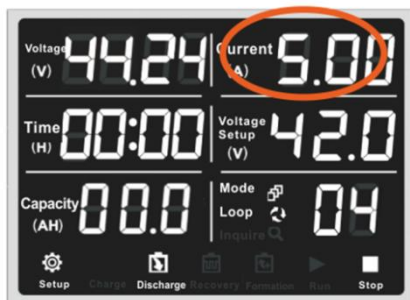
After the current is set, press the setting knob again, the current bar displays "0.50", rotate the black knob to set the charging cut-off current.

Loop Figure 5



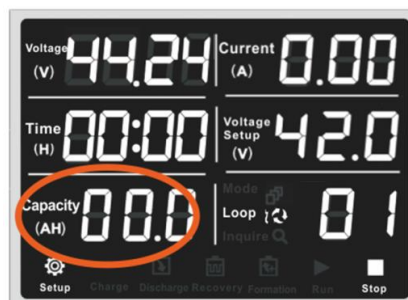
After the charging cut-off current is set, press the black setting knob again, the voltage setting bar flashes, rotate the black knob to set the discharge cut-off voltage.

Loop Figure 6



After the voltage is set, press the setting knob again, the current bar flashes, rotate the black knob to set the discharging current

Loop Figure 7



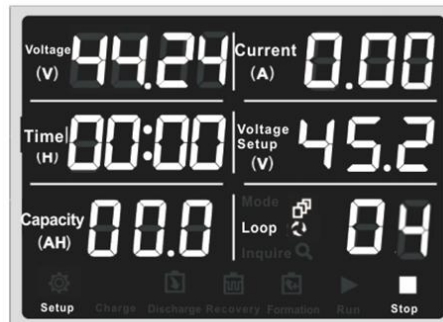
After the discharging current is set, continue press the setting knob, the capacity bar flashes. Rotate the black setting knob to set the charging capacity of the last loop(0-99.9AH, when the last charging capacity reaches this setting capacity, the charging will automatically end. If no charging capacity is set, the last charging will end after fully charged).

Loop Figure 8



After the charging capacity of last loop is set, press the black setting knob again, time bar flashes. Rotate the black knob to set idle time of charge-discharge(0-20 min at option).

Loop Figure 9



After the idle time is set, press the black setting knob again, all setting bar stop flash, the setting is completed. Press the red start button to start the charge-discharge loop

Loop Figure 10

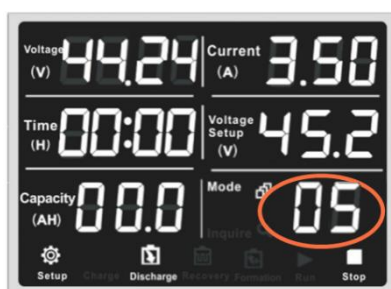
Mode "05"-Loop (The detailed steps refers to the loop figure 1 -9)

Description: Starting with discharge and ending with discharge

Max. Loop index: 16 times

Loop idle interval: 0-20mins adjustable

The preset charging capacity of the last loop: 0-99.9AH(If "0" is set, it means the charging capacity of last loop is not preset.)



Press the black setting knob, the mode selection bar in the lower right flashes, rotate the black setting knob to set the mode to "05".

Loop Figure 1



After the mode is set, continue press the setting knob, the loop number bar in the lower right flashes, rotate the black setting knob to set the loop index of charging and discharging(1-16 times at option).

Loop Figure 2



After the loop number is set, continue press the setting knob, the voltage bar flashes, rotate the black setting knob to set the discharging cut-off voltage.

Loop Figure 3



After the voltage is set, press the setting knob again, the current bar flashes, rotate the black knob to set the discharging current.

Loop Figure 4



After the discharging current is set, press the black setting knob again, the voltage setting bar flashes, rotate the black knob to set the charging constant voltage.



After the voltage is set, continue press the setting knob, the current bar flashes, rotate the black setting knob to set charging current.

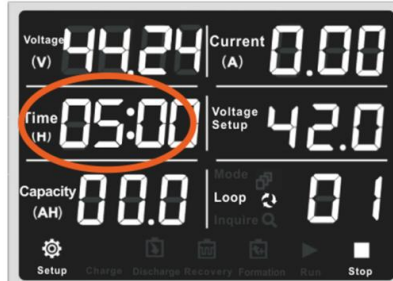
Loop Figure 5

Loop Figure 6



After the charging current is set, press the black setting knob again, the current bar displays “0.10”, rotate the black knob to set the charging cut-off current.

Loop Figure 7



After the charging capacity of last loop is set, press the black setting knob again, time bar flashes. Rotate the black knob to set idle time of charge-discharge(0-20 mins at option)

Loop Figure 8



After the idle time is set, press the black setting knob again, all setting bar stop flash, the setting is completed. Press the red start button to start the charge-discharge loop

Loop Figure 9

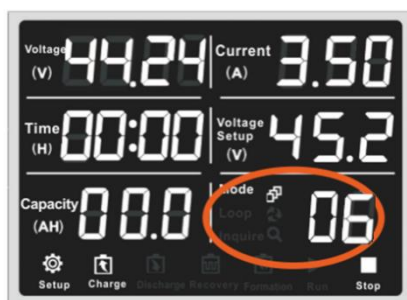
Mode "06"-Loop (The detailed steps refers to the loop figure 1 -9)

Description: Starting with charge and ending with discharge

Max. Loop index: 16 times

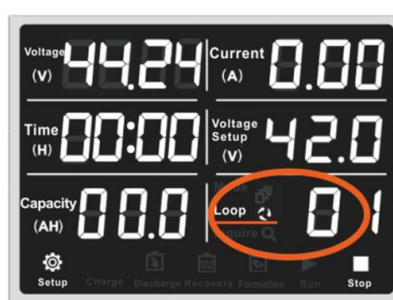
Loop idle interval: 0-20mins adjustable

The preset charging capacity of the last loop: 0-99.9AH(If "0" is set, it means the charging capacity of last loop is not preset.)



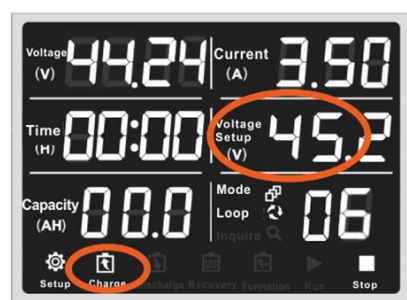
Press the black setting knob, the mode selection bar in the lower right flashes, rotate the black setting knob to set the mode to "06" .

Loop Figure 1



After the mode is set, continue press the setting knob, the loop number bar in the lower right flashes, rotate the black setting knob to set the loop number of charging and discharging(1-16 times at option).

Loop Figure 2



After the loop number is set, continue press the setting knob, the voltage bar flashes, rotate the black setting knob to set the charging constant voltage.

Loop Figure 3



After the voltage is set, continue press the setting knob, the current bar flashes, rotate the black setting knob to set charging current.

Loop Figure 4



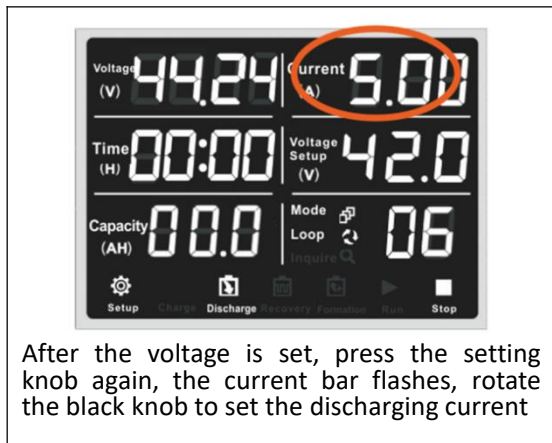
After the current is set, press the setting knob again, the current bar displays "0.10", rotate the black knob to set the charging cut-off current.



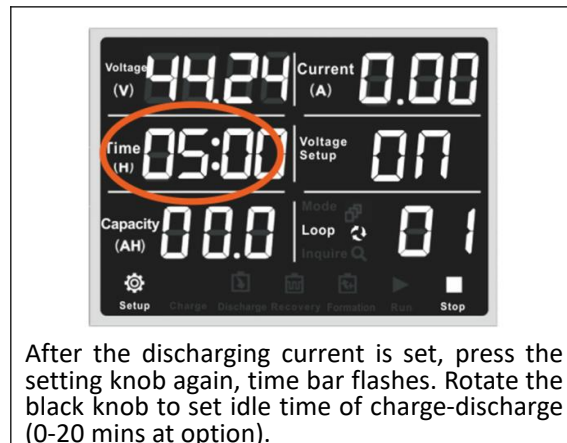
After the charging cut-off current is set, press the black setting knob again, the voltage setting bar flashes, rotate the black knob to set the discharge cut-off voltage.

Loop Figure 5

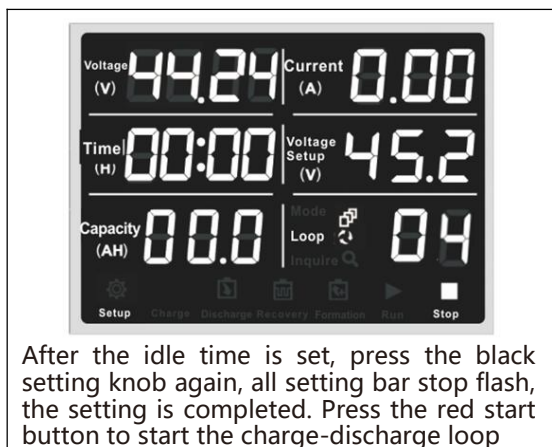
Loop Figure 6



Loop Figure 7

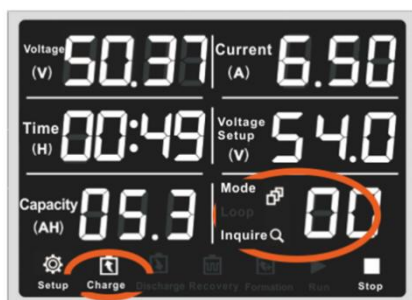


Loop Figure 8



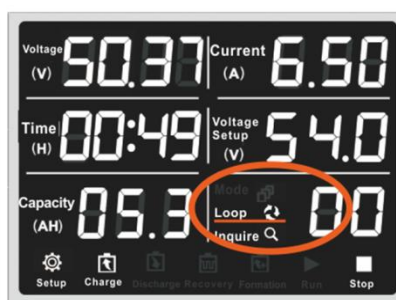
Loop Figure 9

Mode "00"-Inquire (The detailed steps refers to the inquire figure 1 -5)



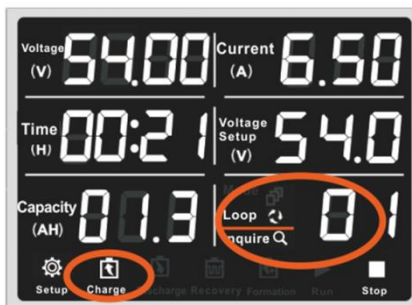
Press the black setting knob, the mode bar in the lower right flashes, rotate the black setting knob to set mode "00", at this moment, the LCD displayed the data of last single charge or last single discharge.

Inquire Figure 1



To inquire the data of last loop of charge-discharge, press the black setting knob, the mode bar in the lower right stop flash and the indicator light of loop number lights on.

Inquire Figure 2



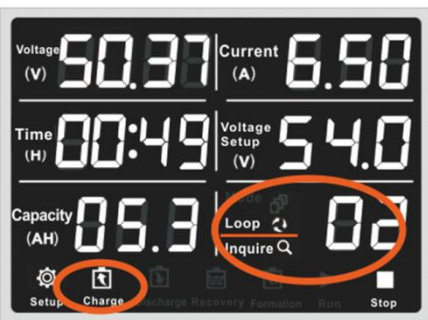
Rotate the black setting knob clockwise, the mode bar in the lower right display "01", the screen displays the data of the first loop charge.

Inquire Figure 3



Continue rotate the black setting knob clockwise, the mode bar in the lower right displays "01", the screen displays the data of the first loop discharge.

Inquire Figure 4



Continue rotate the black setting knob clockwise, the mode bar in the lower right displays "02", the screen displays the data of second charge. For more loops, repeat rotating the black knob and so on.

Inquire Figure 5

Performance and Usage Tips:

- Positive and negative reverse connection protection.
- Intelligent temperature -control speed fan.
- Special LCD screen, all data is clear at a glance.
- Power-failure memory protection.
- High precision, flexible setting, meeting the different requirement of charge-discharge

Special Caution:

The system will automatically save the setting after the parameter setting is completed, it's not necessary to set in next starting-up, click the start button to run directly.

In the charge/discharge process, press the Start button to suspend working, and press the Start button again to continue the work.

The machine will suspend working if the connection cables come off, please keep the connection cables in the good connection.

If the machine stop working accidentally, keep pressing the red Start button for 5 seconds, the machine will resume running state before pause.

When a power failure occurs, turn on the power after the power is restored, keep pressing the red start button for 5 seconds, the device will continue to run from the last power failure, and the previous data will be retained.

Safety Caution:

- Connecting the battery in proper polarity and keeping the good connection
- Keep away from the inflammable and explosive articles in use, and put them in cool and ventilated place. Do not block the air inlet and outlet.
- Please take a proper storage, and avoid violent action such as collision during use and transportation.

Failure Solution

Failure Description	Failure Causes	Solution
Power on and the LCD screen doesn't light up	1. The power cord plug is not connected properly to the power socket	Re-connect the power cord plug
	2. The fuse in the power socket blown,	Replace it with 5A fuse
	3. The fuse in the circuit blown	Replace it with 1.5A fuse
	4. The flat cable between the LCD and main board loosed	Plug the flat cable tightly
	5. The switch power supply don't work properly.	Return to factory for repair or replace the main board.
Power on and the LDC screen light up, but display nothing.	1. The flat cable between the LCD and main board loosed	Plug the flat cable tightly
	2. The LCD was damaged	Replace the LCD
	3. The communication between SCM and LCD display is abnormal	Return to factory for repair or replace the main board.
The setting knob did no work	1. The flat cable between the knob and main board loosed.	Plug the flat cable tightly
	2. The knob is pressed too deep and too tight to reset	Pull the knob out
	3. Encode was damaged	Replace the encode
The device has the abnormal noise	1. Foreign matter in the fan	Open the case and remove the foreign matter
	2. The fan doesn't rotate properly	Refueling is need if there is high noisy, replace the fan if it is damaged
No voltage displays after the test cables connect to the battery	1. The poor connection between the test cables and the battery.	Clear the clamp of test cables or cathode tab of the battery
	2. The voltage sampling flat cable of test cable in the main board loosed or the test cable was damaged.	Reinsert the flat cable or replace the test cable.
	3. The SCM can not detect the voltage	Return to the factory or replace the main board
Press the start button and fail in start	1. The flat cable of start button loosed	Reinsert the flat cable
	2. The start button was damaged	Replace the start button
	3. The SCM can not detect the voltage	Return to the factory or replace the main board.
There is voltage displays in the LCD after the test cables are connected to the battery, but it can't charge and discharge(without current) after start	1. The connection of four core wire in the main board loosed or the four core wire was damaged.	Reconnect the wire or replace the quad
	2. The SCM can not detect the current or the switch power supply was damaged	Return to the factory or replace the main board.
	3. The heat wire loosed	Tighten the heat wire
	4. MOS tube was damaged	Return to factory or replace it

Software Operation Introduction

Preparation For Connection:

Step 1: Connect AC 220V to the power input socket, turn on the power switch.

As shown in figure:



Step 2: Connect the device to the computer by the network cable.

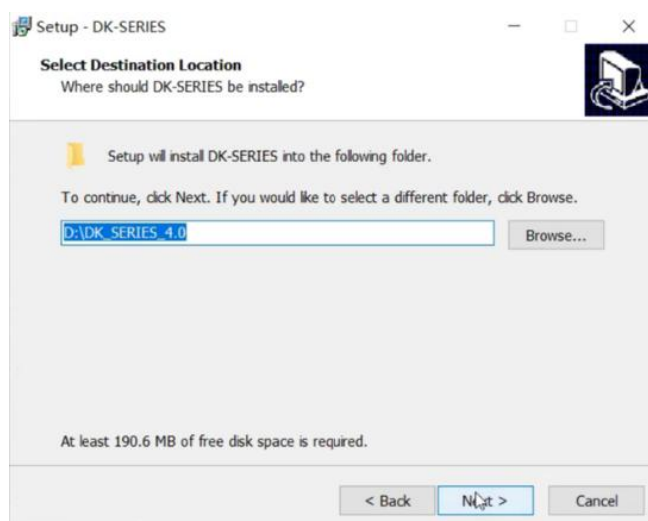


Software Installation and Connection

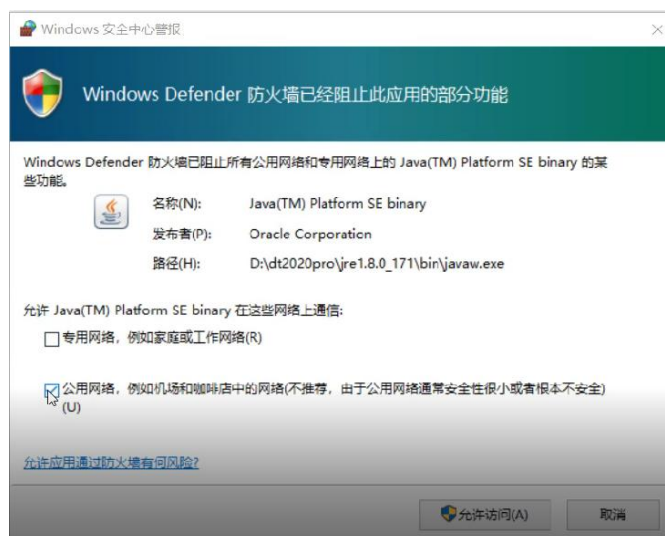
Step 1. Find the installation software and open it

 dk_series_4.0_us

Step 2. Win10 system can choose the installation location, please do not install in C disk, other systems default to D disk.



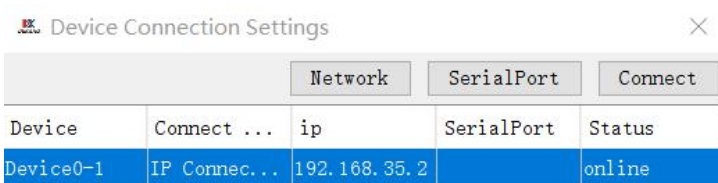
Step 3. Start it after installation, for network selection during the first run, make sure to check the public network to allow to access.



www.dk-tester.com

Call/WhatsApp/WeChat: +8615968872605 | E: feng.zheng76@foxmail.com | Skype: live:f4fcdd9dac4d7d8c

Step 4. Click the “Connect”, select the device need to connect in the window comes out, click to connect device after status bar turning to blue, the set IP window will appear, and directly click confirm by default.



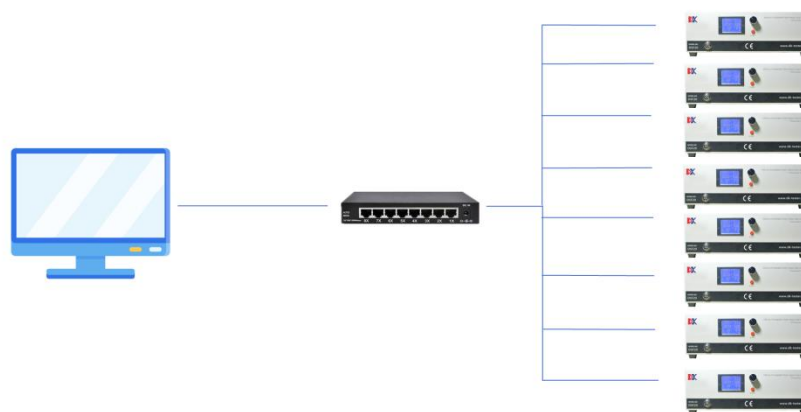
Caution:

1. If it is installed in the C disk, it will cause the user name and password to be reported as an error. The solution is to restart it in administrator mode. If it don't work, please reinstall in other disk.
2. If the public network is not checked in initial running, it may displays “IN CONNECTING” all the time when connection.

Solution: ① Turn off the public network firewall. ② Modify the software operation network connection mode, you can reset the firewall default value if you cannot modify it. ③ Reinstall the software to check the network connection.

Multiple Devices Connection

1. When multiple devices are connected to the computer, connect through a switch



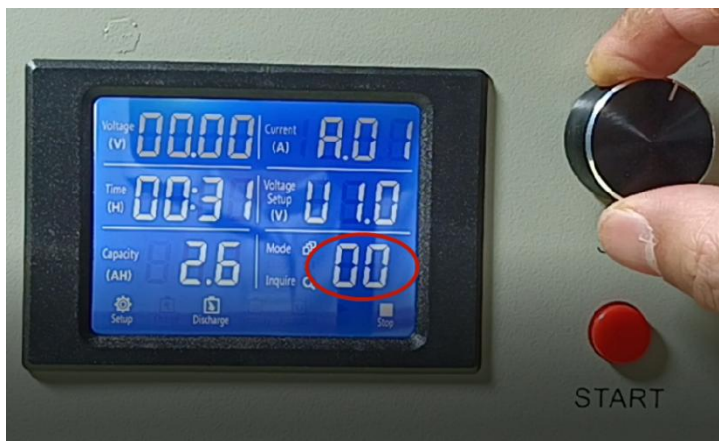
(Schematic diagram of connecting multiple devices)

2. Device Address Setting

If multiple devices are connected, set the address of each device. The address of each device is represented by a number ranging from 1 to 99. The address of each device must be unique.

Device address setting method:

Step 1: Press the black setting knob, the mode bar flashes, turn the knob to mode "0"



Step 2: Press down the black setting knob, the current bar flashes, turn the knob to select the device address.

Step 3: After the device address is set, press the knob again, the device address setting is completed.

Remarks: The device address ranges from 1 to 99. When multiple devices are connected, the device address must be different.

Battery Connection

1. Applicable Batteries

The DSF20 device can test various types of Lithium Batteries, Lead-acid Batteries with the voltage testing range in 9V-99V.

2. The connection between device and batteries (As shown in the figures).



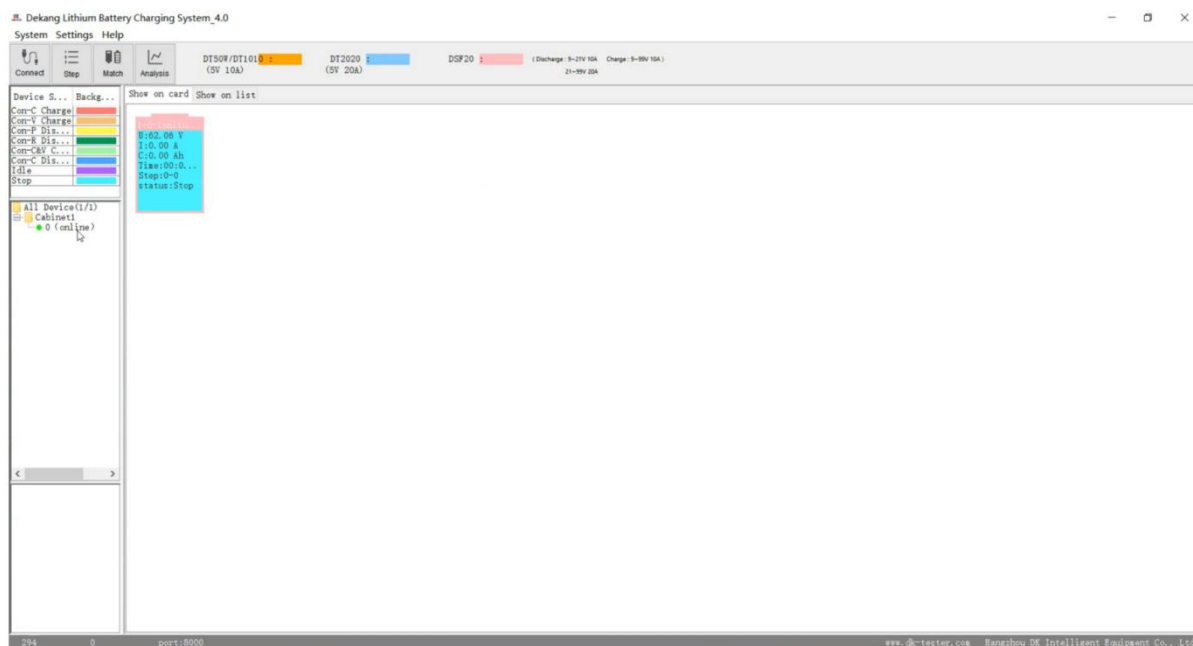
Installing the testing cables delivered together with the machine, properly connect the clip to the positive and negative polarity of battery.

Note: In order to ensure the sampling accuracy, the testing cable is made by four-wire sampling system. When the clip is connected to the polarity piece of the battery, it is necessary to check whether clip on the signal sampling side is full contact.

Operation of Software

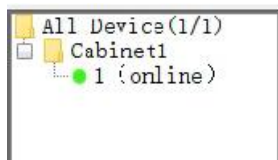
1. Main Interface

1.1 Main Interface

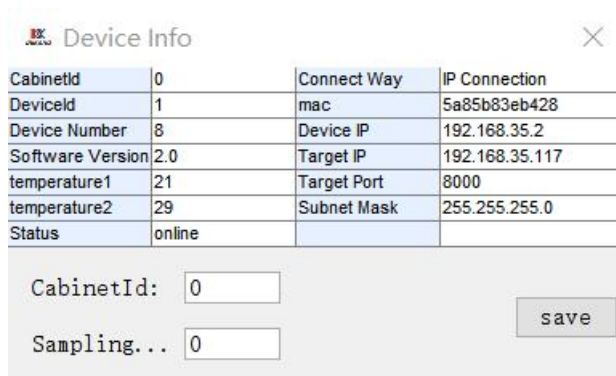


1.2 Device Information

The device information shows the device list, which is used to indicate the connection status and connection number of the software access device. Double-click on a device to see the detailed setting information.



1.2.1 The detailed information of the device is as the figure:



Device Info			
CabinetId	0	Connect Way	IP Connection
DeviceId	1	mac	5a85b83eb428
Device Number	8	Device IP	192.168.35.2
Software Version	2.0	Target IP	192.168.35.117
temperature1	21	Target Port	8000
temperature2	29	Subnet Mask	255.255.255.0
Status	online		

CabinetId:

Sampling...

save

The device number, device channel number and cabinet number are the basic information of the device.

Time: Means the last time the data was updated after the device was connected to the computer

Software version: The firmware version of the device.

Communication, IP, port etc.: Indicates information such as the port and IP address of which the device and the computer are connected.

Temperature1 & 2: Indicates the measured values of the two temperature sensors inside the device. When the temperature exceeds 30 °C, the fan automatically runs to dissipate heat

Cabinet no.: When connecting multiple cabinet, set the different number to distinguish different cabinet.

Status: The connection relations between the device and the computer

Sampling rate: Means the frequency of the data collection and uploading.

2. Channel Display

2.1 List Display

Channel	Voltage(mV)	Current(mA)	Capacity(mAh)	Time	Step	Warning	Status	Mode
0-1	3883	751	382	00:15:08	0-3	normal	Con-C Disch...	online mode
0-2	4029	751	51	00:04:34	0-3	normal	Con-C Disch...	online mode
0-3	4201	259	1657	02:25:45	0-1	normal	Con-C&V Ch...	online mode
0-4	3967	751	431	00:35:10	0-3	normal	Con-C Disch...	online mode
0-5	3998	750	436	00:35:38	0-3	normal	Con-C Disch...	online mode
0-6	4202	455	1840	02:30:39	0-1	normal	Con-C&V Ch...	online mode
0-7	3248	749	564	00:45:50	0-3	normal	Con-C Disch...	online mode
0-8	4201	81	1214	02:30:38	0-1	normal	Con-C&V Ch...	online mode
0-9	3962	750	67	00:05:59	0-3	normal	Con-C Disch...	online mode
0-10	3772	751	507	00:41:11	0-3	normal	Con-C Disch...	online mode
0-11	4201	126	1409	02:29:46	0-1	normal	Con-C&V Ch...	online mode
0-12	3872	751	287	00:23:48	0-3	normal	Con-C Disch...	online mode
0-13	4201	309	1705	02:24:15	0-1	normal	Con-C&V Ch...	online mode
0-14	4200	68	1149	02:25:07	0-1	normal	Con-C&V Ch...	online mode
0-15	4201	65	856	02:24:59	0-1	normal	Con-C&V Ch...	online mode
0-16	4201	57	1020	02:30:35	0-1	normal	Con-C&V Ch...	online mode









After the list display is selected, the device state will be displayed in the list.

2.2 Card Display

0-1-1 online mode U:3886 mV I:751 mA C:175 mAh Time:00:14:35 Step:0-3 status:Con-C Disch... 09-17 08:35:09	0-4-2 online mode U:4034 mV I:750 mA C:149 mAh Time:00:04:01 Step:0-3 status:Con-C Disch... 09-17 08:35:16	0-4-3 online mode U:4201 mV I:263 mA C:1654 mAh Time:02:25:11 Step:0-1 status:Con-C&V C... 09-17 09:29:30	0-4-4 online mode U:3474 mV I:750 mA C:424 mAh Time:00:34:37 Step:0-3 status:Con-C Disch... 09-17 08:40:56	0-4-5 online mode U:3606 mV I:750 mA C:429 mAh Time:00:35:05 Step:0-3 status:Con-C Disch... 09-17 08:35:41	0-4-6 online mode U:4201 mV I:461 mA C:1835 mAh Time:00:30:05 Step:0-1 status:Con-C&V C... 09-17 08:35:47	0-4-7 online mode U:3288 mV I:750 mA C:157 mAh Time:00:45:17 Step:0-3 status:Con-C Disch... 09-17 08:35:52	0-4-8 online mode U:4201 mV I:82 mA C:1213 mAh Time:02:30:05 Step:0-1 status:Con-C&V C... 09-17 08:36:01	0-4-9 online mode U:3968 mV I:750 mA C:160 mAh Time:00:05:27 Step:0-3 status:Con-C Disch... 09-17 09:33:55	0-4-10 online mode U:3774 mV I:751 mA C:1407 mAh Time:00:40:39 Step:0-3 status:Con-C Disch... 09-17 08:36:16	0-4-11 online mode U:4201 mV I:1311 mA C:1407 mAh Time:02:29:13 Step:0-1 status:Con-C&V C... 09-17 09:40:20
0-4-12 online mode U:3877 mV I:751 mA C:280 mAh Time:00:23:15 Step:0-3 status:Con-C Disch... 09-17 09:29:30	0-4-13 online mode U:4201 mV I:1319 mA C:1702 mAh Time:02:23:42 Step:0-1 status:Con-C&V C... 09-17 09:29:24	0-4-14 online mode U:4202 mV I:72 mA C:1148 mAh Time:02:24:33 Step:0-1 status:Con-C&V C... 09-17 09:29:14	0-4-15 online mode U:4201 mV I:66 mA C:856 mAh Time:02:24:25 Step:0-1 status:Con-C&V C... 09-17 09:29:16	0-4-16 online mode U:4200 mV I:58 mA C:1060 mAh Time:02:30:05 Step:0-1 status:Con-C&V C... 09-17 08:35:31						

After the card display is selected, the device state will be displayed in the card.

2.3 Status Color Setting

Device Status	Background
Con-C Charge	
Con-V Charge	
Con-P Discharge	
Con-R Discharge	
Con-C&V Charge	
Con-C Discharge	
Set Aside	
Stop	

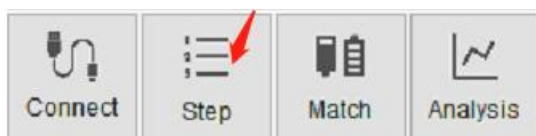
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All the status supported by the device are displayed in color blocks, so that users can easily understand the current running state or find the test channel of abnormal state when applying the device in large quantities.

3. Option Menu Bar

3.1 Step Setting



Step Settings

DI50W/DI1010 DT2020 DSF20

Number	Step Name	Time(min)	Con-V(V)	Con-C(A)	Capacity(Ah)	Limited-C(A)
1	Con-C&V Charge	0.0	71.4	10.0	0.0	1.0
2	Idle	10.0				
3	Con-C Discharge	0.0	46.75	20.0	0.0	
4	Idle	10.0				
5	Cycle Step	1.0	3.0			
6	Con-C&V Charge	30.0	71.4	10.0	0.0	1.0
7	Stop					

add
up
down
edit
delete

New Program
TERNARY 60V 50AH 17S

☒ Save data
☒ TimeInterval (s) 20 ☐ V-Interval (V) 0 ☐ C-Interval (A) 0

export import save cancel

3.1.1 Data Saving Condition

When you need to save the test data to the computer, please check **SAVE DATA** button, otherwise the data will not be saved to the computer.

There are 3 storage conditions to choose from:

Time interval:

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Setting the minimum time interval for data saving, when pass this time, the software system automatically saves a data into the record file of each channel at set interval. This value should not be set too small to avoid the frequent data movement and slow down the computer.

Voltage Interval:

Setting the **V-Interval** condition for data saving, if set to 5, the system will automatically saves a data into the record file when the voltage rise to 60V from 55V. The saving action also will be triggered once when the voltage drop to 55V from 60V. This value should not be set too small to avoid the frequent data movement and slow down the computer.

Current Interval:

Setting the current difference condition for data storage, if set to 1, the system will automatically saves the data into the record file of channel once when the current drop to 9A from 10A. The saving action also will be triggered once when the current rise to 10A from 9A. This value should not be too small to avoid the frequent data movement and slow down the computer.

3.1.2 Work Steps Details

The work step can set multiple test step program and save the name for easy memory, such as "TERNARY 60V 50AH 17S".

Click the **NEW PROGRAM** to add a step program.

Right click to delete or modify the program name. This name will appear in the menu of the following operation interface. Please refer to Step Setting below for details.

Each step program supports saving and setting of up to 64 steps. After the step setting is completed, please add a stop step at the end to stop the working to avoid the abnormality.

Adding Step: Click **ADD** button to add a work step. It must set the corresponding execution parameter of working step, otherwise error parameter may damage the batteries.

Step Modification: Click **EDIT** button can reset the parameter of the selected step, also can double-click this step to open it.

Workstep Delete: Click **DELETE** button to delete selected step.

Workstep Movement: Click **UP** or **DOWN** button to move the selected step.

Workstep Saving: After the setting of working step is completed, click the **SAVE** button to save the current working step into the software system.

Supporting Work Steps:

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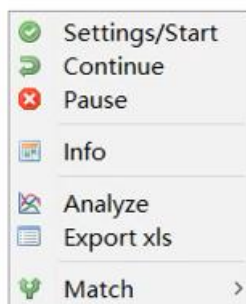
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- Constant current-constant charging (Con-C&V Charge): Constant voltage, constant current and limited current must be set.
- Constant current discharge (Con-C Discharge): Limited voltage, constant current and capacity must be set
- Cycle setting: Switch step number, cycle number (≤ 16 cycles) must be set.
- Idle: Idle time must be set
- Stop: No parameter needs to set

3.1.3 Import and export of the setting files

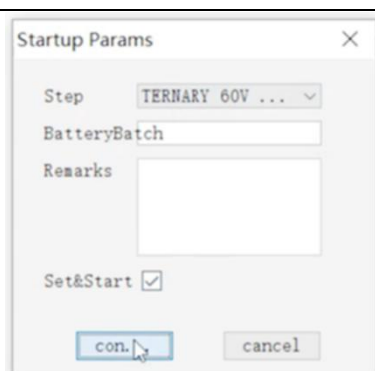
After the above setting is completed, the setting files can be exported and saved. The file can be directly copied to other computer for importing through the U flash drive, which is convenient for editing at one time and be used in multiple computers.

4. Right Click Function



4.1 Set/Start

Right-click to Settin/Start is the option to select and startup the work step. Before formally running, you must ensure that there are work step you need to run in the work program setting. For the setting method, see 3.1.



Select the step program name and click the confirm.

Battery batch no. and remarks: here you can fill in some necessary test information for easy memory and query.

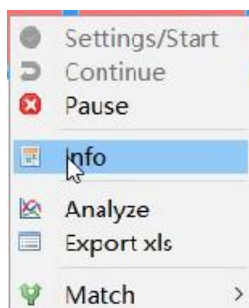
4.2 Continue & Pause

Continue: When it's in the battery disconnection warning state, manual stop state or restart software after power-failure, when the continue function is selected, the device will continue to run begin from the last stopped step, and the previous information is saved in the computer.

(Important Reminder: After the power failure is restored, only if the test has been running for more than 10 minutes before the power failure, to press "Continue" will continue the running from the data of the power failure. If the test did not reach 10 minutes before the power failure, to press "Continue" will run the data from the last test)

Pause: If you want to stop running temporarily, click the **PAUSE** button to stop running, and click the "CONTINUE" to continue running

4.3 Information



Channel Info						
Channel	1-1-6	StartTime	21-01-25 18:51:54			
Status	Con-C Charge	Batch				
TimeInterval(s)	20	Step	Cycle0-Step1			
C-Interval(mA)		Step Name	STANDARD 7.2V 6000MAH			
V-Interval(mV)		File Path	./DataRecord/1-1-6.data			
		Version	3.0			
		Remarks				
Number	Step Name	Time(mins)	Max-V(mV)	Con-C(mA)	Capacity(m...	-ΔV(mv)
1	Con-C Charge	0.0	3000.0	600.0	0.0	40.0
2	Idle	1.0				
3	Con-C Charge	180.0	3000.0	60.0	0.0	0.0
4	Idle	10.0				
5	Con-C Disch...	0.0	3000.0	3000.0	0.0	
6	Idle	10.0				

Select the device and right-click **INFO** to view the detailed setting information of the device, and you can view the details of the currently setting program and the currently running step.

CHANNEL: indicates the device number of the currently displayed information.

STARTTIME: The time of this device started the steps last time

STATUS: The current running status of this device

STEP and STEP NAME: Indicates the name and sequence number of the steps being executed in this channel

TIME INTERVAL/C-INTERVAL/V-INTERVAL: Indicates the parameter setting of the data saving in this channel

File Path: Indicates the absolute path of the data record file for this channel

Version: Hardware version

Remarks: Represents the information input when the step is issued.

4.4 Analysis

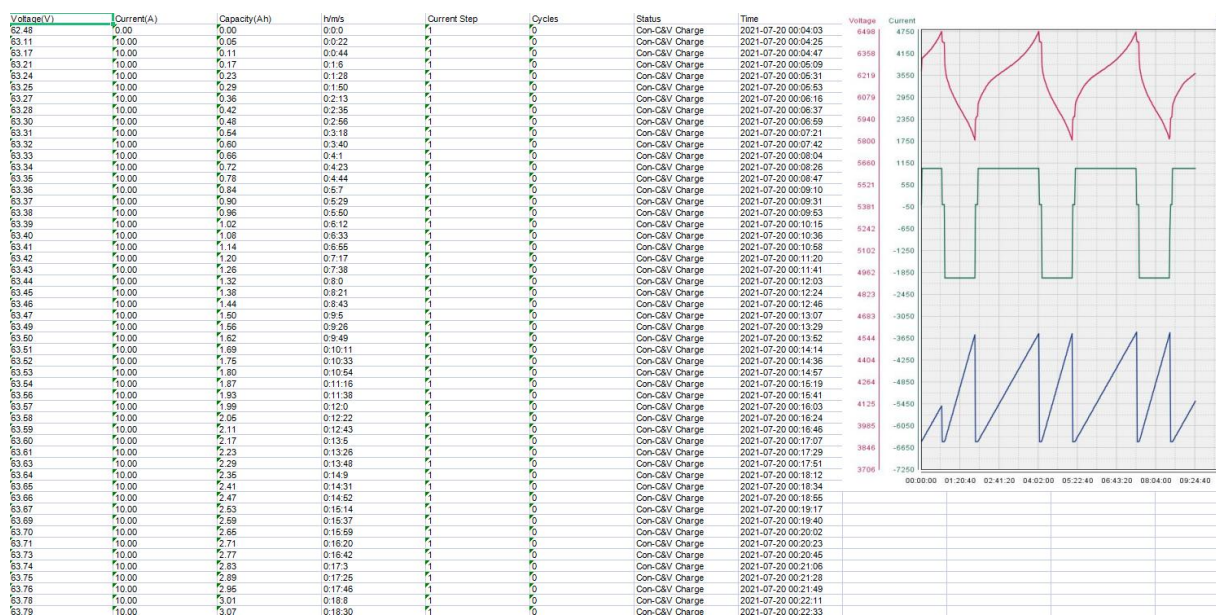
When the device has been running for a period of time or has been completed running, under normal circumstances, the test record from start-up to the current has been recorded. After selecting the analysis function, it can automatically retrieve the log file and start the data curve analyzer. Please refer to the Data Analysis chapter for curve analysis software.

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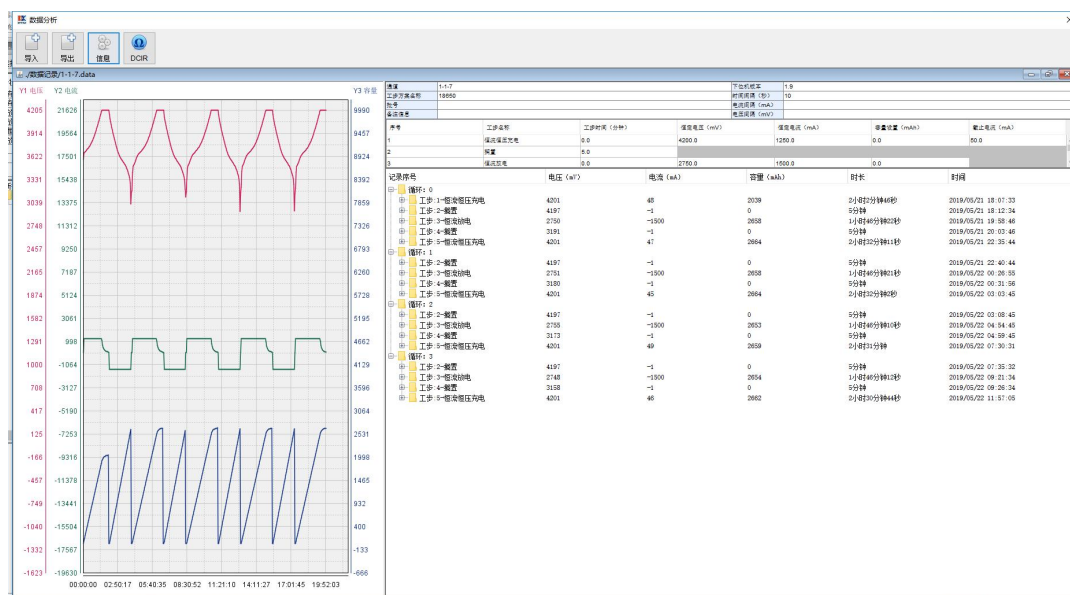
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4.5 Export

Export the relative test data of the selected channel in table form



5. Data analysis



The function that the data analysis software supports:

- Supporting the 3Y axis, single time axis.
- All curves support up, down, left, right translation, zoom in.
- Left click and hold a Y axis to move up and down by moving the mouse up and down.

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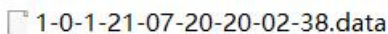
- Left click and hold a X axis to move the curve left and right by moving the mouse left and right.
- Right-click and hold a Y axis and move the mouse up and down to enlarge the curve
- Right click and hold a Y axis and move the mouse left and right to enlarge in the time curve.

5.1 Data Import

Two methods to import data:

- a. Right click on the single channel in main menu, click the “Analysis” button, the data will be automatically imported into the curve analysis software, and open it.
- b. Click the ANALYSIS button on upper right corner of the main interface, click the IMPORT button to enter into the data record folder under installation directory, select the data record file you want to view, the suffix format is *.dat

5.2 File Naming Format

As figure:  1-0-1-21-07-20-20-02-38.data

File naming as per: cabinet number-device number-channel number-year-month-date -hour -minute-second.data. As shown in the figure above, it means that the file was generated at 20:02:38 on July 20, 2021, and it is the first file of the NO.1 channel of the NO.0 device in the No. 1 cabinet.

5.3 Data Export

Data exporting function is used to output the imported data in XLS report.

When using it, you must import the data record file you need to view and be able to view it in the window. After selecting the Save Data function, the software prompts you to save the location and enter a name.

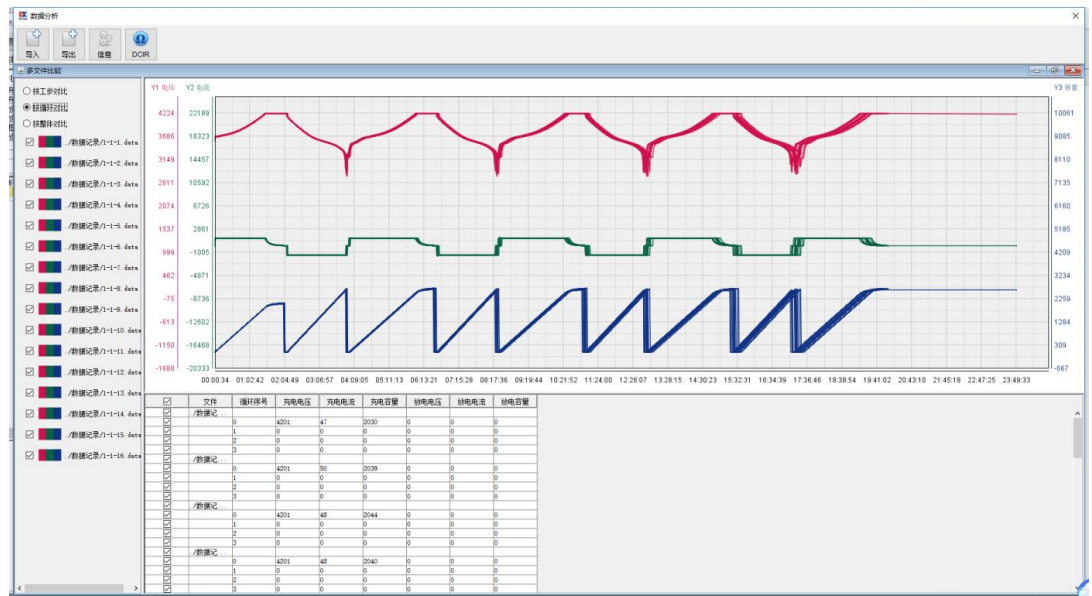
5.4 Multi-curve comparison

Multi-curve comparison can compare the differences of multiple data record files or a single data file

5.4.1 Cycle Comparison

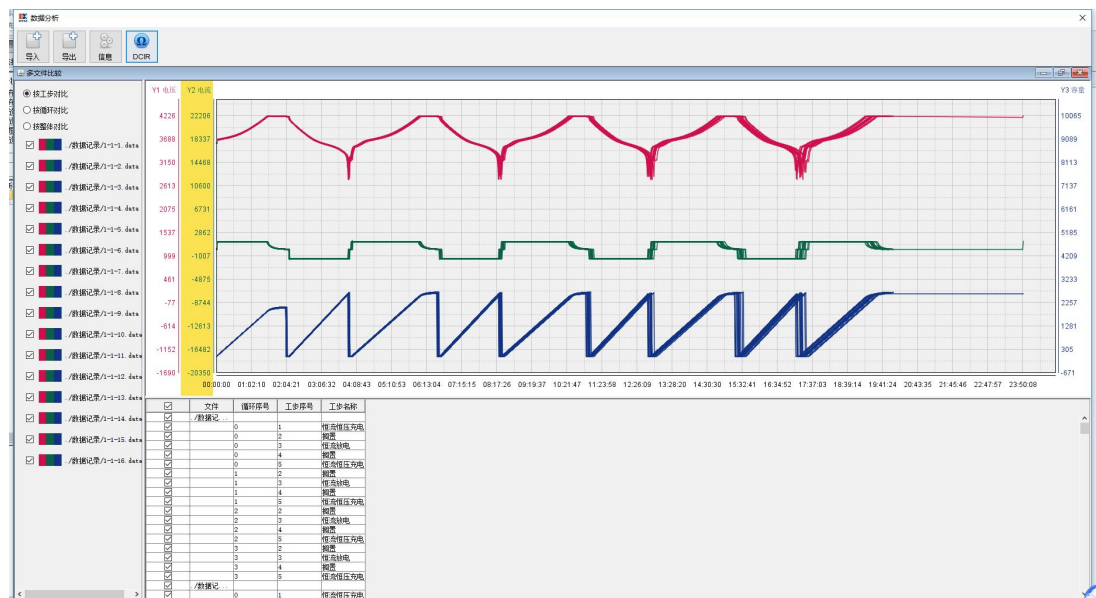
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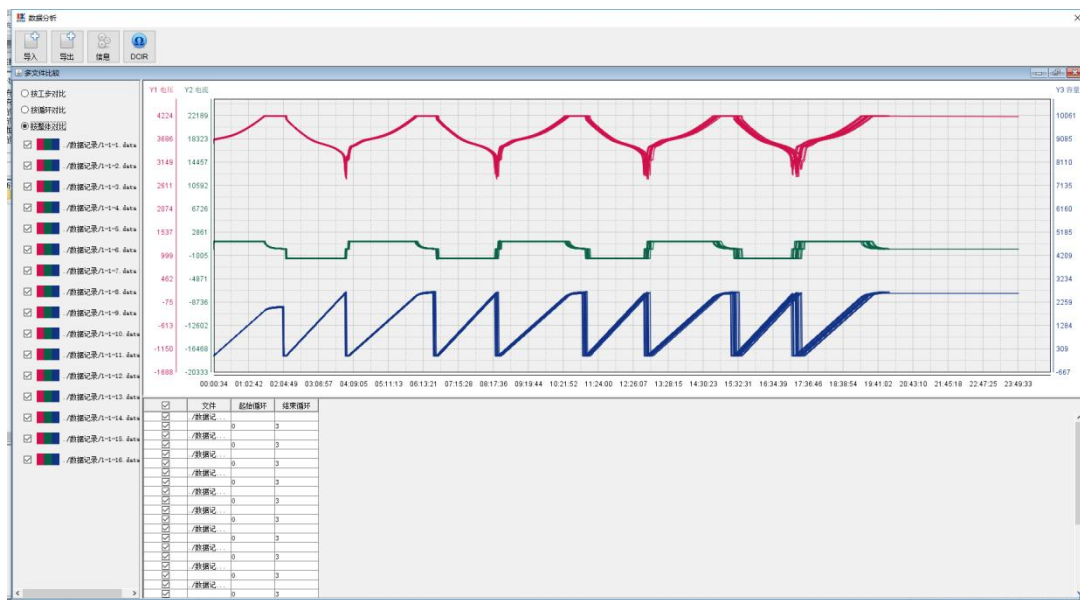
Cycle comparison can be used to compare the test differences of imported data from the beginning of cycle to the end of cycle.

5.4.2 Work Step Comparison



Step comparison is used to compare the test differences of imported data from the beginning of step to the end of step.

5.4.3 Entire Comparison



Entire comparison is used to compare the test differences of imported data from the beginning of entire steps to the end of entire steps.

6. Operation Steps

- Step 1: Set the data record setting, step program setting for the battery you need to test and save the setting.
- Step 2: Select the channel you need to start to test, you can hold down the CTRL key to multiple single selection or hold down the SHIFT to batch selection.
- Step 3: Right click on one of the selected channels, select SETTING/START and select the work step you set before starting test
- Step 4: The device emits a start-up test prompt sound, and the state of the software interface changes. Double-click a running channel to see the state and data of running step.
- Step 5: PAUSE and CONTINUE can be selected to suspend the test or resume the test during the test process, the previous test data will not be cleared. If select the Start, the device starts to run the step program again .
- Step 6: After the test is completed, you can use the matching function for matching or use analysis tools for data analysis.

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