LABORATORY GRADE
REMOTE PROGRAMMING SWITCHING MODE
DC REGULATED POWER SUPPLIES

SDP - 3618 / 3636 / 3660

User Manual

7673-3618-0000
REV.0 2015/03

Table of Contents

1. Safety Instructions

The following safety precaution must be observed during all phase of operation and service of this equipment. If you do not follow the instructions and information on proper handing in this manual, we assume no liability for any resulting personal injury or damage to property.

General Safety Instructions

- Do not use the unit near water
- Do not install unit near heating sources and heating emitting devices
- Clean only with dry cloth
- Do not block the fan ventilation
- Prevent the power cord from being walked and / or pinched
- Unplug this unit when not use
- Unplug this unit during lighting and storms
- Do not open the cover of the power cable is connected
- Never replace components when the power cable is connected
- Always disconnect power, discharge circuit and removed external voltage before touching components
- Only use optional accessories with this unit
- Please contact qualified service personnel for repair

Supply Input Range

- The unit is of universal input: 100 - 240Vac, 50 / 60Hz~

2. Technical Specifications

Models	SDP-3618	SDP-3636	SDP-3660
Output			
Variable Output Voltage	1 - 18Vdc	1 - 36Vdc	1 - 60Vdc
Variable Output Current	0 - 20A	0 - 10A	0 - 5A
Output Rated Power	360W	360W	300W
Voltage Regulation			
Load (10-100% Rated Voltage)	≤50mV		
Line (90-264Vac Variation)	≤20mV		
Current Regulation			
Load (10-90% Rated Current)	≤50mA		
Line (90-264Vac Variation)	≤50mA		
Ripple & Noise			
Ripple & Noise (r.m.s.) Voltage	≤5mV		
Ripple & Noise (peak-peak) Voltage	≤50mV		
Output Tracking OVP	O/P 1-5V: set voltage +2V O/P 5-18V: set voltage +3V	O/P 1-5V: set voltage +2V O/P 5-20V: set voltage +3V O/P 20-36V: set voltage +4V	O/P 1-5V: set voltage +2V O/P 5-20V: set voltage +3V O/P 20-36V: set voltage +4V
Meter Type & Accuracy			
Display Meter	Colour LCD (4 digit - Ammeter, Voltmeter & Power meter)		
Meter Accuracy	±1% +5counts for V <5V, I <0.5A ; ±1% +2counts for V <5V, I <0.5A		
LCD Dimension	48 X 66 mm		
Input Voltage	90 - 264Vac 50 / 60Hz~		
Full Load Input Curr. (230 / 100 Vac)	2.1 / 4.6A	2.1 / 4.6A	1.7 / 3.8A
Efficiency (230Vac)	≥85%	≥86%	≥86%
Power Factor Control	Power factor correction >0.95 at optional load		
Cooling Method	Thermostatic control fan from zero to full speed		
Operating Temperature	0 - 40°C		
Protections	Overload, Short Circuit by Constant Current, Output Tracking Over Voltage, Over Temperature		
Approvals	CE EMC: EN 55011, 55022 LVD: EN 60950, 61010		
Dimensions	193 x 98 x 215 mm 7.6 x 3.9 x 8.5 inch		
Weight	Approx. 2.4kgs 5.2lbs		
Accessories	User Manual		
Remote Programmable Specification			
Communication Interface	USB 2.0, RS-485, 10/100Mb Ethernet		
Remote Programming Functionality	Full control of power supply functions and data read-back		
Data Logging	Yes, with supplied software		

● All values are based on the standard ambient temperature 25°C and pressure 0.1Mpa.

3. Introduction

The SDP series of high performance programmable with new advanced microprocessor technology allow programming and setting of all parameters on the unit's key pad without the use of PC. The colour LCD display facilitates setting of multiple parameters and real time output V/ I/ W wave form.

The convenient closed housing firmware upgrade and calibration procedure allow up keeping of the optimal state of the power supply. The power supplies come with Ethernet, USB and RS-485 ports for remote control, Programming, Monitoring and Data Logging via PC interface through SCPI commands.

Groups of control settings and cyclic sequence can be stored in the PC and input to the selected power supply via Ethernet, RS-485 and USB. When using RS-485, one PC can control and data log as many as 31 power supplies of the same series. There are features in this new series that are only found in higher price category power supplies.

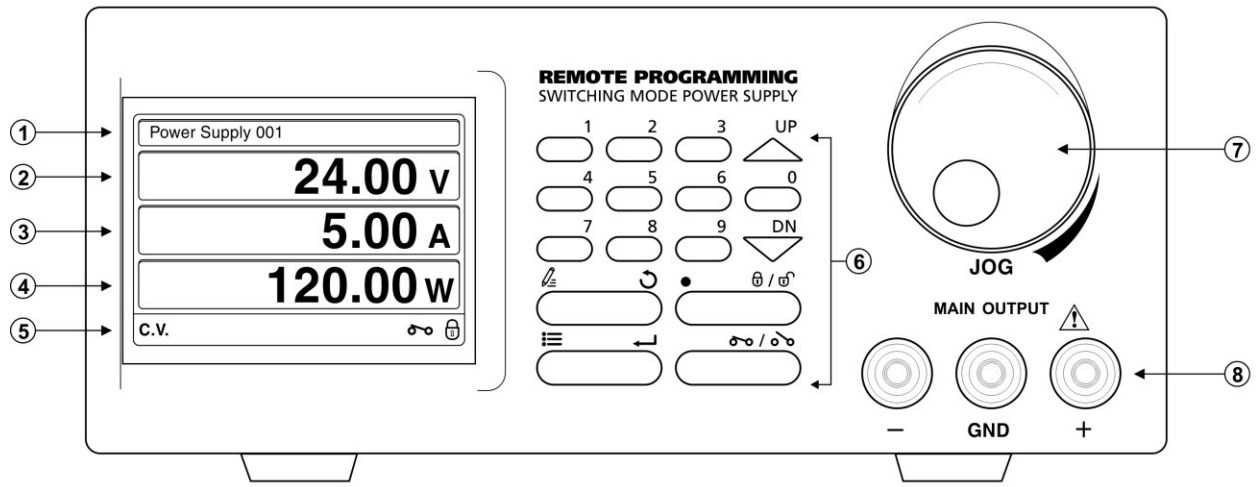
This series of power supplies have obtained the safety approval EN-61010 and EN-55011 EMC approval for scientific, industrial equipment of the CE directives.

Features

- 360W single output laboratory grade programmable switching mode PS
- Color LCD display multiple parameters & real time output V/ I/ W graph
- Full panel setting of cyclic program and all system parameters including LAN
- Full remote programming, monitoring and data logging
- One PC can control, monitor and data log up to 31 power supplies via RS-485.
- One PC can control, monitor and data log any number of power supplies via Ethernet.
- Built in Ethernet, RS-485 and two USB ports.
- One device USB port for remote programming, control and data logging.
- Local and remote programmable cyclic run of 20 sets V, I, Time and up to 999 cycles.
- Supplied with control software, SCPI command sets, and LabView™ driver.
- Convenient close housing calibration and firmware upgrade.
- 4 digit ammeter, voltmeter and power meter.
- Tracking OVP plus user defined max. output voltage.
- 9 user presets of voltage and current limit at the key pad.

4. Front & Rear Panel

4.1 Front Panel Annotation



1. Power supply identity: It can assign a number, which from 1 to 254, for power supply to identity it.
2. Output Voltage Display: Showing the output voltage
3. Output Current Display: Showing the output current
4. Output Power Display: Showing the output power
5. Status Bar: Show this status of power supply. It included

C.C.	The power supply operating in Constant Current Mode
C.V.	The power supply operating in Constant Voltage Mode
OVP	The power supply is in Over Voltage Protection
OCP	The power supply is in Over Current Protection
CAL	The power supply is in Calibration Mode
品品品	The power supply is in Remote Mode, all keypad is locked in the mode
	The output is ON
	The output is OFF
	The keypad is locked
	The keypad is unlocked
	The power supply is running internal program

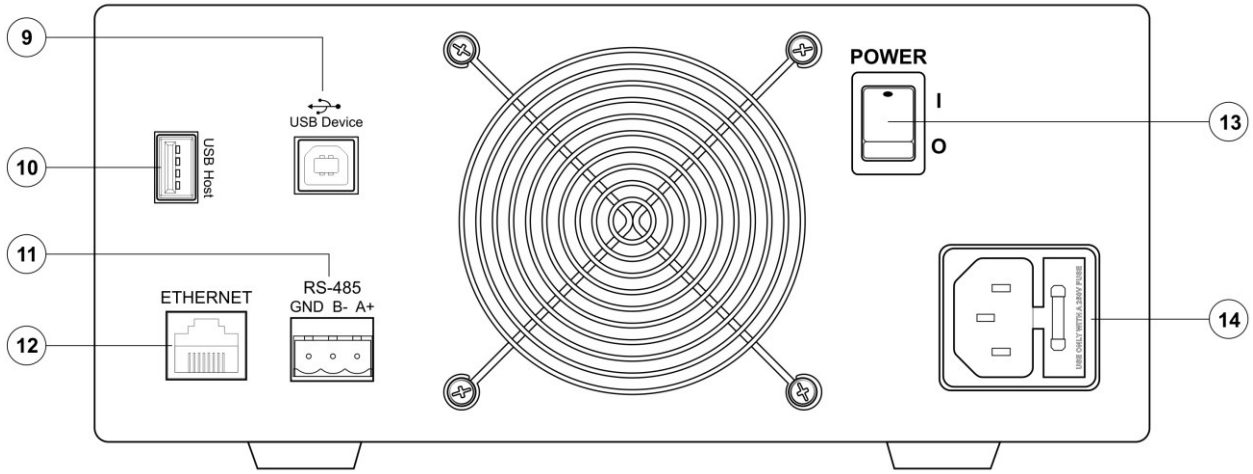
6. Keypad Definition:

0 thru 9	Press to select numerical values
UP	Press to ascend numerical values
	Press to move highlight upward
DN	Press to descend numerical values
	Press to move highlight downward
	In Main screen, use to enter program step menu
	In Setup Menu screen, exit to one level up

	In Main screen, use to enter Menu
	In Setup Menu screen, use to confirm setting
	In Main screen, use to lock and unlock keypad
	In numerical input area, use to enter decimal point
	Setting output ON / OFF

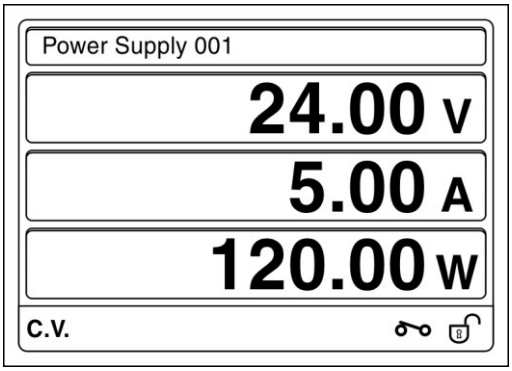
7. JOG:
   The JOG has 5 Functions
   - During the setting of voltage or current, rotate to increase / reduce value of setting
   - In voltage or current setting, press to move to different digit for setting
   - In menu screen, press to select all
   - In menu screen, rotate to move selection to right / left
   - Reset during input value
8. Main Output Terminal

4.2 Rear Panel Annotation

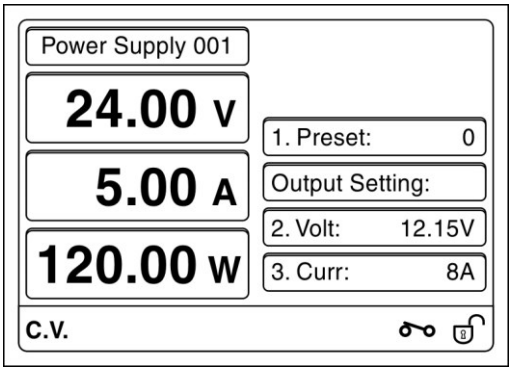


9. USB Device Port
10. USB Host
11. RS-485 Port
12. Ethernet
13. Power Switch
14. Power Socket

5. Operation with Main Screen



Basic Screen



Output Setting Screen

The Main Screen of SDP has two parts

- Basic screen shows actual output status of power supply
- Output setting screen shows actual output status as well as output setting area. You can recall preset setting, set output voltage and current in this screen.

5.1 Enter and exit Output Setting Screen

Rotating JOG anti-clockwise to pull out Output Setting Screen. You can rotate JOG clockwise or press  to exit Output Setting Screen.

The Output Setting Screen will automatically exit after ideal for 2 minutes.

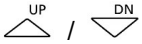
5.2 Change Output Voltage and Current Setting

It has 2 ways to change output setting for voltage and current.

5.2.1 Use JOG to Change Output Setting

By using JOG to change output setting, the actual output will effective immediately when you are rotating the JOG.

i. Enter Output Setting Screen

ii. Highlight Voltage / Current by using 

iii. Rotate JOG clockwise / anti-clockwise to increase and decrease setting

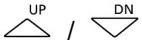
iv. Press JOG highlight to different decimal place for cross and fine adjustment

v. Press  to exit

5.2.2 Use Keypad to Change Output Setting

You can direct key-in value in setting area to change output setting. The output will only effective after press  to confirm

i. Enter Output Setting Screen

ii. Highlight Voltage / Current by using 

iii. Direct key-in value. (example: to set 12.34V, then key-in 1234)

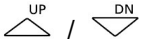
iv. Press  to confirm setting

v. If you make mistake during key-in, press  to clear and restart key-in

5.3 Change Output by Recalling Preset Value

You can recall preset 1 to 9 to set output value quickly

i. Enter Output Setting Screen

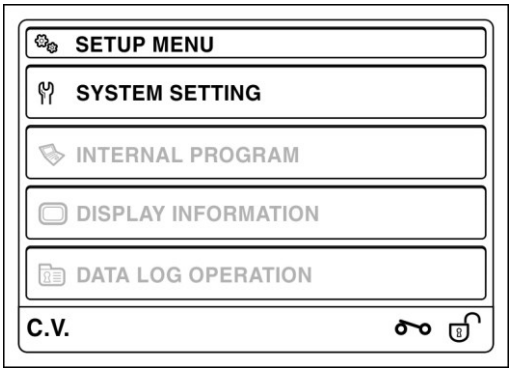
ii. Highlight preset by using 

iii. Enter number 1 to 9 for step you prefer (If you forget the setting, press JOG once to show all of them)

iv. Press  to confirm

* The first 9 step is commonly used with preset 1 to 9

6. Main Setup MENU



This model of SDP is using Menu Base operation. The Setup Menu can preform following 4 things.

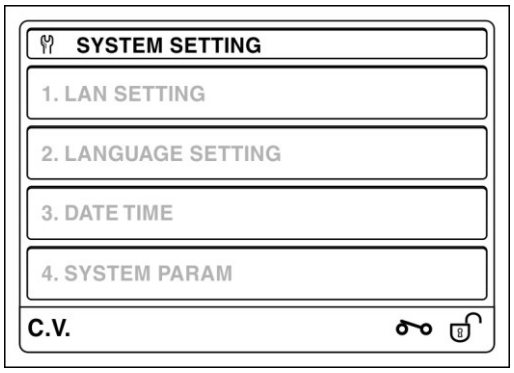
- Configure System Setting
- Configure Internal Program
- Show system information
- Perform Data log operation

6.1 Main Setup MENU

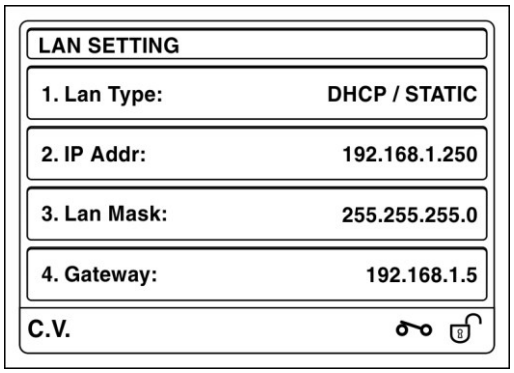
Press ⏎ in basic to enter main SETUP MENU. It content 4 sub-menus. You can use UP / DN key to move to different menu. You can also press number 1 to 4 to quick move between menus.

6.2 System Setting MENU

Select SYSTEM SETTING in main SETUP MENU then press ⏎ to enter SYSTEM SETTING MENU. You can configure LAN setting, Language setting, Date time setting and System parameter in this sub-menu.



6.2.1 LAN SETTING



i. In SYSTEM SETTING menu, use UP / DN key to move to LAN SETTING. Then press ↵.

ii. Configure LAN type

You can configure power LAN card use “DHCP” or “Static”. Use UP / DN key to move to “Lan type” setting. The rotate JOG to select between DHCP and Static. Then press ↵ to confirm setting.

iii. Configure IPv4 address

To configure IPv4 address of power supply. Use UP / DN key to move to “IP Addr” line. Direct key-in IP address. Use rotate JOG to move between 4 segments of IP address.

If you input incorrect number, the number will highlight in red colour. You can press JOG once to start over input another value.

iv. Configure Lan Mask

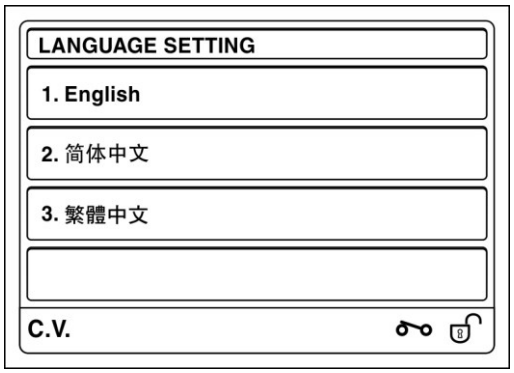
Use UP / DN key to move to “Lan Mask” line. Direct key-in netmask of your network using. Use JOG to move between 4 segments of netmask setting.

v. Configure default gateway

Use UP / DN key to move to “Gateway” line. Direct key-in IP address of your network default gateway. Use JOG to move between 4 segments of default gateway setting.

vi. Finally press ↵ to confirm and exit LAN Setting.

6.2.2 LANGUAGE SETTING



This power supply support multi-language setting for MENU.

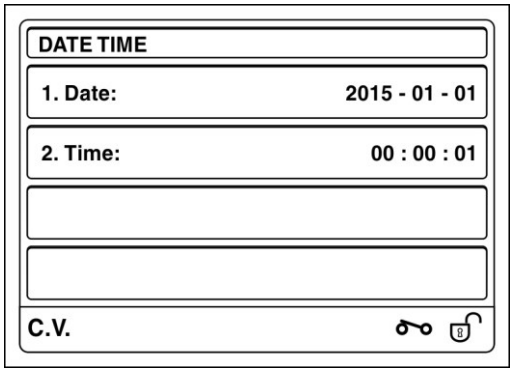
i. In SYSTEM SETTING menu, use UP / DN key to move to LANGUAGE SETTING. Then press .

ii. Then press to enter language setting menu.

iii. Select your prefer language for menu.

iv. Press to confirm and exit setting. Then menu will change to language you selected.

6.2.3 DATE TIME SETTING



You can configure date and time

i. In SYSTEM SETTING menu, use UP / DN key to move to DATE TIME. Then press .

ii. Then use UP / DN key to move to Date configuration line.

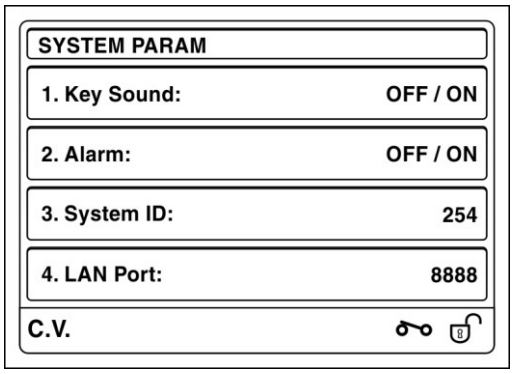
iii. Direct key-in date. The date format is yyyy-mm-dd.

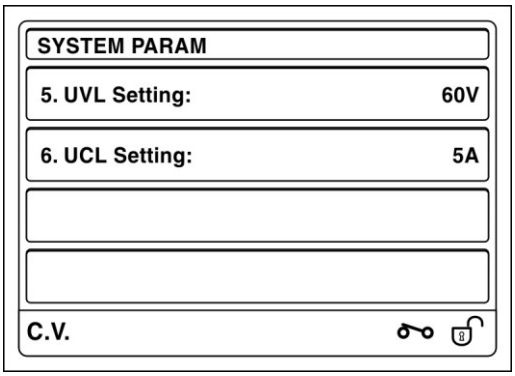
iv. Use UP / DN key to move to Time configuration line.

v. Direct key-in time.

vi. Press to store and exit.

6.2.4 SYSTEM PARAMETER SETTING





You can set Key Sound ON / OFF, Alarm ON / OFF, System ID number, LAN Port for remote control, UVL and UCL in this sub-menu.

i. In SYSTEM SETTING menu, use UP / DN key to move to SYSTEM PARAM. Then press ↵.

ii. Use UP / DN key to move to Key Sound setting line, then rotate JOG to select ON / OFF.

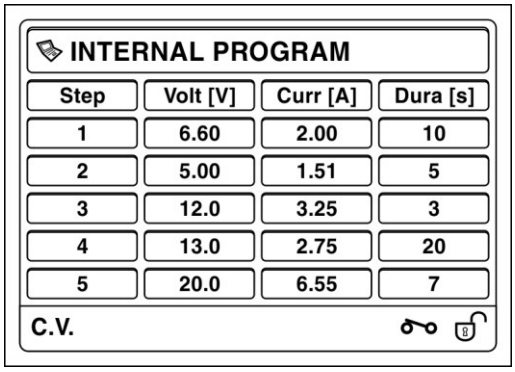
iii. Use UP / DN key to move to System ID line, then direct key-in number 1 to 254. The number will turn to red if you input invalid number. Press ↵ to confirm the input.

v. Use UP / DN key to move to LAN Port line, direct key-in port number for remote control.
e.g. IP address is 192.168.1.100 and port number is 8888. The remote control software can be connect to system through 192.168.1.100:8888.

vi. Use UP / DN key to move to UVL Setting, direct key-in upper voltage limit which range is between 1V to maximum rating voltage for model.

vii. Use UP / DN key to move to UCL setting, direct key-in upper current limit which range is between 0.01A to maximum rating current for model.

6.3 INTERNAL PROGRAM

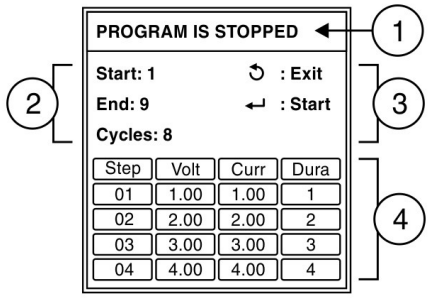


The INTERNAL PROGRAM has 20 steps for user to define voltage, current and duration of each step to be running.
* The first 9 step is commonly used with preset 1 to 9.

6.3.1 Edit steps for internal program

i. Select INTERNAL PROGRAM in SETUP MENU, then press ⏎ to enter above menu screen.
ii. Rotate JOG to show steps you would like to edit.
iii. Press UP / DN once, the voltage setting area of the step will be highlighted for edit.
iv. Direct key-in value you would like to set. Use . for input dot. (e.g. 12.34 press 12 . 34).
v. Rotate JOG to current setting area to edit current.
vi. Rotate JOG to duration setting area to edit running duration.
vii. If finish the editing, press ⏎ twice to exit. If continuous to edit other step, rotate JOG to highlight voltage setting area. Then press UP / DN to move to next / previous step to edit.
viii. If you would like to exit without save the change, press ESC to exit editing.

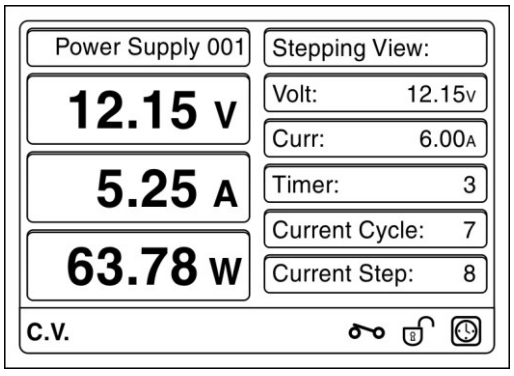
6.3.2 Internal Program Start / Stop



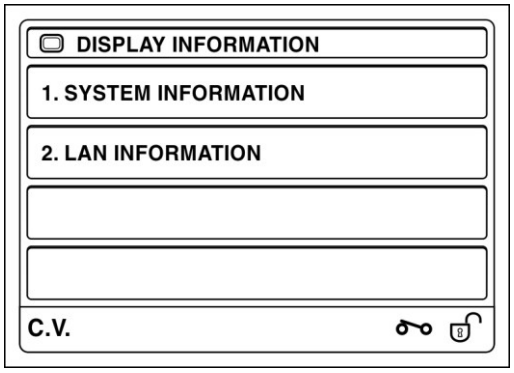
The above internal program running menu content 4 perts.
Part 1 Indicate program is running or stopped.
Part 2 Indicate and edit start running step, end running step and number of cycles to be run.
Part 3 Reminder for Exit key, Start key and Stop key.
Part 4 Steps review windows.

i. Press ESC in Main Screen to pull up above internal program running menu.
ii. Rotate JOG to review steps.
iii. Press UP / DN to move between Start, End and Cycles input space.
iv. Enter setting use keypad (e.g. The above example is run from 1 to 9 for 8 cycles)
v. Press ⏎ to start running.
vi. If the program is running, press ⏎ again to stop.

When the internal program is running. The screen will show following stepping view. It shows voltage, current and duration of step. As well as cycle and step are running.



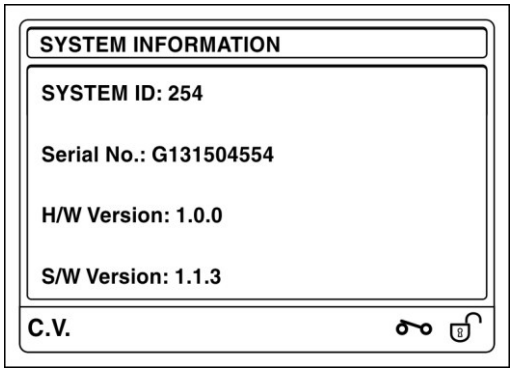
6.4 Display Power Supply Information



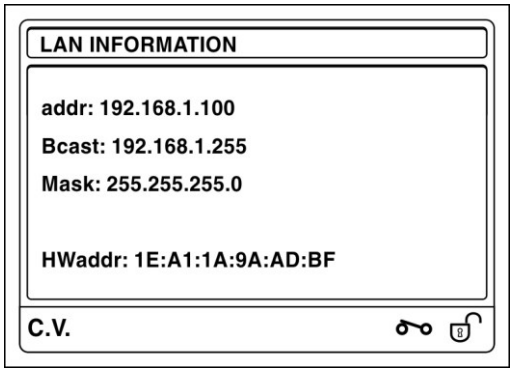
You can check system information and LAN setting information in DISPLAY INFORMATION sub-menu.

i. Select DISPLAY INFORMATION in SETUP MENU, then press ⏎ to enter above menu screen.

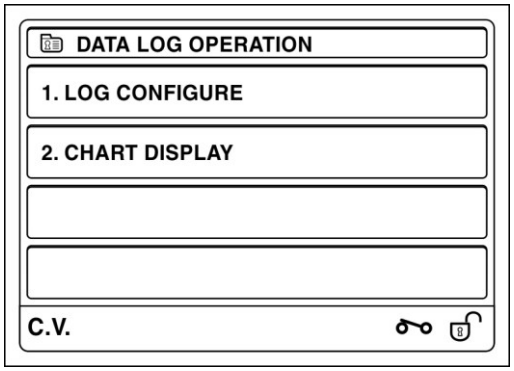
ii. Use UP / DN to select system information, then press ⏎ to show system information.



iii. Use UP / DN to select LAN information, then press ⏎ to show LAN setting information.



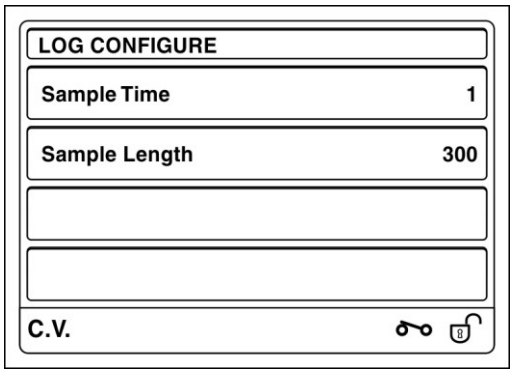
6.5 DATA LOG CONFIGURE



The DATA LOG OPERATION menu allow you to setup sampling time in second and display output graph for voltage, current and power of power supply.

i. Select DATA LOG OPERATION in SETIP MENU, then press ⏎ to enter above menu screen.

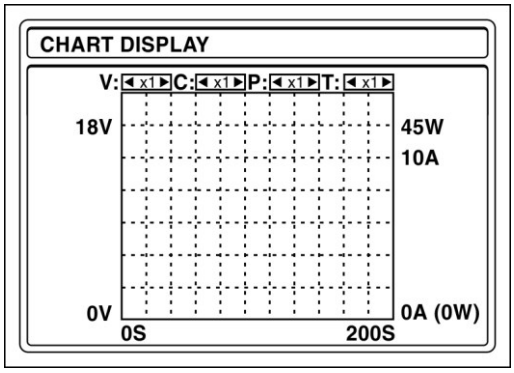
ii. Use UP / DN to select LOG CONFIGURE sub-menu.



iii. Press DN to highlight Sample Time setting. The Sample Length is maximum data logging time in second. (The maximum time is limited due to memory size of storage used to store data).

iv. Press ESC to exit.

v. Use UP / DN to select CHART DISPLAY. The following output chart will come up.
(You can also press key 1 in basic main screen to quick access to this display).



vi. It allow you to change display scale for voltage, current, power and time. Press JOG to select between V:, C:, P: and T: on the top of chart display. Then rotate the JOG to adjust display scale for selected display.

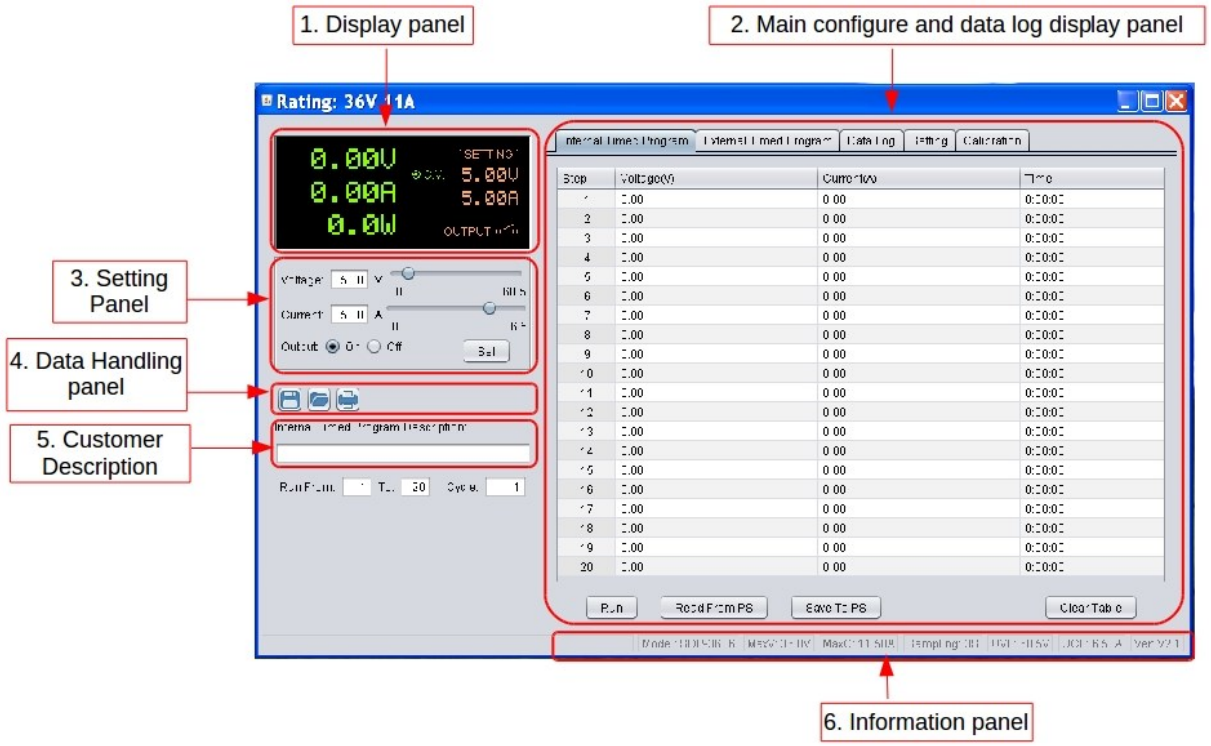
vii. You can press ESC to exit.

7. PC Interface Control User Manual

Support OS: Windows XP/ Vista/ 7/ 8

USB Driver: Silicon Lab CP210x USB driver
(Included in CDROM folder “USB CP210x Drivers V6.6.1 for Win_XP_2003_Vista_7_8”)

Execute Program: run “<CDROM Drive>:\pscs\pscs.bat”



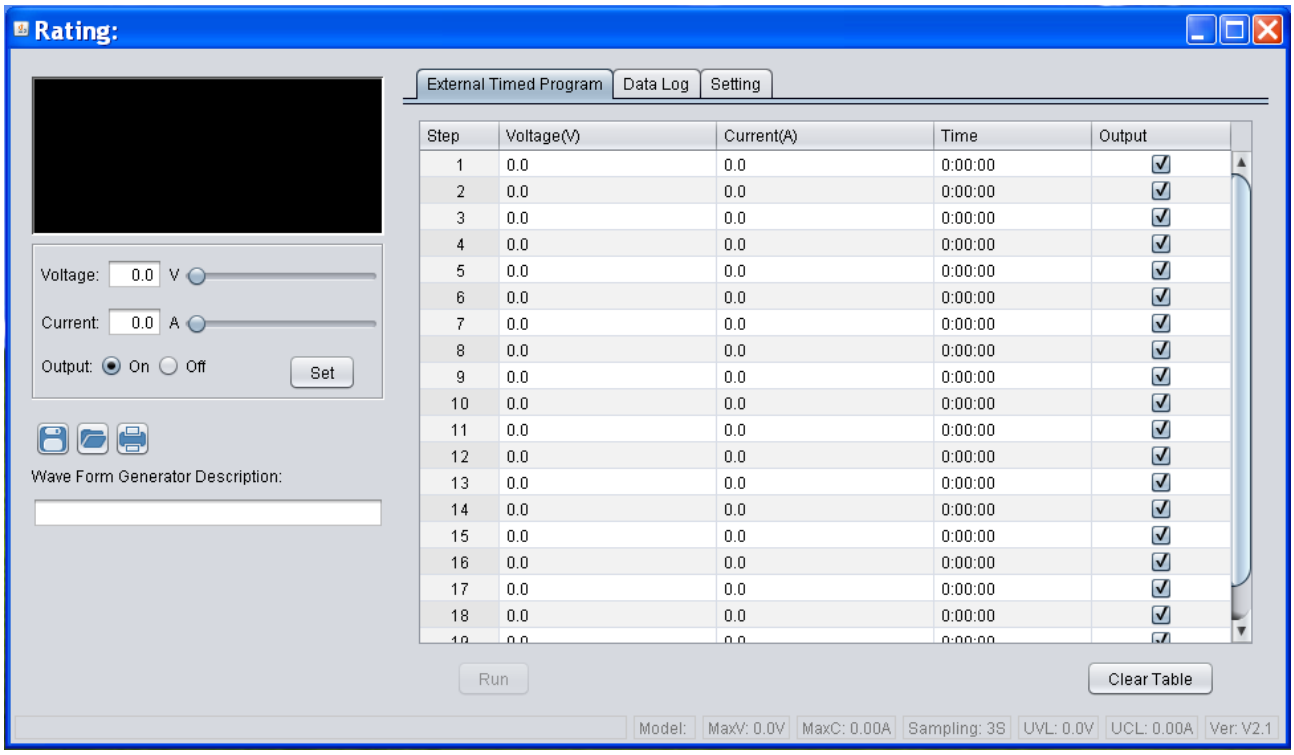
7.1 Main Display

The Main interface divided into 6 panels.

1. Display panel - use to display real-time information of power supply.
2. Main configuration and data log display panel - use to change general setting of program and display data log.
3. Setting panel - use to set incident voltage value, current and output ON/OFF.
4. Data handling panel - use to save, load and print data.
5. Description input panel - use to enter description for wave from.
6. Information panel - use to display Maximum voltage/current, sampling time, upper voltage/current limit and software version.

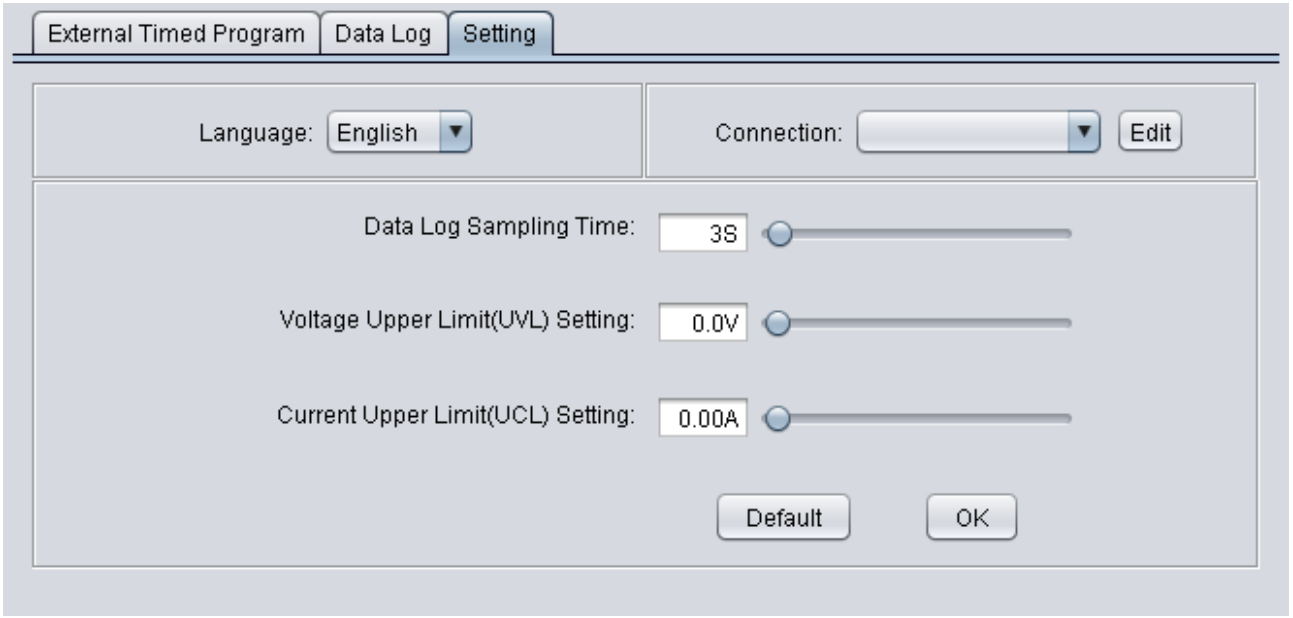
7.2 Connect to Power Supply

Before edit any connection setting, the software will not connect to power supply. It just show following display. The first thing you need to do is to edit correct connection for your system. If there are saved connection setting in software. The software will search power supply and connect automatically.

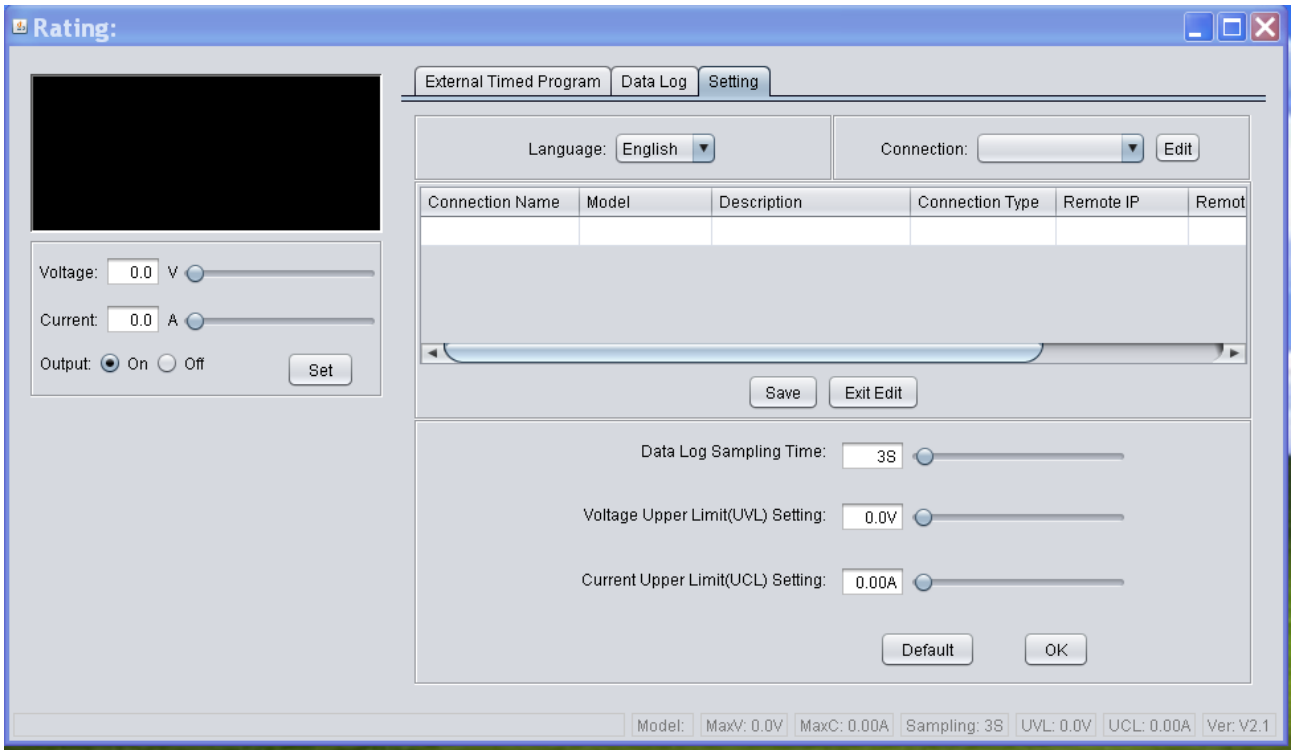


Connection editing steps

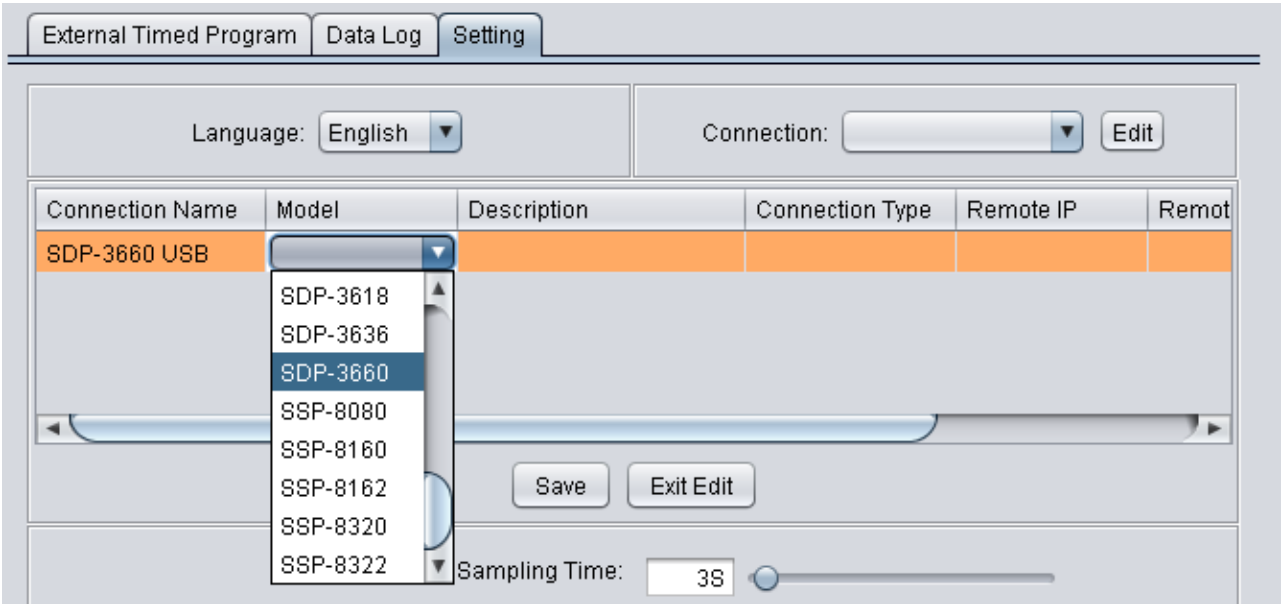
i. Select setting tab



ii. Click on Edit to start edit connection. The connection edit panel come up.

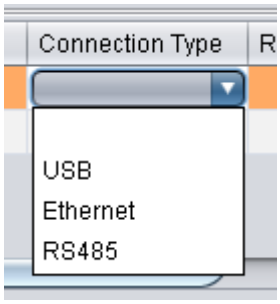


iii. Enter connection name for this connection setting and select your power supply model. (e.g. SDP-3660)

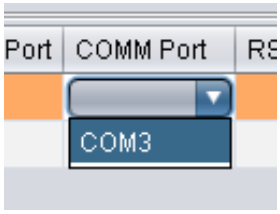


iv. Enter description of system

v. Select connection type for your system. It allow configure for USB, Ethernet and RS485. Select USB in this case.



vi. Select COM port for your system (e.g. COM3)

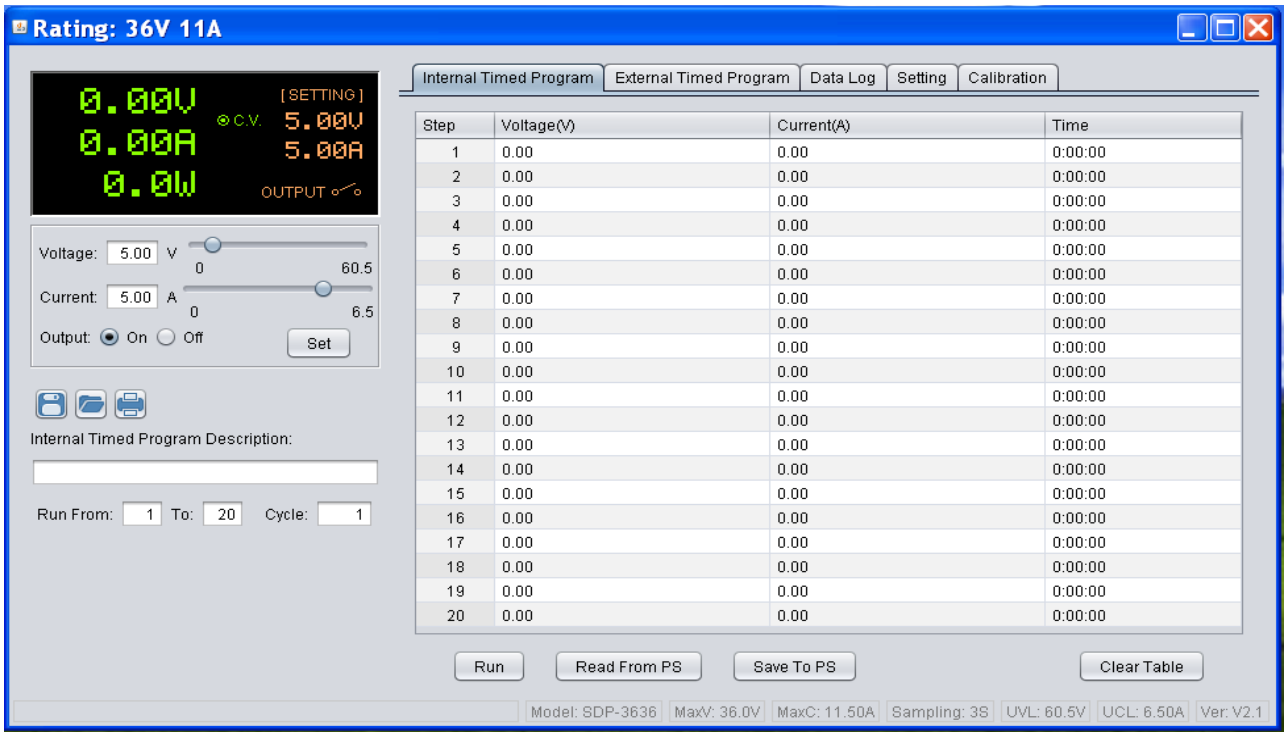


vii. Then click Save to save setting then click Exit Edit to exit the edit page.

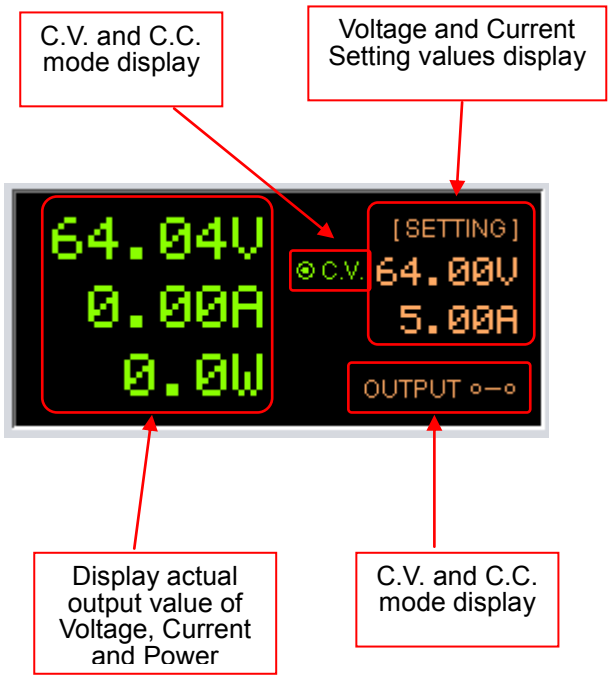
The final setting for this page is like this.

Connection Name	Model	Description	Connection Type	Remote IP	Remote Port	COMM Port	F
SDP-3660 USB	SDP-3660	SDP-3660 USB	USB			COM3	

After save configuration, the power supply connect automatically. The display change as follow.



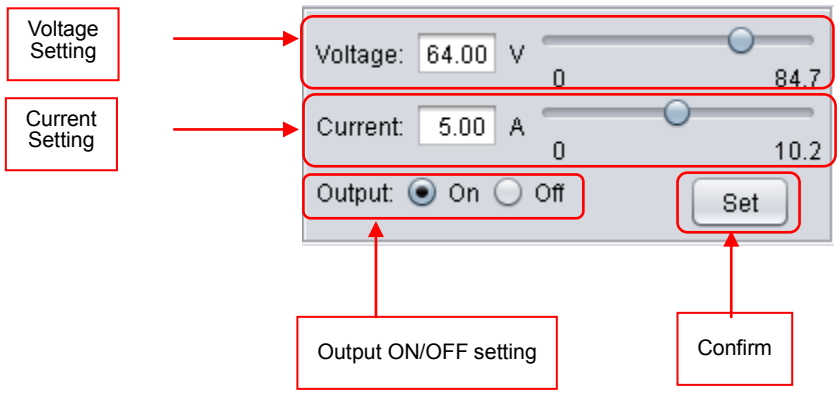
7.3 Display Panel



The display show following information

- Output voltage value
- Output current value
- Output power value
- Output ON/OFF status
- C.V. / C.C. model
- Setting values

7.4 Set Output Voltage Value, Current Value and ON/OFF Status

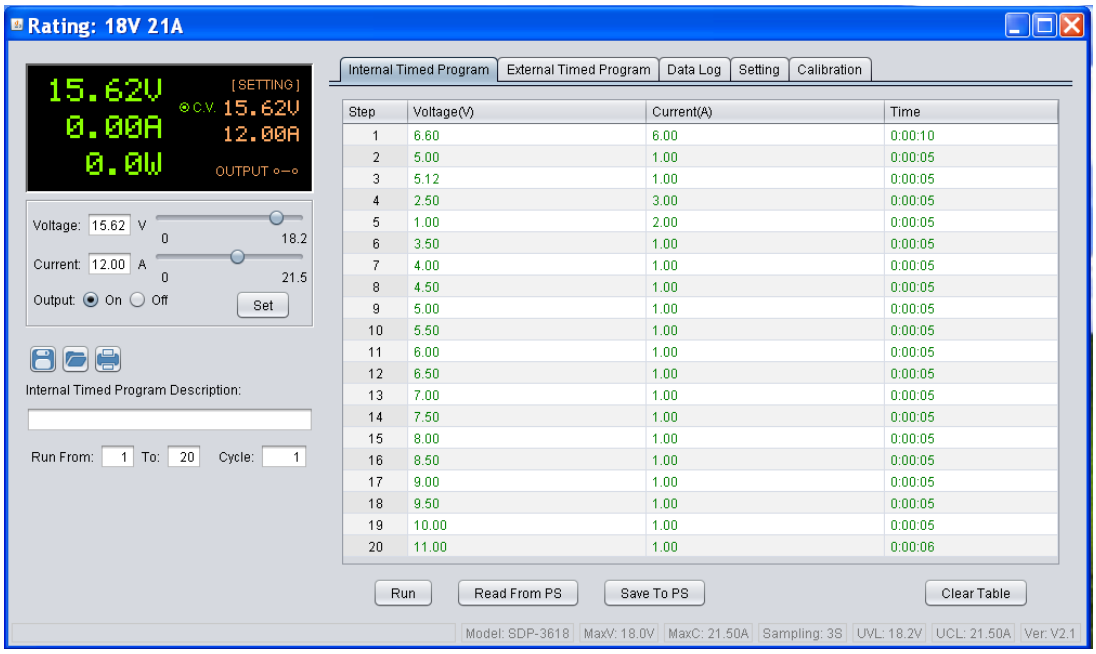


It allow direct input voltage value and current value in setting area or slide bar to adjust value. After adjust the value, then click Set button to confirm setting.

7.5 Internal Timed Program

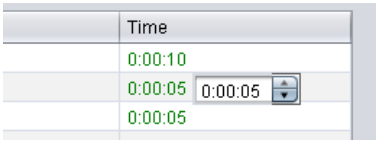
Select Internal Timed Program tab to operate with 20 internal steps program. It can define Voltage, Current and running time for each step. User can setting running cycle for the Timed Program for specified steps range.

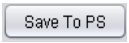
It has an Internal Timed Program Description space for user to enter description for the setting. The description will be saved when user select to save setting into CSV file.

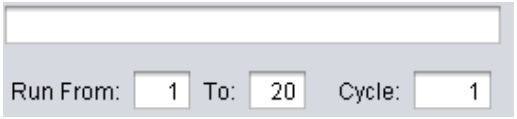


- Click  to read internal setting from power supply.
- Double click on the cell that you would like to set value. For example Step 1 voltage.
- Slide the bar to configure the value.

- Set time for this step to be running. The time range is between 0 to 9hours 59 minutes 59 seconds. You can click up/down button to change value or directly input value. If the time value is set to 0, this step will be skipped. Slide the bar to configure the value.



- Click  to save the setting back to power supply.
- Input range of steps and cycle you would like to run from internal timed program.

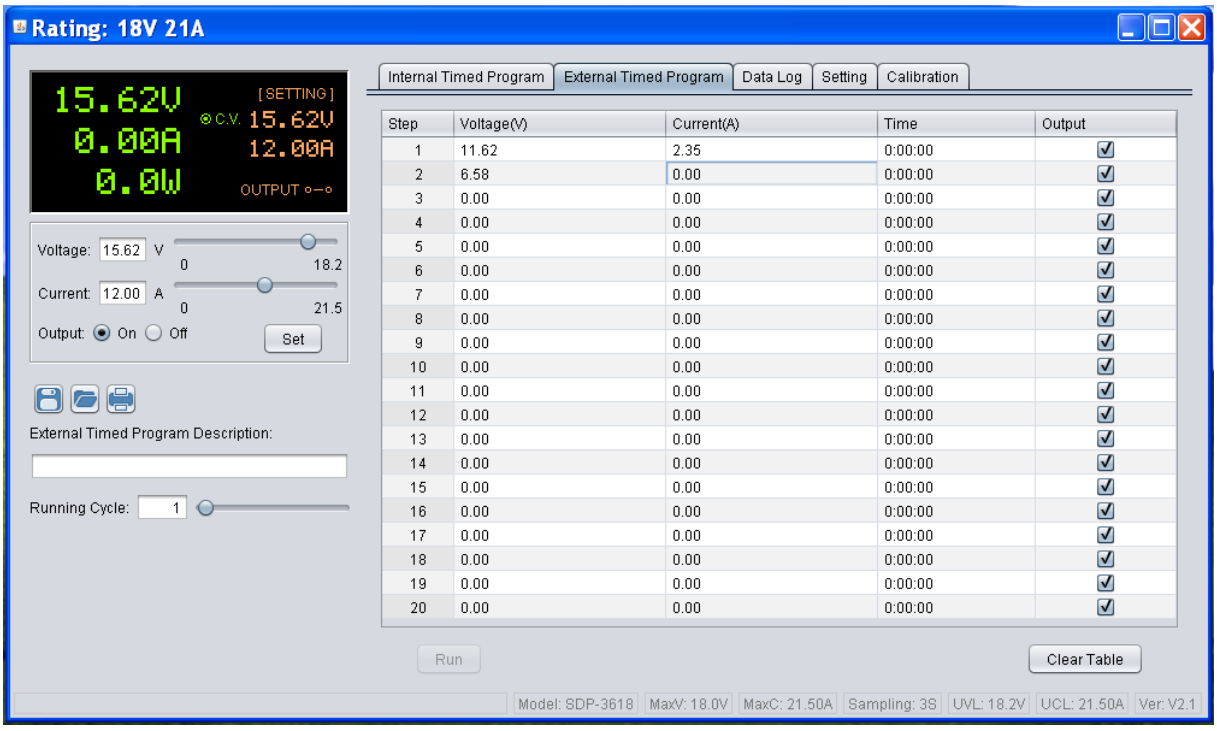


- Click  to execute the selected range and number of cycle.
- Click  to clear the setting.

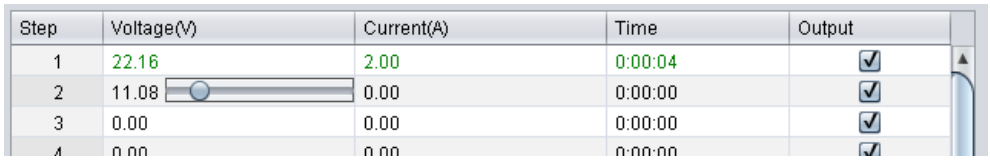
7.6 External Timed Program

Select External Timed Program tab to operate with 20 user define steps program. It can define Voltage, Current, running time and Output ON/OFF for each step. User can setting running cycle for the Timed Program. External Timed Program is completely controlled by PC, PC counts the time and changes voltage and current of power supply.

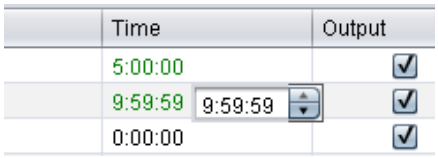
It has an External Timed Program Description space for user to enter description for the setting. The description will be saved when user select to save setting into CSV file.



- Double click on the cell that you would like to set value. For example Step 2 voltage.
- Slide the bar to configure the value.



- Set time for this step to be running. The time range is between 0 to 9hours 59 minutes 59 seconds. You can click up/down button to change value or directly input value. If the time value is set to 0, this step will be skipped.



- Select running cycle between 0-999. You can use slide bar to select or directly input value in text box. Input 0 means run the program forever.

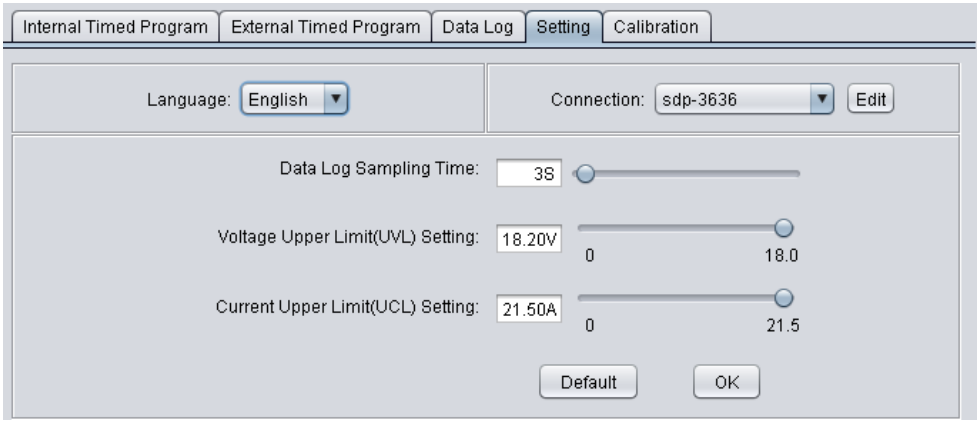
- Click Run button to start running cycle.
- In between program running cycle, click Stop button to stop program.
- Click Clear Table to clear the setting.

7.7 Set Upper Limited of Voltage and Current

Select Setting tab to configure Voltage Upper Limit (UVL) and Current Upper Limit (UCL). If you set the UVL and UCL, all setting in General Output setting, Internal Timed Program and External Timed Program cannot higher than this limit. You will find the setting become red to alert you it is over the UVL or UCL.

In the setting tab,

- Direct input your setting value or using slide bar to configure for the UVL an UCL.

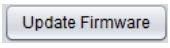


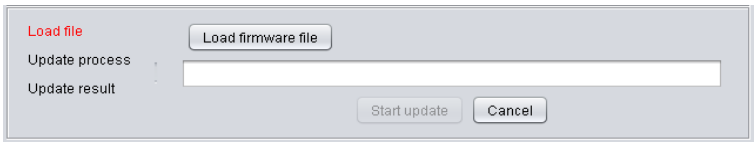
- Click  button to save the setting to power supply

7.8 Firmware Upgrade

*** WARNING: PLEASE DO NOT POWER OFF POWER SYSTEM OR DISCONNECT POWER SUPPLY FROM PC OR CLOSE PC SOFTWARE DURING FIRMWARE UPDATE PROCESS. OTHERWISE, THE POWER SUPPLY WILL BE DAMAGED.**

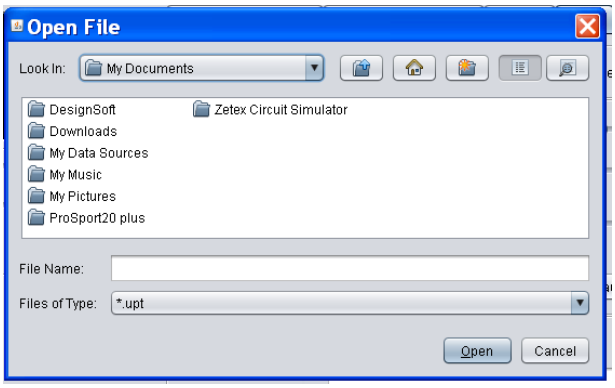
SDP power supply allow user to upgrade firmware through Manson provided software.

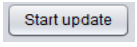
- Select Setting tab
- Click  to enter follow firmware upgrade page



- Click  to load firmware image file

- Select the image file in Open File interface



- After load firmware image file, then click  to start transfer image to power supply and update.

- After update success, the power supply will reboot.