CIRCUIT-TEST

Triple Output Power Supply

PSB-4618

Variable: 0.1-18VDC @ 6A
Fixed: 3.3 / 5VDC @ 0.8A, 12VDC @ 0.8A

PSB-4332

Variable: 0.1-32VDC @ 3.5A
Fixed: 3.3 / 5VDC @ 0.8A, 12VDC @ 0.8A

OPERATION MANUAL

Contents

Keep this manual in a safe place for quick reference at all times.

This manual contains important safety and operation instructions for correct use of the power supply. Read through the manual and pay special attention to the markings and labels of this unit and equipment to be connected.

Pay special attention to these two types of notices used in this manual

WARNING: ⚠
Failure to observe this warning may cause injury to persons and damage to power supply or connected equipment.

CAUTION: ⚠
Failure to observe this caution may result in damage to equipment and improper functioning of the power supply.

Warning

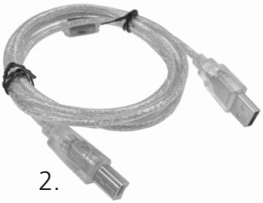
1. Do not use this power supply near water.
2. Do not operate or touch this power supply with wet hands.
3. Do not open the casing of the power supply when it is connected to AC mains.
4. Refer all servicing to qualified service personnel only.
5. Before replacing the AC fuse at AC socket, find out and clear up the cause first.
6. Replace the AC fuse with the same type and rating as the original fuse.

Caution

1. Use a grounded 3 pin AC source.
2. This unit is for indoor use only.
3. Do not operate or place this unit in a humid, dusty, direct sunlight location or near any heat source.
4. Before plugging into local AC mains, check rating label at the back of the unit.
5. Do not block any ventilation openings of the unit.
6. This unit must be used within the specified rating; regular excessive continuous loading may cause damage to the power supply.
7. The gauge size of input power cable must be at least 0.75mm2 and the total length of power cable must not exceed 3m.

Accessories

1.



2.

3.

1. AC Power Cord
2. USB cable
3. Output cable with alligator clips

Introduction

PSB-4xxx series is a new line of laboratory grade low noise linear power supplies that offer excellent voltage and current regulation with advanced MCU control and USB PC interface.

It is ideal for noise sensitive applications; communication, audio visual, measuring devices. The MCU control with 10 steps wave form generator with cyclic operation makes working and testing DUT ever so convenient.

Key Features

- The large LED display shows the vital status and the two 4 digit voltage and current meters.
- The variable output has 10mV and 1mA resolution.
- There are 3 user defined presets in the responsive touch feel screen.
- There are 3 isolated fixed voltage outputs and a main variable output with rotary encoder volumes.
- An output On-Off switch makes setting the output values safer and easier.
- The cyclic waveform generation is programmable and operated using front panel controls without PC.

It is bundled with the PC Control software, USB drivers, SCPI command sets for remote control programming, monitoring, and data logging or integration with test instruments via SCPI.

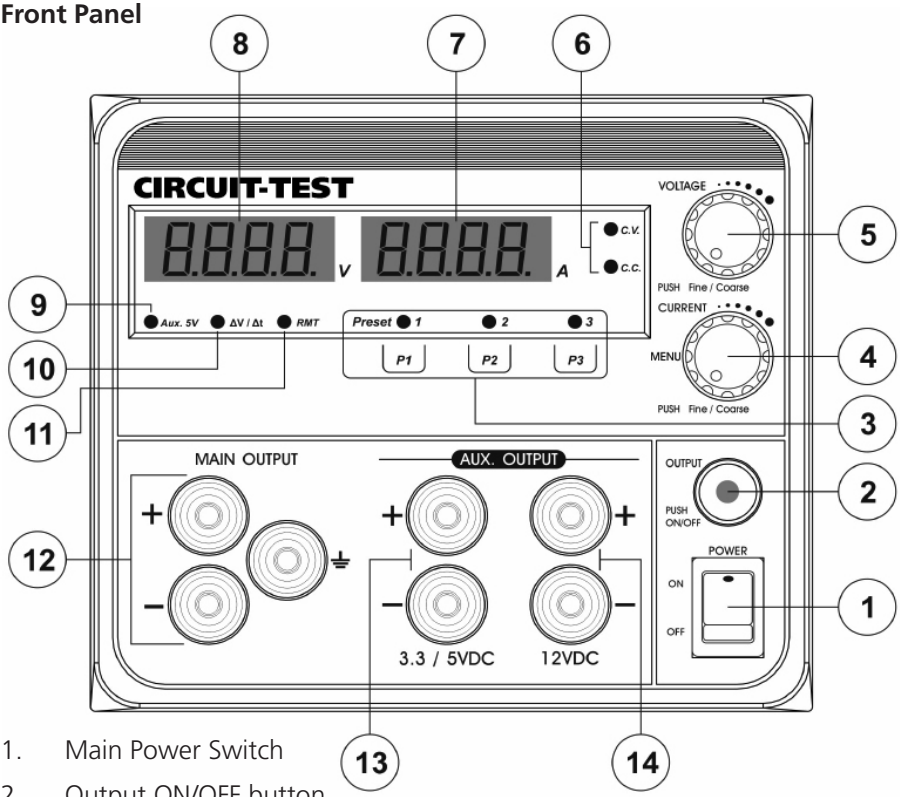
SPECIFICATIONS

	PSB-4618	PSB-4332
Variable Output Voltage	0.1 - 18VDC	0.1 - 32VDC
Variable Output Current	0 - 6A	0 - 3.5A
Voltage Regulation		
Load (10-90% Rated Current)	≤10mV	
Line (±10% Variation)	≤5mV	
Current Regulation		
Load (10-90% Rated Voltage)	≤ 3mA	
Line (±10% Variation)	≤ 2mA	
Ripple & Noise (RMS)	≤ 5mV	
Auxiliary Fix output		
Aux. 1 output	3.3/5VDC (selectable), 0.8A	
Aux. 2 output	12VDC, 0.8A	
Tracking Over Voltage Protection	O/P ≤ 5V: Set voltage +1V O/P > 5V: Set voltage x 120%	
Voltage Setting Resolution	10mV	
Current Setting Resolution	1mA	
Accuracy		
Voltage Meter	4 Digit LED Display (±0.5% +5digits, <10) (±0.5% +2digits ≥10V)	
Current Meter	4 Digit LED Display (±0.5% +5digits, <0.5A) (±0.2% +5digits ≥0.5A)	
Input Voltage	120VAC	
Full Load Input Current	≤ 2A@120VAC	
Cooling Method	Thermostatic control fan	
Protections	Overload, Short Circuit by Constant Current, Output Tracking Over Voltage, Over Temperature	
Special Feature	3 user defined V and I preset, remote V, I, and output on-off	
Presets Cycle Programming	10 steps waveform generator max. preset cycle 999	
Command Set	SCPI	
Communication Type	USB	
Dimensions (WxHxD)	150x132x260mm (5.9 x 5.2 x 10.2")	
Weight	5.1kg (11.2lbs)	

*All values are based on the standard ambient temperature 25ºC and pressure 0.1Mpa.

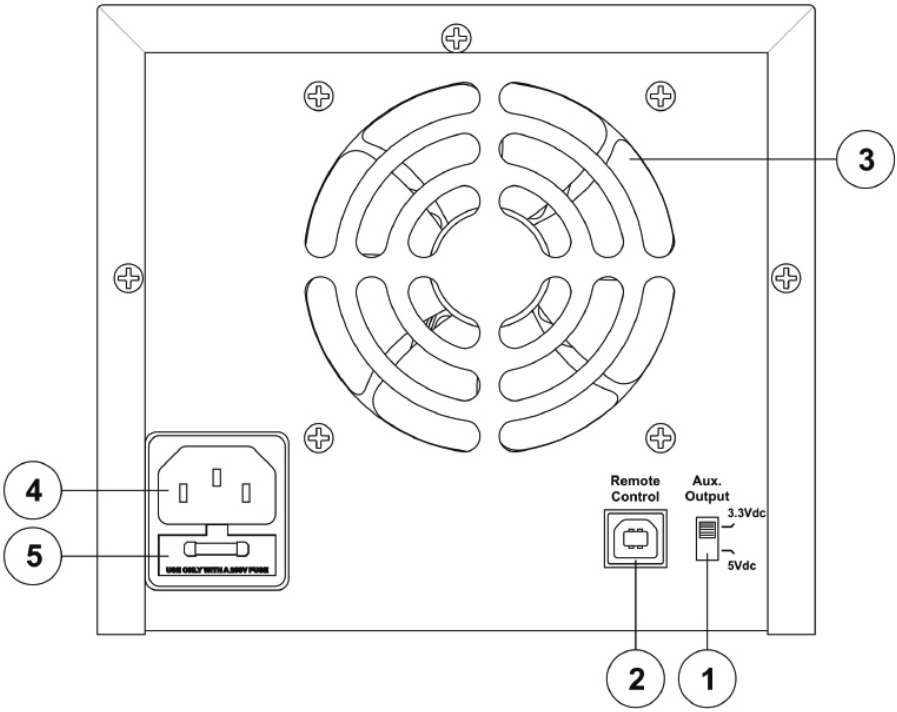
Controls and Indicators

Front Panel



1. Main Power Switch
2. Output ON/OFF button
3. Preset 1/2/3 selection and LED indicator
4. Main Output Current limit adjust knob and Menu entry
5. Main Output Voltage limit adjust knob
6. C.V. / C.C. mode indication
7. Ammeter
8. Voltmeter
9. Auxiliary Output 5V indicator
10. Wave Form generation cycle running indicator
11. Remote Control indicator
12. Adjustable Main Output
13. Auxiliary Output 1 for 3.3V/5V
14. Auxiliary Output 2 for 12V

Back Panel



1. Auxiliary 1 3.3V/5V selection
2. USB Remote Control port
3. Cooling Fan
4. AC power plug
5. AC fuse

Operations

Basic Mode of Operation

This power supply is designed to operate as a constant voltage source or as a constant current source. Automatic crossover to either mode of operation occurs when the load condition changes as follows:

Constant Voltage (CV), Automatic crossover & Constant Current (CC)

The power supply functions as a constant voltage source (CV) as long as the load current is less than the preset current limiting value. When the load current is equal to or greater than the preset current limiting value, the power supply will automatically cross over to the constant current mode, voltage will drop, (CC) will show on the LED display panel and it will operate as a constant current source.

When the load current drops below the preset current limiting value, the supply returns to constant voltage (CV) mode.

Setting the Output Voltage & Current Limiting Value (CC)

It is always a good safety practice to turn the output OFF in setting the voltage and current.

The volume knobs are of rotary encoder design with shifting decimal place for fast precision tuning.

Turn the voltage or current knob to set your desired values.

Quick pushes on the knobs will move the decimal place. When the desired number column is flashing turn the knob to get to the desired number otherwise you need to repeat quick pushes again.

One quick push on the current knob will display the preset current limiting value.

Remark: If you find the default time-out of the LED indicators too fast or too slow you can adjust the tempo of the time-out duration with (tout Set) in Main Menu program mode.

Output On / Off Button

This push button sets the Output to either On or Off mode. When it is in the On mode the voltage meter shows the output voltage and the current meter shows the current reading if output is connected to an active load.

When output is set to OFF, the display will show OP OFF (output off).

When powered up the unit's default output setting is OFF but it can be programmed to be same as the last setting of output just before powering down by menu programming as illustrated in Front Panel Menu section.

Presets 1, 2, 3

Touch-feel reaction technology is used for the triggering of the presets.

These 3 presets store the frequently used voltage and current limit settings which are adjustable and stored at any time.

Note: It is strongly advised to set the output to OFF for checking the preset values.

Aux. Output 1 Voltage Selection (3.3/5V)

Move the switch (1) at the back of power supply for selection of 3.3 or 5 VDC.

At 3.3VDC setting, indicator (10) remains Off and at 5VDC setting indicator (10) is On.

Connecting and Operating Procedure

1. Check the rating label and plug in to AC mains.
2. Switch on the power supply and the LED display should be on at the same time.
3. The (CV) icon should be shown on the display.
4. Turn current volume knob (4) clockwise to maximum if you do not require lower current limiting value, otherwise do the preset the (CC) limiting procedure.
5. Set your desired output voltage using voltage volume knob (5) and then turn off the output terminal using push button (2).
6. Connect to your load; positive to positive and negative to negative.
7. Turn on the output terminal again and check if display shows (CV).
8. If display shows (CC), either your preset current limiting value is too low or your load requires more voltage and current. You need to re-access the voltage and current requirement of your load and increase the voltage or current accordingly until (CV) appears.

Connecting the 3 Outputs (using PSB-4332 as an example)

All the three outputs are fully isolated from ground and with each other so that it is possible to make cross connections to power a circuit board or device that requires for example: +3 or +5V, +12 V or -12V and 1-32V as shown in Fig. 1.

The variable main output is set for 12V and it is assigned as the +12V source (Maximum current 3A)

The variable main output can be set for voltage between 1-32V such as 16V.

The fixed 12V is made as the - 12V source (Maximum current 0.8A)

The fixed 5V is made as the +5V source. (Maximum current 0.8A)

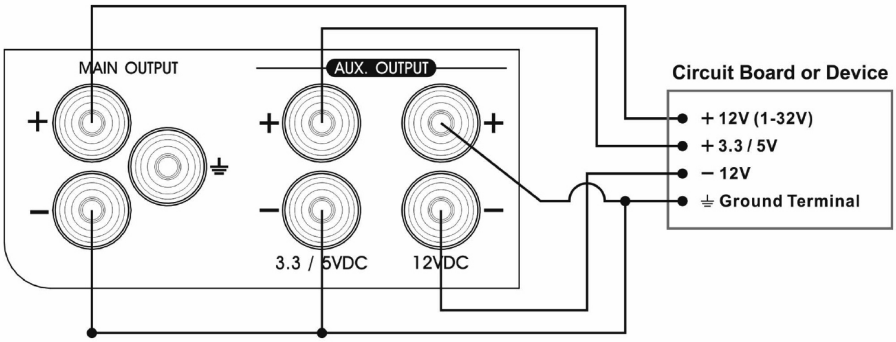


Fig.1 PSB-4332 with Cross Connection of 3 Outputs

Connecting 3 Outputs in Series (using PSB-4332 as an example)

You can have a 17V fixed output by connecting the 5V in series with the 12V outputs.

The 2 outputs (Aux.2) can be connected in series to make a variable 5V to 37V with maximum current 2A (Fig. 2)

The 3 outputs can be connected in series to make a variable 17V to 49V with maximum current 1A, (Fig. 3)

There are other combinations of cross connections possible for different positive and negative output voltages.

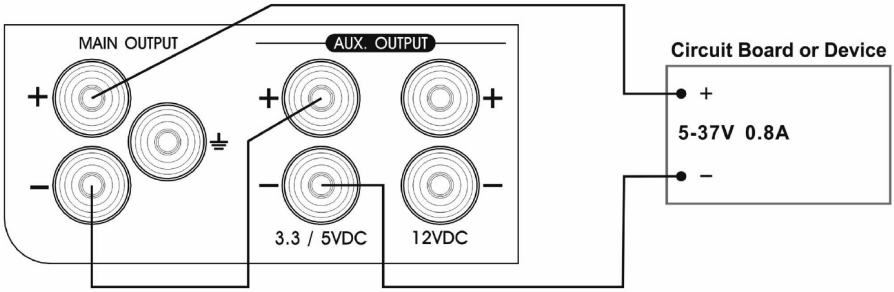


Fig. 2 PSB-4332 with Two Outputs in Series

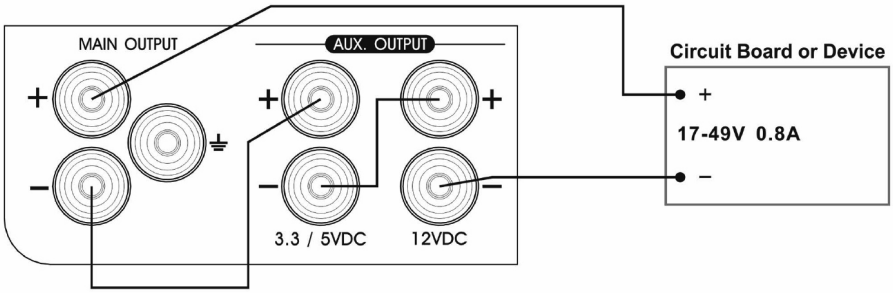


Fig.3 PSB-4332 with Three Outputs in Series

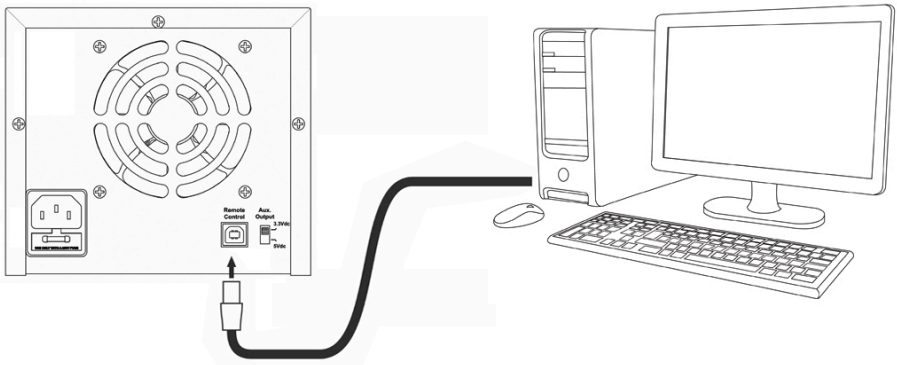
Remote Programmable Control

PSC-4618 and PSC-4332 can be interfaced with PC via the built-in USB port allowing remote control of the power supply.

Drivers for the USB, LabVIEW and SCPI command sets are provided in addition to the programmable PC control software of timed cyclic operations and 10 List points waveform generation.

PC Connection

Connect the power supply to Windows PC using the supplied USB cable and download the driver and software for the respective model from the website www.circuittest.com. For detailed usage of the driver and PC software please refer to the software manual which can be downloaded from the website www.circuittest.com



Front Panel Menu

The following features are programmable in Menu Mode using Voltage and Current knobs.

1. Upper Voltage Limit (UVL Set)
2. Upper Current Limit (UCL Set)
3. Programming (dv/dt Set) and Operation (dv/dt Run) of waveform generation
4. Power Up output off or output as the last shut down. (Pu Set)
5. Brightness adjustment of LED display (Disp Set)
6. Timeout period of voltage and current display (tout set)
7. USB selection (UNS Set)
8. Factory Reset (FACS Set)

Press and hold the Current Knob to get in to the menu mode, press and hold again to exit and confirm new settings.

Once the power supply is in the Program Menu Mode, turn the Volt Knob to scroll through the 8 features; press the Volt Knob to either get into the selected feature to adjust or to get back to scroll mode for another feature selection.

Program Mode Main Menu Sequences:

UVL Set-->UCL Set -->dV/dt Run ->dV/dt Set-->FACS Set-->Pu Set--> Uns Set-->Disp Set--> tout Set--> UVL Set

Both control knobs are used to program the above functions, follow the function of each knob as follows:

Current Knob

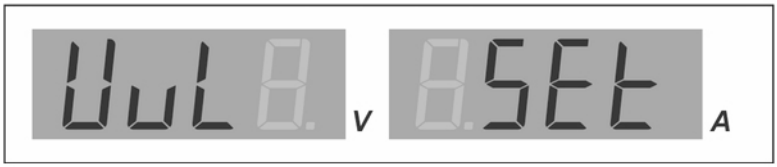
- Press and hold (4 sec) to get in to Menu mode.
- Press and hold (4 sec) to confirm all new settings and exit Menu.
- Rotate to change the values or status of selected feature setting.

Voltage Knob

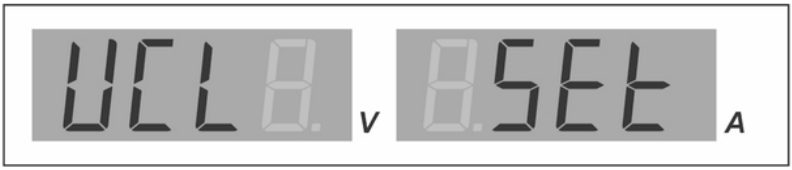
- Rotate the knob to scroll through the 8 features.
- Press the knob to get into the selected feature for programming or a new setting.
- Press the knob to return to scroll mode for other feature selection.

EXAMPLE: Setting Upper Current Limit UCL

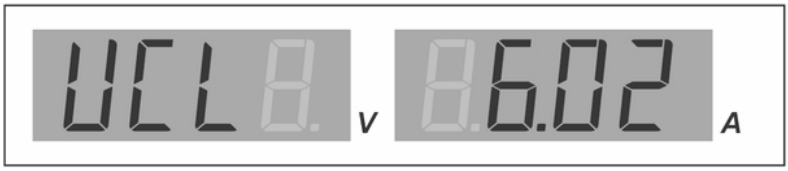
1. Press and hold (4 sec) Current Knob until [UuL SEt] appears indicating power supply is in Programmable Mode.



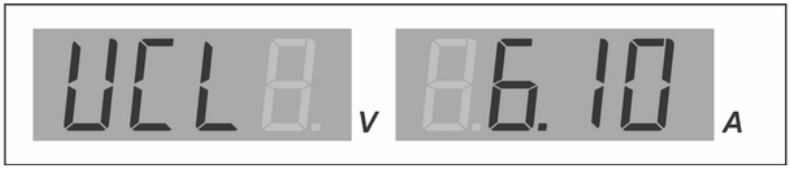
2. Turn Voltage Knob until [UCL SEt] appears.



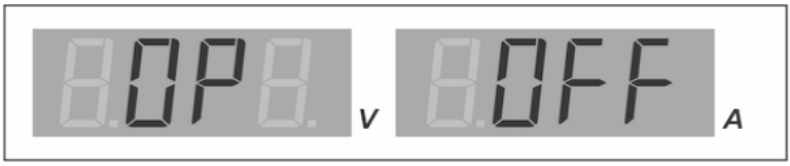
3. Press Voltage Knob to get into the selected UCL setting and the original upper current limit appears.



4. Turn the Current Knob to adjust the Upper Current Limit setting.



5. Press and hold the Current Knob until display changes to Output OFF to confirm the new setting and exit from the programmable Menu mode.

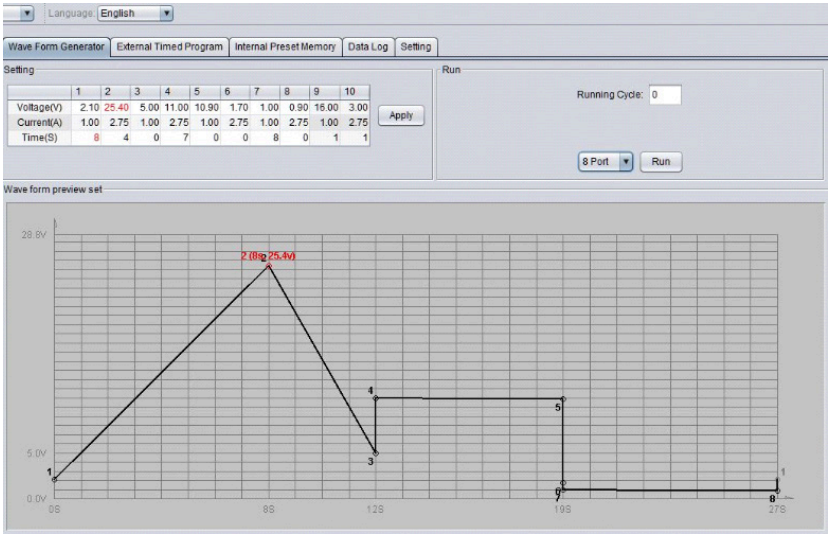


Wave Form Generation

It is much easier to set and run the waveform generation using the supplied software which also shows the waveform profiles before running. You can monitor the streaming output with the load at the output, data log the results and your settings. However you can still program all the 10 List Points, and run your waveform generation without the use of a PC.

There are 10 points available for making a waveform generation. Each point has 3 parameters: voltage level, current limiting level and transit time (T) to next point. You do not need all 10 points to generate a waveform, but you need at least 2 points to make a waveform. You can run from one cycle to 999 cycles or non- stop running cycles of your waveform.

Principle of waveform generation:



Point 1 [2.1V; 1A; T=8 sec to Point 2]

Point 2 [25.4V; 2.75A; T=4 sec to Point 3]

Point 3 [5.0V ; 1.0A ; T =0 sec to Point 4]

Point 4 [11V ;2.75A ; T= 7 sec to Point 5]

AND SO ON TO POINT 8

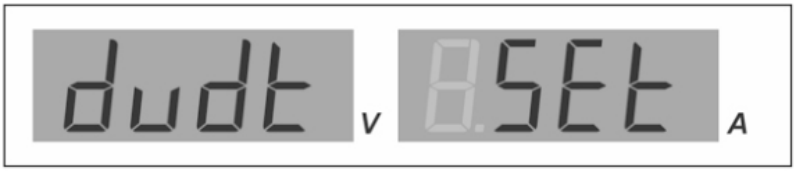
Point 8 [0.90V ; 2.75A ;T=0 sec to Point 1]

Note: in this 8 point example, the last point 8 will go back to point 1 to repeat the cycle run.

Programming of dvdt

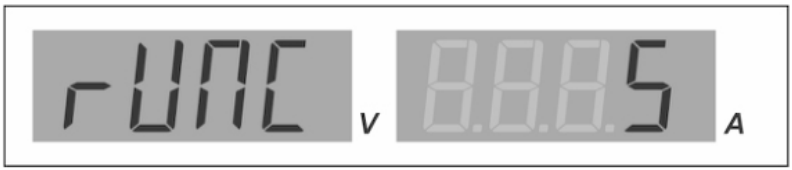
1. Press and hold current knob until display changes to [Uul SEt] indicating in Menu Mode

2. Turn voltage knob to [du/dt SEt]

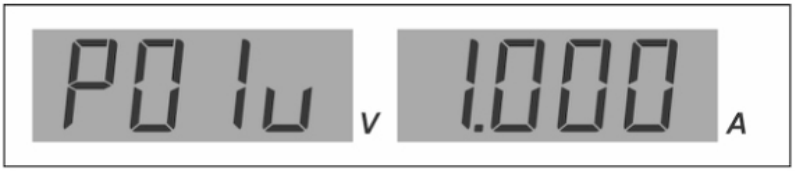


3. Push voltage knob to get into setting mode and [rUNP] shows up, turn current knob to desired number of points (2 to 10) to run the waveform generation.

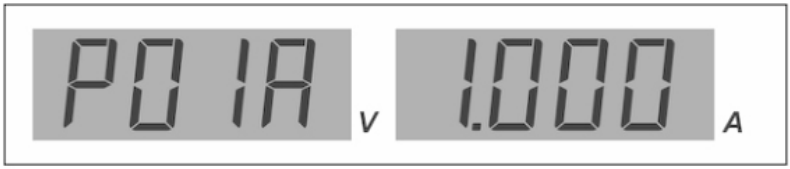
4. After selection of number of points then turn the voltage knob to go to the [rUNC] for number of cycles to run the waveform generation. In this example 5 cycles is set by turning the current knob.



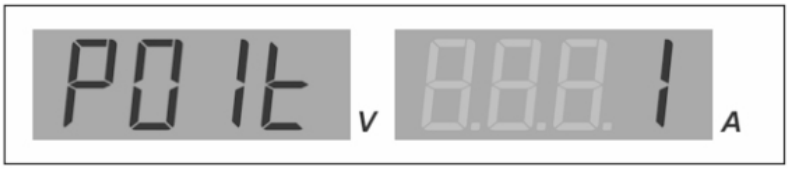
5. Now turn the voltage knob to setting of point 1 [PO1u] voltage level for point 1 and change value by tuning the current knob.



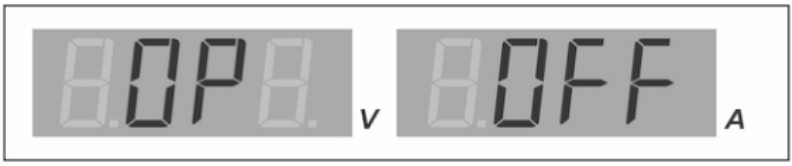
6. Turn the voltage knob to setting of current level of point 1 [P01A] and change value by tuning the current knob.



7. Turn the voltage knob to setting of Time from point 1 to point 2 by tuning the current knob.



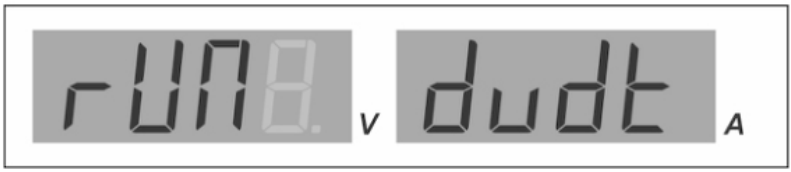
8. After point 1 then go to point 2 by tuning the voltage knob and follow the same procedure for the rest of points
9. Confirm all the settings and exit by pressing and hold the current knob.



Running of dv/dt

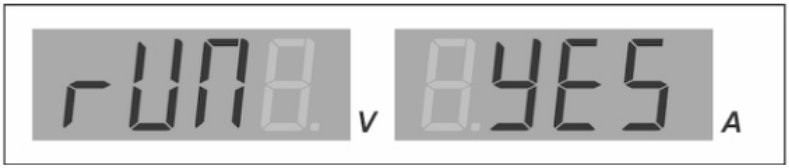
After setting of the parameters of the required points and number of cycles, you can run the waveform generation as following:

1. Turn voltage knob to [rUN] [dudt]



2. Push voltage knob again to get into the rUN mode.

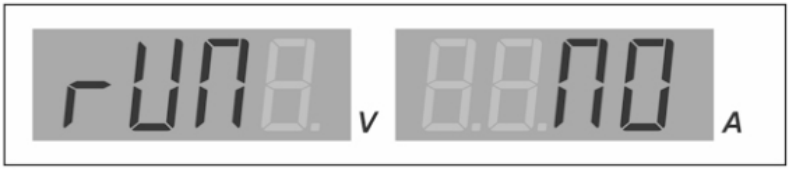
3. Turn the current knob to Yes and press and hold current to run the waveform generation.



* Take note of the flicking dv/dt LED and the changing of the voltage and current values on the display.

Stop running of dv/dt

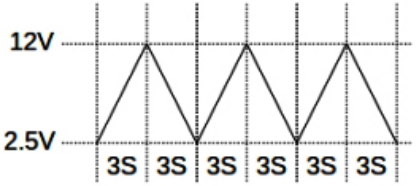
1. You can pause the running of the dv/dt waveform generation by pushing the output on off



2. Exit from the waveform generation by repeating the above procedure and set to NO.

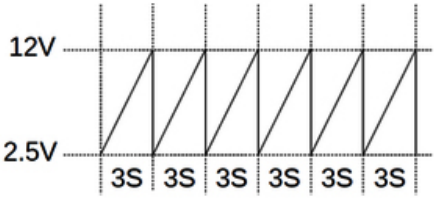
EXAMPLES

Example 1. Triangular Waveform



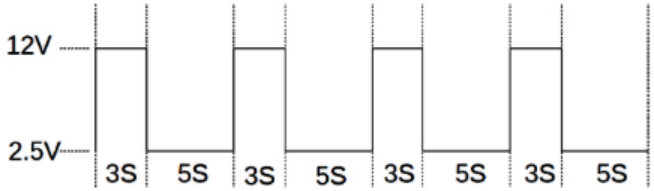
Set item	Value	Explanation
rUNP	2	Set 2 steps to run. Step 1 and Step 2
rUNC	3	Run 3 cycle only
P01U	2.5	Set Step 1 voltage to 2.5V
P01C	1	Set Step 1 current to 1.0A
P01t	3	Set Step 1 run time to 3s (Ramp UP from step 1 voltage to step 2 voltage in 3s)
P02U	12	Set Step 2 voltage to 12V
P02C	1	Set Step 2 current to 1.0A
P02t	3	Set Step 2 run time to 3s
		(Ramp DOWN from step 2 voltage to step 1 voltage in 3s)

Example 2. Saw-tooth Waveform



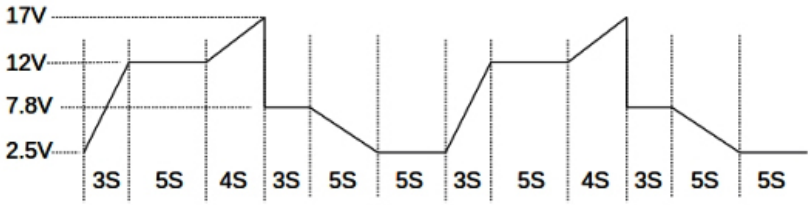
Set item	Value	Explanation
rUNP	2	Set 2 steps to run. Step 1 and Step 2
rUNC	6	Run 6 cycle only
P01U	2.5	Set Step 1 voltage to 2.5V
P01C	2	Set Step 1 Current to 2A
P01t	3	Set Step 1 run time to 3s (Ramp UP from step 1 voltage to step 2 voltage in 3s)
P02C	2	Set Step 2 Current to 2A
P02U	12	Set Step 2 voltage to 12V
P02t	0	Set Step 2 run time to 0s (Edge DOWN from step 2 voltage to step 1 voltage in 0s)

Example 3. Rectangular Waveform



Set item	Value	Explanation
rUNP	4	Set 4 steps to run. From Step 1 and Step 4
rUNC	4	Run 4 cycle only
P01u	2.	Set Step 1 voltage to 2.5V
P01C	2A	Set Step 1 Current to 2A
P01t	0	Set Step 1 run time to 0s (Edge UP from step 1 voltage to step 2 voltage in 0s)
P02u	12	Set Step 2 voltage to 12V
P02C	1	Set Step 2 Current to 1A
P02t	3	Set Step 2 run time to 3s (Keep at 12V by 3s, since step 2 voltage = step 3 voltage)
P03u	12	Set Step 3 voltage to 12V
P03C	2.5	Set Step 3 Current to 2.5A
P03t	0	Set Step 3 run time to 0s (Edge DOWN from step 3 voltage to step 4 voltage in 0s)
P04u	2.5	Set Step 4 voltage to 2.5V
P04C	1.5	Set Step 4 Current to 1.5A
P04t	5	Set Step 4 run time to 5s (Keep at 2.5V by 5s, since step 4 voltage = step 1 voltage)

Example 4. Irregular Waveform



Set item	Value	Explanation
rUNP	7	Set 7 steps to run. Step 1 and Step 7
rUNC	0	Run forever
P01U	2.5	Set Step 1 voltage to 2.5V
P01C	2	Set Step 1 Current to 2A
P01t	3	Set Step 1 run time to 3s (Ramp UP from step 1 voltage to step 2 voltage in 3s)
P02U	12	Set Step 2 voltage to 12V
P02C	1	Set Step 2 Current to 1A
P02t	5	Set Step 2 run time to 5s (Keep at 12V by 5s, since step 2 voltage = step 3 voltage)
P03U	12	Set Step 3 voltage to 12V
P03C	1.5	Set Step 3 Current to 1.5A
P03t	4	Set Step 3 run time to 4s (Ramp UP from step 3 voltage to step 4 voltage in 4s)
P04U	17	Set Step 4 voltage to 17V
P04C	2	Set Step 4 Current to 2A
P04t	0	Set Step 4 run time to 0s
		(Edge DOWN from step 4 voltage to step 5 voltage in 0s)
P05U	7.8	Set Step 5 voltage to 7.8V
P05C	2.5	Set Step 5 Current to 2.5A
P05t	3	Set Step 5 run time to 3s (Keep at 7.8V by 3s step 5 voltage = step 6 voltage)
P06U	7.8	Set Step 6 voltage to 7.8V
P06C	1.5	Set Step 6 Current to 1.5A
P06t	5	Set Step 6 run time to 5s (Ramp DOWN from step 6 voltage to step 7 voltage in 5s)
P07U	2.5	Set Step 7 voltage to 2.5V
P07C	2	Set Step 7 Current to 2A
P07t	5	Set Step 7 run time to 5s (Keep at 2.5V by 5s, since step 7 voltage = step 1 voltage)

Error table

Error	Description
OtP	Over temperature protection. This error indicates that the internal temperature of power supply is too high. It will resolve automatically when the temperature drops to safety level.
OuP	Over voltage protection. This error indicates that the voltage at output terminal exceeds the level of the tracking voltage for the set voltage. (refer to specification). Disconnect the load from the output first and restart the power supply. If the error shows up again without load, it may have hardware fault. Please contact service provider.
OcP	Over current / load protection. This error indicates that the output is overloaded. Disconnect the load from the output first and restart the power supply. If the error still shows without load, it may have hardware fault. Please contact service provider.
UuL	Upper Voltage Limit. This error shows that the output voltage setting is higher than Upper Voltage Limit setting. Reduce Voltage output setting to value lower than Upper Voltage Limit to resolve this error.
Ucl	Upper Current Limit. This error shows that the output current setting is higher than Upper current Limit setting. Reduce Current output setting to value lower than Upper Current Limit to resolve this error.

Warranty

Circuit-Test Electronics warrants to the original purchaser that this product be free of defect in material or workmanship for a period of 2 years from the date of purchase.

Any product which has been subjected to misuse or accidental damage is excluded from the warranty. Except as stated above, Circuit-Test Electronics makes no promises or warranties either expressed or implied including warranties of merchantability or the fitness for any particular purpose.

Notes:

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