multicomp PRO

MULTI OUTPUT PROGRAMMABLE LINEAR MODE POWER SUPPLY

MP710077 and MP710078

Table of contents

Precautions 3
Copyright 3
Accessories 3
Introduction 4
Specifications 5
Indications 6
- Front Panel 6
- Back Panel 7
- AC Voltage Selection 8

Operation Procedures 9
- Basic operation 9
- Connection and Operation 9
  - Connect 3 outputs 10
- Connect 3 outputs in series 10
- Remote Programmable control 11
- Front Panel Menu 12
- Wave Form Generation 14
  - Running DV/DT 16

Precautions

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

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

Disclaimer
Exclusions for documentation, Indemnity and Product application.

1. Assumes no warranty to the accuracy, suitability of technical information given in the user manuals or other documentation.
2. Undertakes no responsibility or liability of losses, damages and related expenses whether specific, direct, indirect consequential or accidental which might result from the use of information given in this manual.
3. Shall not be liable to anyone for any special, collateral, incidental or consequential damages in connection with or from the use of these products. The sole and exclusive liability, regardless of the form of action shall not exceed the purchase price of the product.

Accessories

1. AC Power Cord
2. USB cable
3. Output cable with crocodile clip

Introduction

This new series of low noise, excellent voltage & current regulation precision laboratory grade linear supply merges with the advanced MCU control and PC interface via USB and optional Ethernet .
It is ideal for noise sensitive applications; communication, audio visual, measuring devices. The MCU control with 10 Step Wave Form generator with cyclic operation makes working & testing DUT convenient.

The large LED display shows the vital status & the two 4 digit voltage and current meters.
The variable output has 10mV and 1mA resolution.
There are 3 user defined pre-sets 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.

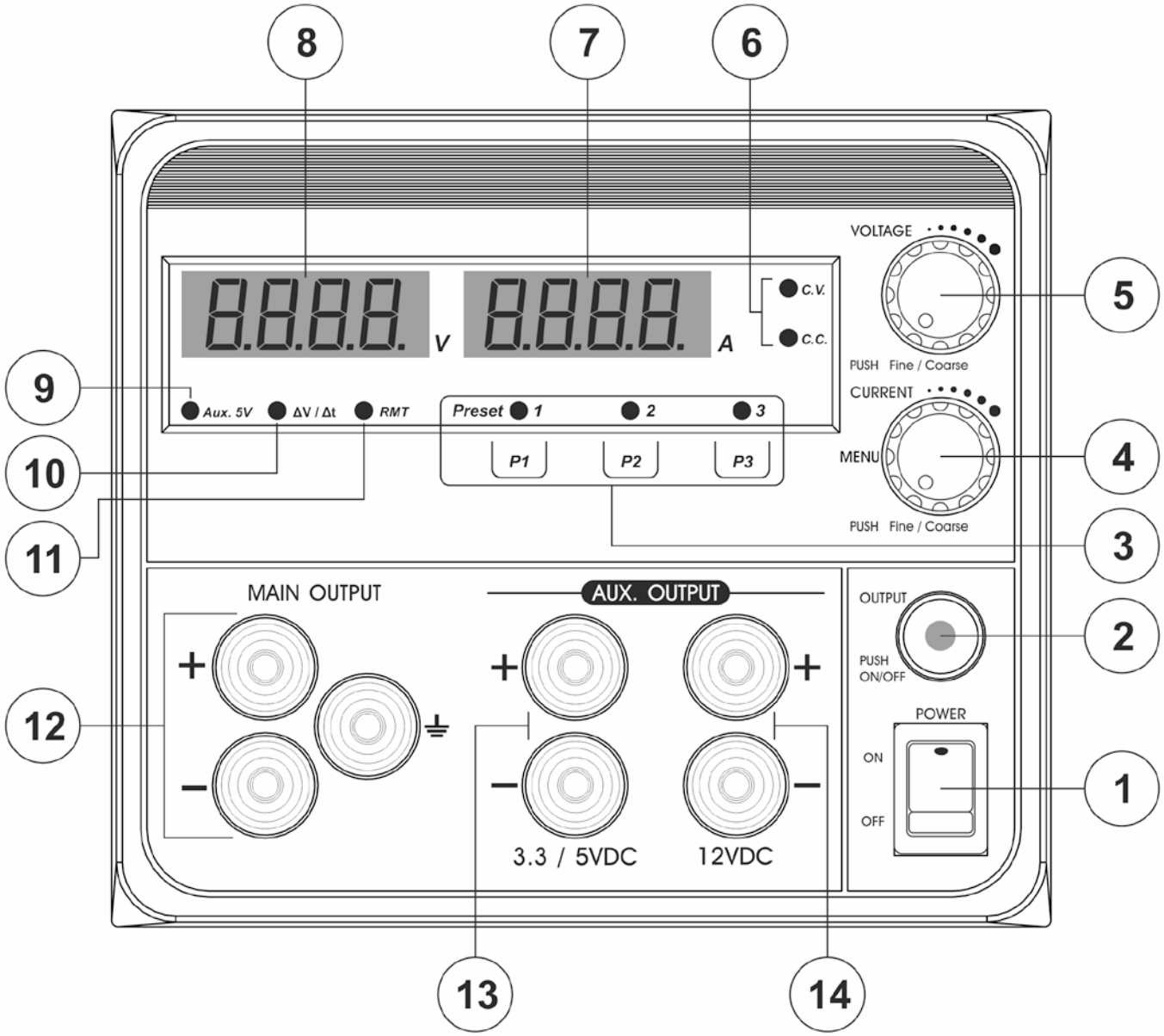
Specifications

Models	MP710077	MP710078
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 (r.m.s)	≤ 5mV	
Auxiliary Fix output		
Aux. 1 output	5mVDC/3.3VDC (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	
Meter Type & 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% +2digits >0.5A)	
Input Voltage	115/230VAC	
Full Load Input Current	≤ 1.1A@230VAC	
Cooling Method	Thermostatic Control Fan (0 to full speed)	
Protections	Overload, Short Circuit by Constant Current, Output Tracking Over Voltage, Over Temperature	
Special Feature	3 User defined V & I preset,Remote V, I, & output on-off	
Presets Cycle Programming	10 steps waveform generator Max. preset cycle 999	
Commend Set	SCPI	
Communication Types	USB (bundle); Ethernet (Optional)	
Approvals	CE EMC: EN 55011, 55022 LVD: EN 60950, 61010	
Dimensions (WxHxD)	151x132x260mm	
Weight	~5.1kgs	

- All values are based on the Standard ambient Temperature 25°C and Pressure 0.1Mpa.
- SPECIFICATIONS ARE SUBJECT TO CHANGE WITHOUT PRIOR NOTICE

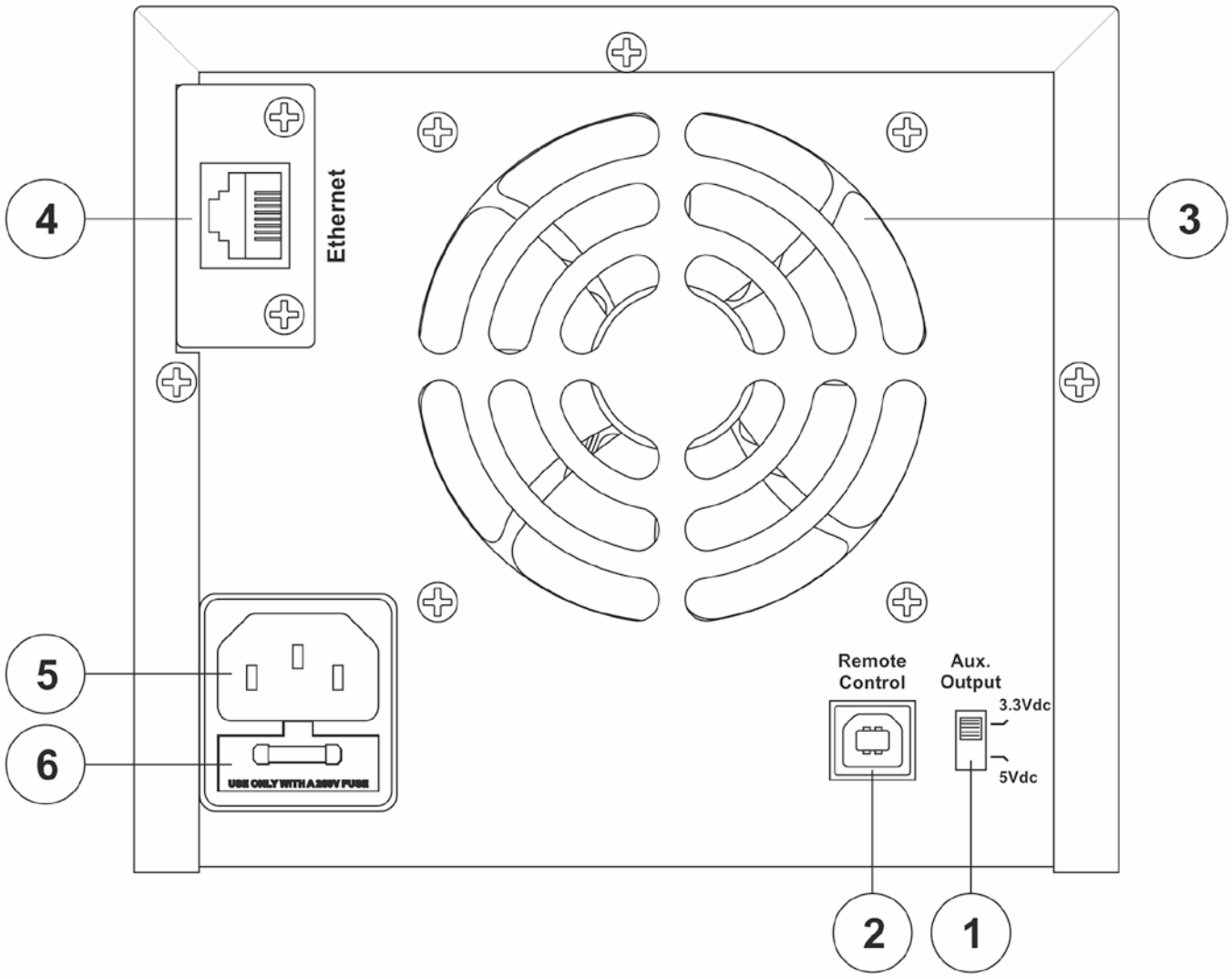
Indications

Front Panel



1. Main Power Switch
2. Output ON/OFF button
3. Preset 1/ 2/ 3 selection and LED indication
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

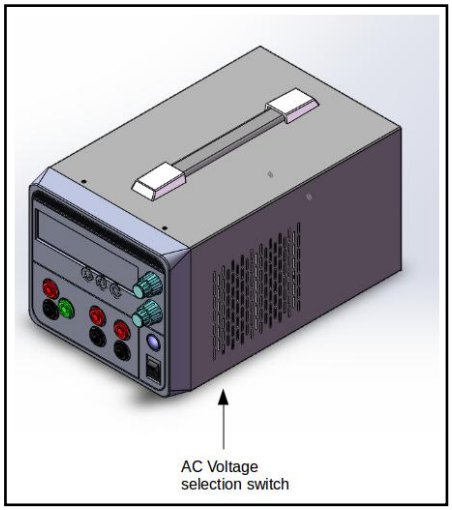
Back Panel



1. Auxiliary 1 3.3V/ 5V selection
2. USB Remote Control port
3. Cooling Fan
4. Ethernet port (Ethernet model only)
5. AC power plug
6. AC FUSE

AC Voltage Selection

The AC selection switch is location on the bottom of power supply.



Use a pointed tool to switch AC voltage between 115VAC and 230VAC.

Select 115 for AC voltage range from 100VAC to 126VAC
Select 230 for AC voltage range from 207VAC to 253VAC

Warning: Please mark sure you correctly select the voltage of your range. Incorrectly selected the voltage will cause damage on power supply.

Operation Procedures

Basic operation

Switching on the power supply
Double check the AC Voltage Selection for the AC Mains with the rating label, the power supply can be set to either 115V or 230V AC.
When power supply is switched on all the LEDs and Display lights for about 2 seconds self-test before displaying normally to indicate if output is Off or On.

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 following:

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 pre-set current limiting value, the power supply will automatically cross over to the constant current mode, voltage will drop, (CC) will show on the LCD display panel and it will operate as a constant current source.
When the load current drops below the pre-set current limiting value, the supply returns to constant voltage (CV) mode.

Setting the Output Voltage & Current Limiting Value (CC)
It is of 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.
Turning 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 desire number otherwise you need to repeat quick pushes again.
One quick push on the current knob to see the pre-set current limiting value.
Remark: If you find the default time out of the LED indications is too fast or too slow you can adjust the tempo of the time out duration to your personal choice. SEE SECTION: (LED duration time)

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 displays will show OP OFF (OUTPUT OFF).
In the powering up of the unit, the 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 GIVEN IN Front Panel Menu Section

Pre-sets 1, 2, 3
Touch-feel reaction technology is used for the triggering of the pre-sets.
These 3 pre-sets store the frequently used voltage and current limit settings which are adjustable & stored at any time.
It is strongly advisable to set the output to OFF for checking the pre-set 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) is Off
and at 5VDC setting indicator (10) is On.

Connection and Operation

Connection and Operation Procedure
1. Check the rating label and plug in to AC mains.
2. Switch on the power supply and the LCD display should be on at the same time.
3. The (CV) icon should be shown on the display.
4. Turn to current volume knob (4) to maximum clockwise 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 by 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.

Connect 3 outputs

Connecting the 3 outputs (using MP710078 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 1-36V as shown in Fig. 1.
The variable main output is set for 12V and it is assigned as the +12V source (available maximum current 3A)
Note the variable main output can be set for other voltage (1-32V) such as 16V.
The fixed 12V is made as the - 12V source (available maximum current 0.5A)
The fixed 5V is made as the +5V source. (available maximum current 0.5A)

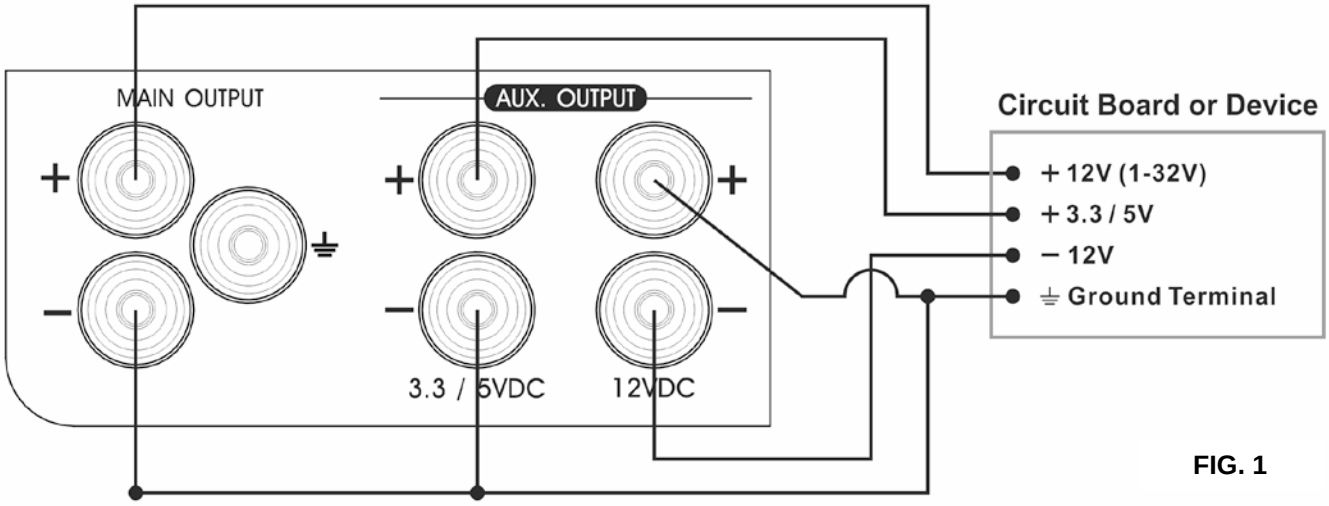


FIG. 1

Connect 3 outputs in series
Connecting outputs in series (using MP710078 as an example)
You can have a 17V fixed output by connecting the 5V in series with the 12V outputs.
The 2 outputs (Aux.1) 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 combination of cross connections for different positive and negative output voltages.

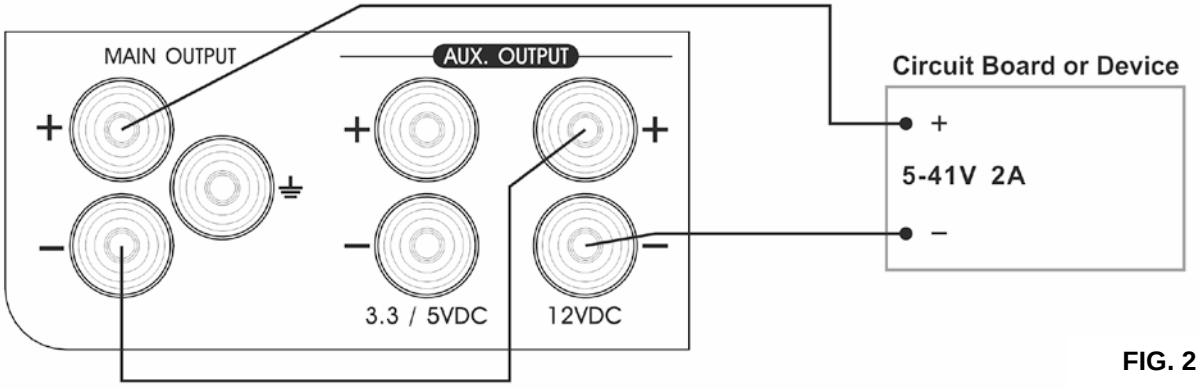


FIG. 2

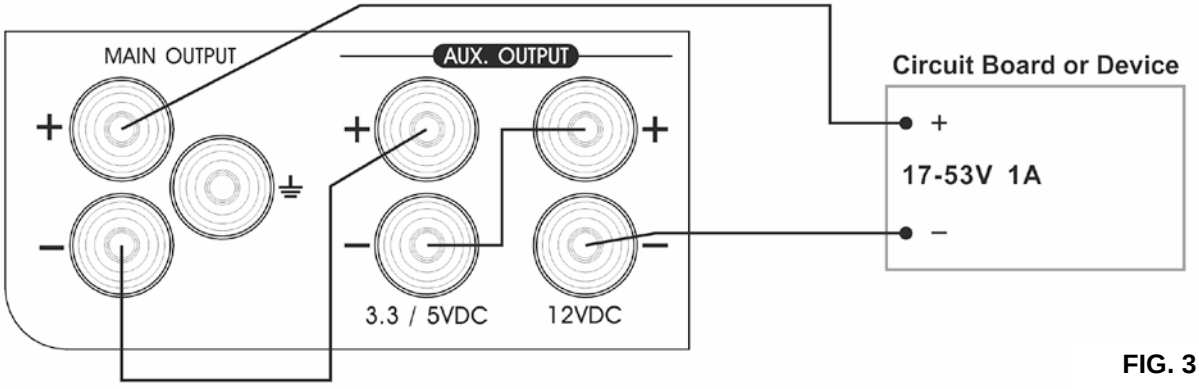
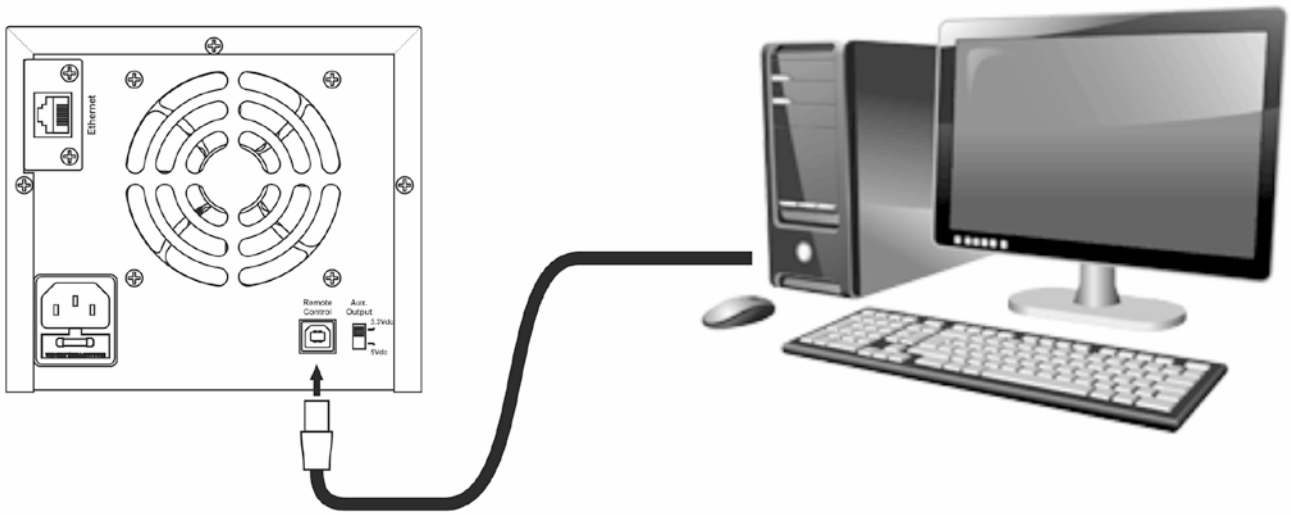


FIG. 3

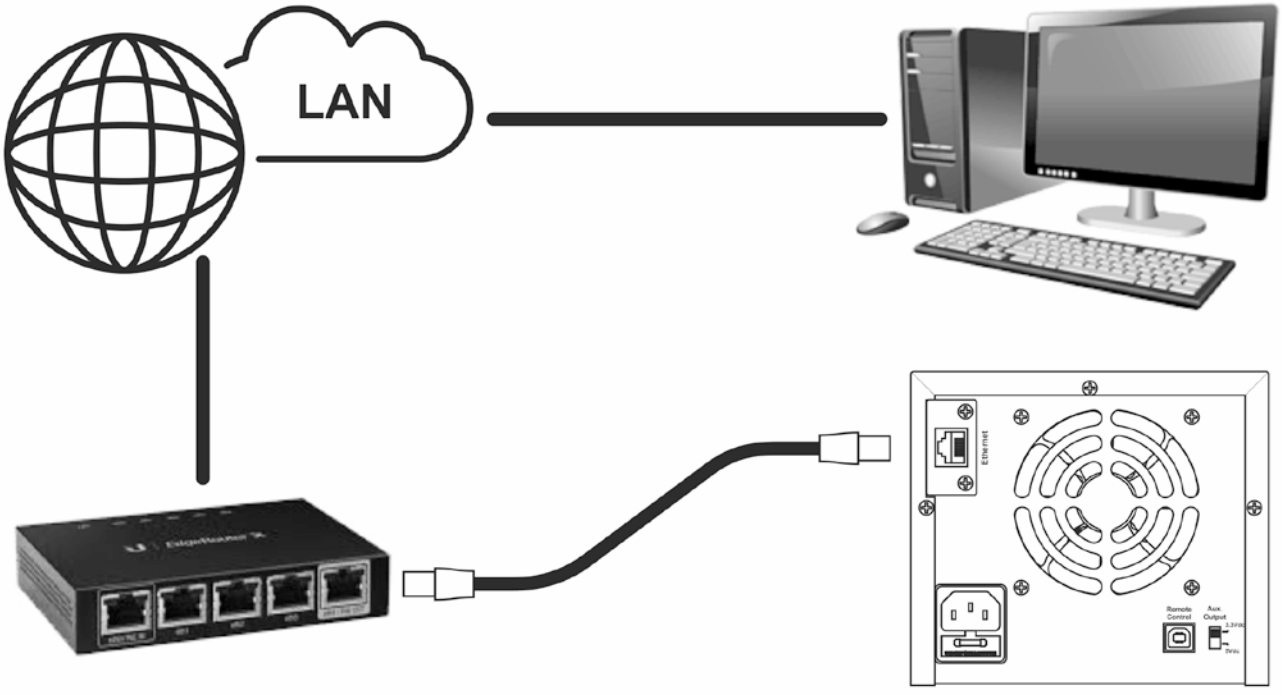
Remote Programmable control
The NEP can be interfaced with PC via the built in USB port or the optional factory installed Ethernet port. Drivers for the USB, Labview & SCPI Command Sets are provided in addition to the proprietary programmable control software of timed cyclic operations & 10 LIST points waveform generation.

There is also an App for APPLE & ANDRIOD tablets which allow remote monitoring and controls on NEP interfaced with Internet access .

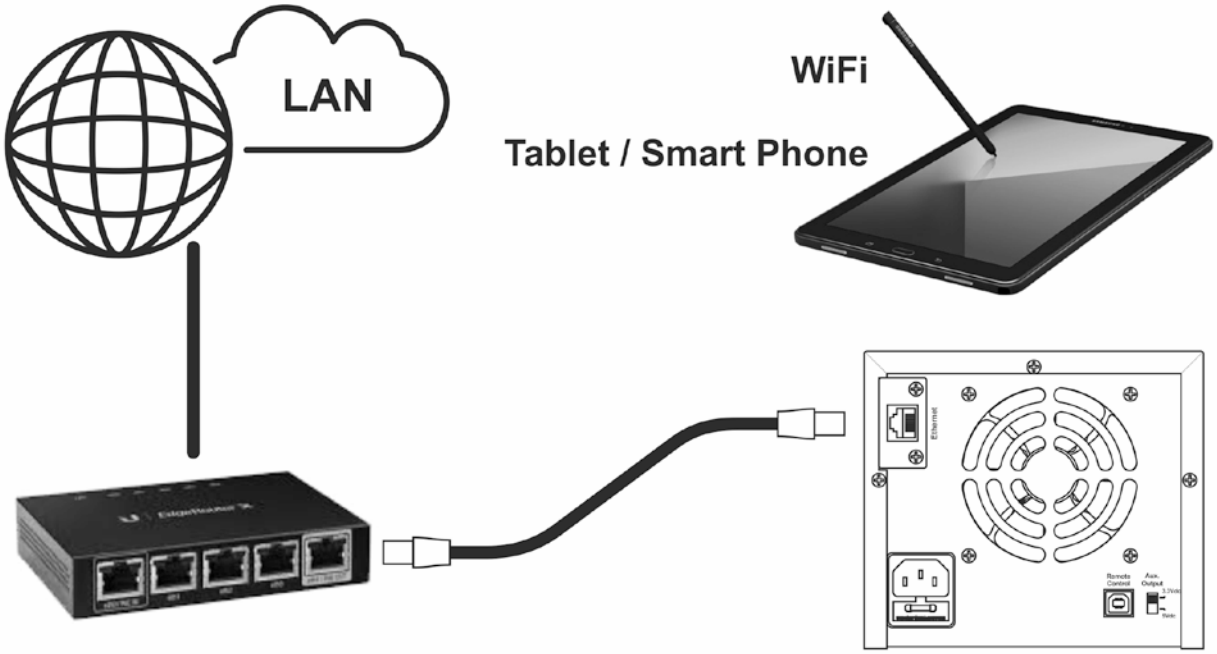
PC CONNECTION
The NEP with USB can be remote control using Windows PC. Connecting the NEP to PC using provided USB cable as following connection diagram.



The LAN enabled model NEP can be remote control through work connection as follow.



The network connected power supply can be remote controlled by tablet/iPhone with relevant apps.



Please download the driver from Farnell website product page.

For the detail usage of driver and PC software. Please refer to PC software manual.
PC software manual is also available to download from the Farnell website product page.

Front Panel Menu

The following features can be programmable in Menu Mode using Voltage & Current controls.

1. Upper Voltage Limit. (UVL Set)
2. Upper Current Limit (UCL Set)
3. Programming (dv/dt Set) & 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 & current display (tout set)
7. USB or optional Ethernet selection (UNS Set)
8. Factory Reset (FACS Set)

Long press on the Current Control to get in to the menu mode, second long press to exit & confirm new settings on the adjusted features.

Once the NEP is in the Program Menu Mode, turn the Volt Control to scroll through the 8 features; press the Volt Control to either get into the selected feature for adjustment 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

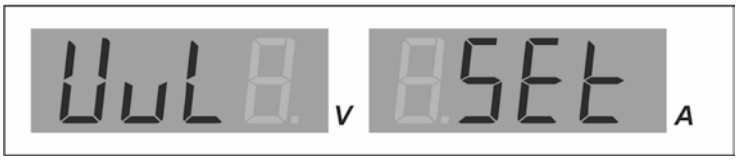
Both rotary control are used to program the above functions intuitively, just follow the function of each control as following:

CURRENT CONTROL -- LONG PRESS (4 sec)TO GET IN TO MENU MODE.
LONG PRESS (4 sec)TO CONFIRM ALL NEW SETTINGS & EXIT MENU MODE.
ROTATE TO CHANGE VALUES OR STATUS OF SELECTED FEATURE SETTING.

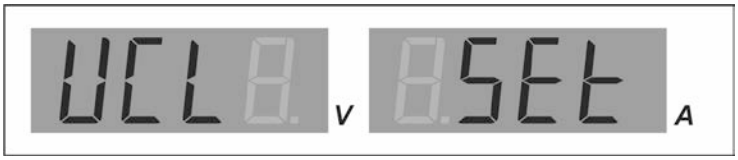
VOLTAGE CONTROL -- ROTATE KNOB TO SCROLL THROUGH THE 8 FEATURES.
SHORT PRESS GET INTO THE SELECTED FEATURE FOR PROGRAMMING OR NEW SETTING.
SHORT PRESS TO RETURN TO SCROLL MODE FOR OTHER FEATURE SELECTION.

EXAMPLE: Setting Upper Current Limit UCL

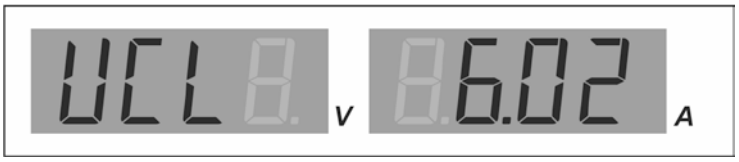
1. Long press (4 sec) Current Control until [UuL SET] appears indicating power supply in Programmable Mode.



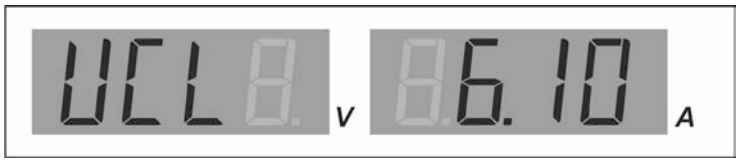
2. Turn Voltage Knob until [UCL SEt] appears.



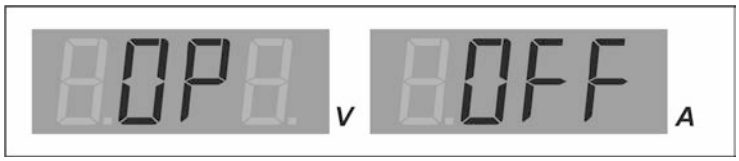
- Short press Voltage Control to get into the selected UCL setting and the original upper current limit appears.



- Turn the Current Control to adjust the Upper Current Limit setting.



- Long press the Current Control until display changes to Output OFF to confirm the new setting and exit from the programmable Menu mode.

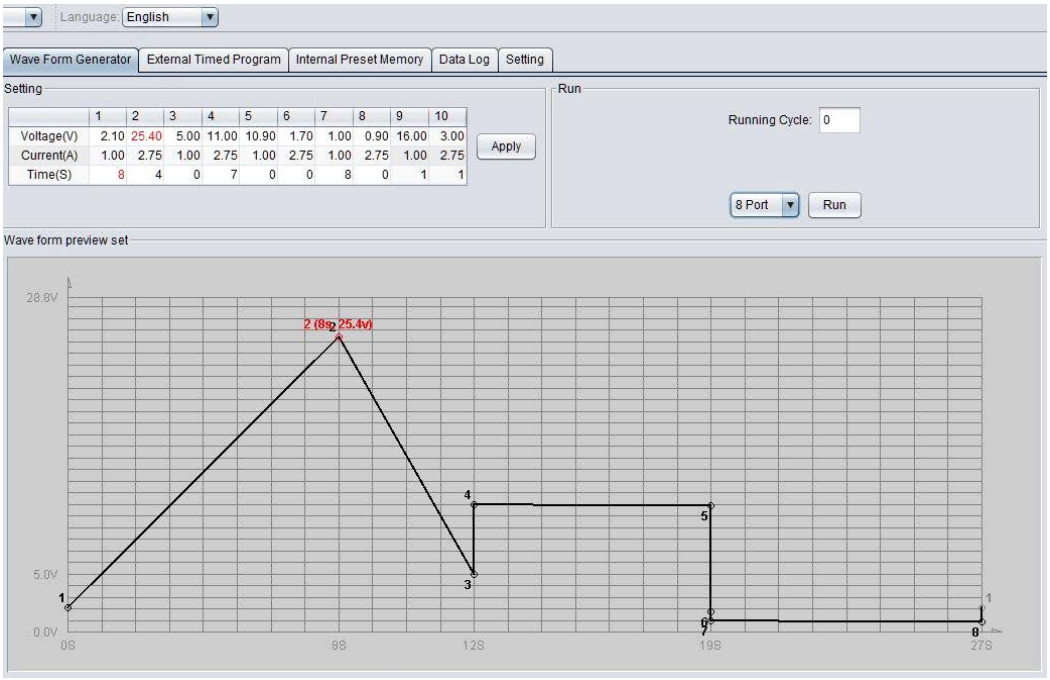


Wave Form Generation

It is much easier to set and run the waveform generation using the supplied software which also shows the waveform shape before running. You can monitor the streaming output with the load at the output, data log results and your settings as well.
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.

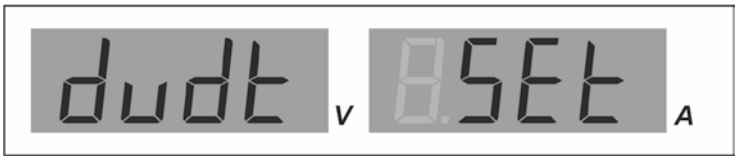
Principle of waveform generation:



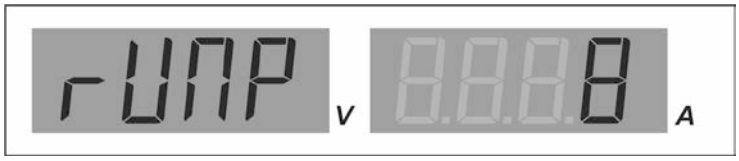
Point 1 [2.1V; 1A; T=8 sec to Point 2]
Point 2 [25.4V; 2.75A; T=4 sec to Point 3]
Point 3 [5.0V; 1.0A; T =0 sec to Point 4]
Point 4 [11V; 2.75A; T= 7 sec to Point 5]
AND SO ON TO POINT 8
Point 8 [0.90V; 2.75A; T=0 sec to Point 1]

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

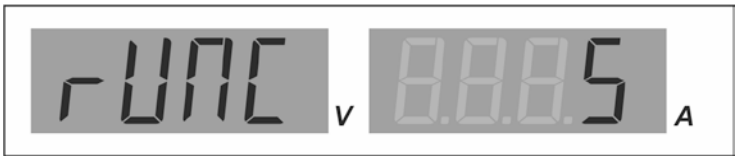
- Long push current control until display changes to [uvl Set] indicating in Menu Mode
- Turn voltage control to [dv/dt Set]



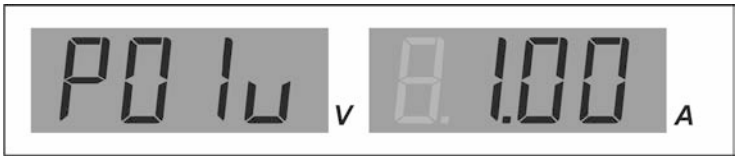
- Push voltage control to get into setting mode and [rUNP] shows up, turn current control to desired number of points (2 to 10) to run the waveform generation.



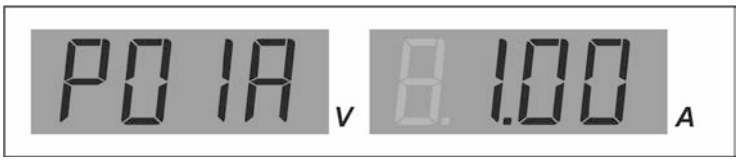
- After selection of number of points then turn the voltage control to go to the [rUNC] for number of cycles to run the waveform generation. In this example 5 cycles is set by turning the current control.



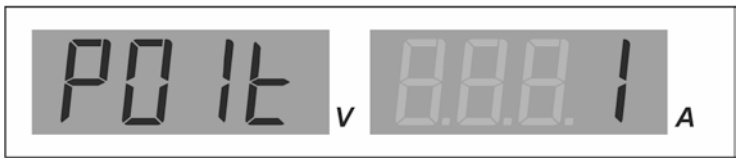
- Now turn the voltage control to setting of point 1 [PO 1u] voltage level for point 1 and change value by tuning the current control.



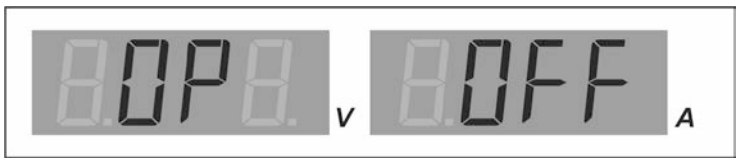
- Turn the voltage control to setting of current level of point 1 [PO 1A] and change value by tuning the current control.



- Turn the voltage control to setting of Time from point 1 to point 2 by tuning the current control.



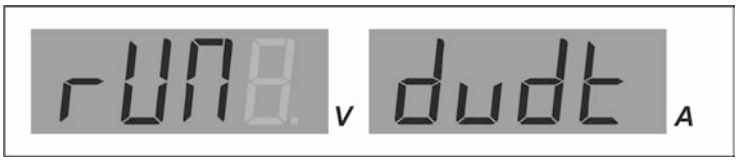
- After point 1 then go to point 2 by tuning the voltage control and follow the same procedure for the rest of points.
- Confirm all the settings and exit by long push of current control.



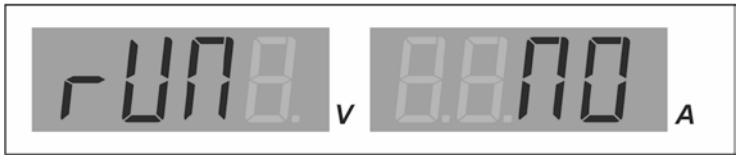
Running of dv/dt

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

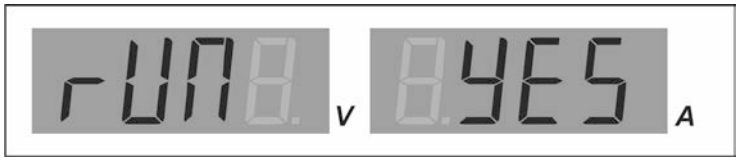
1. Turn voltage control to [rUn] [dudt]



- Push voltage control again to get into the rUn mode



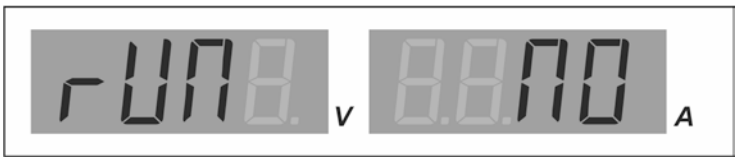
- Turn the current control to Yes and long push current to run the waveform generation.



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

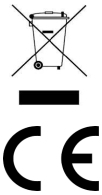
Stop running of dv/dt

1. You can pause the running of the dv/dt waveform generation by push the output on off.
2. Exit from the waveform generation by repeating the above procedure and set to NO.



Error table

ERROR	Description
OtP	Over temperature protection. This error indicates 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 indicate the voltage at output terminal exceeds the level of the tracking voltage for the set voltage. (refer to specification). Disconnecting load from the output first and restart power supply. If the error show up again without load, it may have hardware fault. Please contact service provider.
OcP	Over current / load protection. This error indicates the output is overloaded. Disconnecting load from the output first and restart 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 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 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.



INFORMATION ON WASTE DISPOSAL FOR CONSUMERS OF ELECTRICAL & ELECTRONIC EQUIPMENT. When this product has reached the end of its life it must be treated as Waste Electrical & Electronics Equipment (WEEE). Any WEEE marked products must not be mixed with general household waste, but kept separate for the treatment, recovery and recycling of the materials used. Contact your local authority for details of recycling schemes in your area.

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