

# NSP-2050/3630/6016 SWITCH MODE POWER SUPPLY

## USER MANUAL

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 any equipment 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 warning 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 any fuse first determine and correct the cause of the blown fuse.
6. Replace the AC mains fuse with the same type and rating as the original.
7. The maximum output voltage of Model NSP-6016 is 60VDC, avoid touching the metal parts of the output terminals on this model.

### **CAUTION:**

1. Always use a properly grounded AC power source.
2. This unit is for indoor use only.
3. Do not operate or place this unit in a humid or dusty location, in direct sunlight or near any heat source.
4. Before plugging into the AC mains, check the rating label at the back of the unit.
5. Do not block any ventilation openings on 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 0.75mm<sup>2</sup> (18AWG) and the total length of power cable must not exceed 3m.

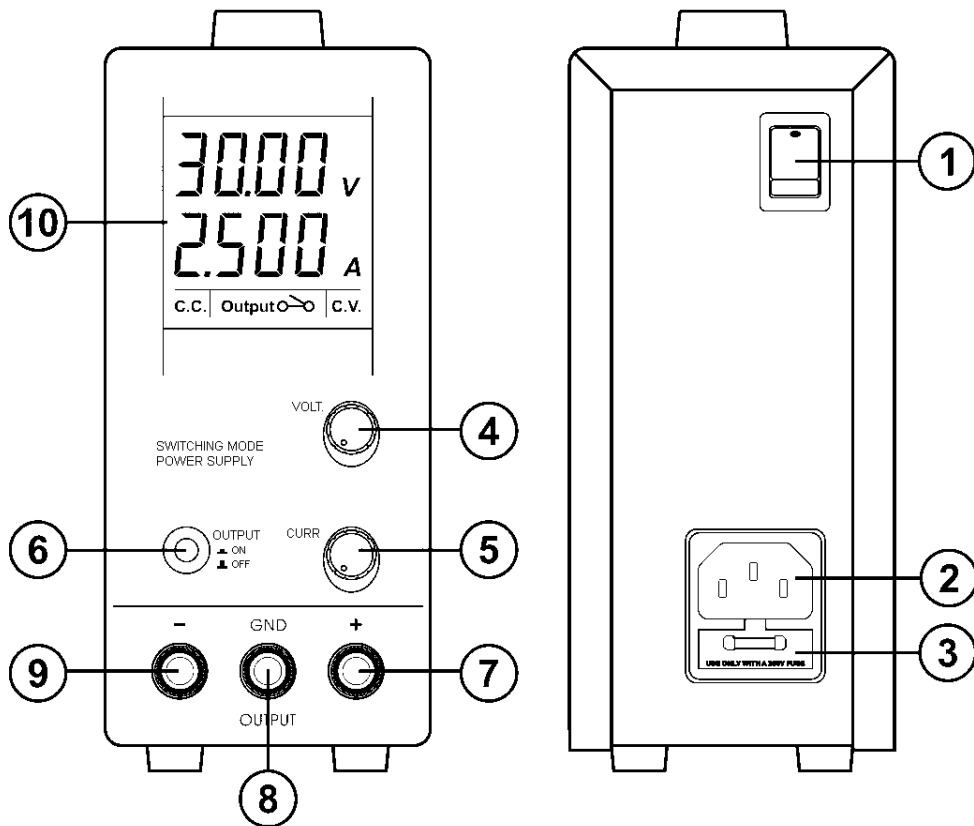
## **ENVIRONMENTAL OPERATING CONDITIONS**

- 10-80% R.H.
- Maximum relative humidity 80% for temperature up to 31°C, decreasing linearly to 50% relative humidity at 40°C.
- Altitude up to 2000m
- Installation category: CAT 2
- Pollution degree: 2
- Mains supply voltage fluctuation up to ±10% of the normal voltage

## **INTRODUCTION**

The NRP precision series of switch mode laboratory DC power supplies are ideal for test, measurement and service applications where tight voltage and current regulation is critical. The highly efficient switch mode design delivers outstanding performance from an extremely compact footprint. Unique separate output ON/OFF control allows voltage and current setting, with the supply output turned off.

## CONTROLS AND INDICATORS



1. Power Switch:  
Mains power supply on-off switch.
2. AC Input Socket with Fuse (for connection of supplied AC power cord).
3. Concealed Fuse box (remove the power cord and pry open the cover to remove the fuse)
4. Output Voltage adjustment. (Press momentarily for coarse or fine tuning)
5. Output Current adjustment. (Press momentarily for coarse or fine tuning)
6. Output On/Off push button
7. Output (+) Positive supply output (red).
8. Output (GND) Chassis ground terminal (green).
9. Output (-) Negative supply output (black).
10. LCD Display panel showing:  
4 digit voltage & current meter, (CV) constant voltage mode, (CC) constant current mode, Output on/off state **Output**

## OPERATION

### **Ground Connection**

Depending on the application, the power supply output terminals can be grounded to suit the following conditions:

- Negative Ground - black (-) negative terminal is shorted with green (GND) terminal.  
Positive Ground - red (+) positive terminal is shorted with green (GND) terminal.  
Floating Ground - green (GND) terminal is not connected. Note that in this mode, high impedance leakage can exist between the power supply circuitry and the chassis ground.

### **Basic Modes 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 (CV) source as long as the load current is less than the preset current limit. When the load current is greater than the preset current limit, the power supply will automatically cross over to the constant

current mode, the voltage will drop and constant current (CC) will show on the LCD display. It will then operate as a constant current source. When the load current drops below the preset current limit, the supply returns to the CV mode.

**Connection and Operation Procedures**

1. After checking the rating label, plug the lead into the AC mains.
2. Ensure that no load is connected to the output terminals.
3. Switch on the power supply and the LCD display backlight will illuminate.
4. The (CV) icon should be shown on the display and the output (6) should default to off.
5. Turn the current control (5) to the maximum clockwise if you do not require a lower current limit; otherwise see the preset (CC) limiting procedure below.
6. Set your desired output voltage and then turn off the output terminal by push button (6).
7. Observing the correct polarity, connect the load to the output terminals.
8. Turn on the output terminal again and check if display shows (CV).
9. 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.

**Set the Output Voltage (CV) and the Current Limit Value (CC)**

Turn the voltage or current control to set the desired value. Momentarily press the control to allow course or fine tuning. Turn the control until the desired digit is flashing on the display. Momentarily press the control again to set the lower digits if required. Note one quick press on the current control will display the preset current limit momentarily.

**Precaution:** Do not press the voltage or current control for more than 3 seconds.

**Tracking Output Over Voltage Protection (OVP)**

This function protects the connected load in the event that the output voltage control circuit malfunctions. The maximum output voltage should not exceed 30% of the adjusted voltage value during operation.

**Over Temperature Protection (OTP)**

When the temperature inside the power supply becomes higher than a pre-determined value, the output voltage and current of the power supply will automatically decrease to zero to prevent damage to power supply. When the temperature inside the power supply drops to around 65°C then the power supply will automatically return to normal operation.

**SPECIFICATIONS**

MANSON MODEL NO. TENMA MODEL NO.	NSP - 2050 72-8340	NSP-3630 72-8345	NSP-6016 72-8350
Output Voltage Adjustable Range	1 - 20VDC	1 - 36VDC	1 - 60VDC
Output Current Adjustable Range	0.25 - 5A	0.25 - 3A	0.25 - 1.6A
Voltage Regulation			
Load from 10% to 100% Variation	120mV	50mV	50mV
Line from 180 to 264VAC Variation	20mV		
Ripple & Noise in rms	5mV		8mV
Ripple & Noise (peak to peak)	30mV	50mV	100mV
Current Regulation			
Load from 10% to 100% Variation	20mA		
Line from 180 to 264Vac Variation	20mA		
Ripple & Noise (peak to peak)	70mA	20mA	20mA
Switching Frequency	80KHz - 120KHz		
Input Voltage (Jumper Selection)	90-130 or 180-264Vac, 50/60Hz~		
Full Load Input Current at 230VAC	0.83A		
Power Factor	0.68		
Efficiency at Maximum Power	80.5%	83%	84%
Volt and Amp Control Type	Rotary Encoder		
Voltmeter and Ammeter Display	4 Digit LCD with backlight		
Voltmeter Accuracy	±0.5%+5counts for range V ≤5V ±0.5%+3counts for range V >5V	±0.5%+5counts for range V ≤10V ±0.5%+3counts for range V >10V	±0.5%+5counts for range V ≤20V ±0.5%+3counts for range V >20V
Ammeter Accuracy	±0.5%+5counts for range I ≤2A ±0.5%+3counts for range I >2A	±0.5%+5counts for range I ≤1A ±0.5%+3counts for range I >1A	±0.5%+5counts for range I ≤0.5A ±0.5%+3counts for range I >0.5A
LCD Indication	CC, CV, Amp, Volt, Output ON-OFF		
Protection	Short Circuit, Overload, Over Temperature, Tracking Over Voltage Protection		
CE Approvals	LVD : EN 61010 , EMC : EN 55011		
Cooling System	Natural Convection		
Dimensions in mm (WxHxD)	70 x 150 x 250mm / 2.8 x 6.0 x 9.8in.		
Weight in Kg	2Kgs / 4.4Lbs		
Remarks	All specifications are based on 230VAC 50Hz~		