

**NTP-8521 / 8531 / 8561**  
**SWITCHING MODE POWER SUPPLY with USB REMOTE CONTROL**

**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 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 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 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.
7. The max. output voltage of Model NTP-8561 is 60VDC, avoid touch the metal contact part of the output terminals.

**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, in direct sunlight location or near any heat source.
4. Before plugging into local AC mains, check with the 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 0.75mm<sup>2</sup> and the total length of power cable must not exceed 2m.

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**OPERATION ENVIRONMENTAL CONDITION**

- 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**

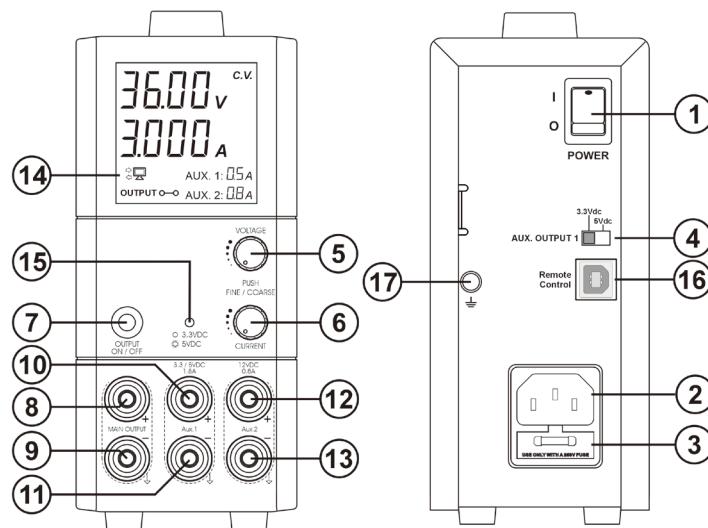
This series of 100W Switching Mode Power Supplies with Current Limiting Control is designed with the objectives of high accuracy, compactness and easy portability. Rotary encoder tuning with MCU are used for voltage and current control. 4 digit display LCD of voltage and current for high precision.



This power supply is ideal for trouble shooting circuit boards or devices which require two or three different input voltages such as 3V or 5V, 12V and 0.8-36V. This power supply can provide 3 outputs at the same time.

All three outputs are fully isolated so different cross connections of 2 or 3 outputs can provide various fixed or variable output voltages. Any output can be connected for positive or negative polarity. (See connection diagrams)

The USB communication interface allows users to configure, control, or monitor basic power supply settings. Moreover this power supply uses SCPI (Standard Commands of Programmable Instruments) syntax for easy system integration with test equipment.

## **CONTROLS AND INDICATORS**



1. Power Switch:
  - Turns the power supply on-off, when it is on the front display lights up.
2. AC Input Socket with Fuse
3. Concealed Fuse box (ply open the cover to get to the fuse)
4. 3.3V/5VDC selection switch (for Aux output 1)
5. Output Voltage Tuning knob. (Quick push the knob to toggle the coarse and fine tuning)
6. Output Current Tuning knob. (Quick push the knob to toggle the coarse and fine tuning)
7. Output On/Off push button
  - a. For Main output: Quick push this button to turn the Main output ON/OFF
  - b. For Main output & Aux outputs: Push and hold this button for 3 seconds to turn the Main and Aux outputs OFF, quick push this button again to turn them ON
  - c. The main output is defaulted as power up output OFF. Push and hold this button and then turn ON the power switch (1), it can be changed to power up output ON. To change it back to power up output OFF, just repeat the same procedure
8. Main Output Terminal Positive (+) Red color
9. Main Output Terminal Negative (-) Black color
10. Aux Output 1 Terminal Positive (+) Red color (3.3VDC or 5VDC selectable)
11. Aux Output 1 Terminal Negative (-) Black color (3.3VDC or 5VDC selectable)
12. Aux Output 2 Terminal Positive (+) Red color (Fixed 12VDC)
13. Aux Output 2 Terminal negative (-) Black color (Fixed 12VDC)
14. LCD Display panel showing:
  - 4 digit voltmeter, Ammeter, (CV) constant voltage mode, (CC) constant current mode,
  - Output Terminal on/off state 
  - 2 digit Aux outputs Ammeter
  - USB Remote Control 
15. Aux 1 output voltage indicator (ON: 5VDC, OFF: 3.3VDC)
16. USB remote control
17. Ground Terminal

## **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 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 preset 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 preset current limiting value, the supply returns to constant voltage (CV) mode.

### ***Set the Output Voltage and Presetting Current Limiting Value (CC)***

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

Quick pushes on the knobs will move the decimal place for fast tuning.

Turn the knob when the desired number column is flashing otherwise you need to repeat quick pushes again.

One quick push on the current knob to see the preset current limiting value.

### ***Aux. output 1 voltage selection***

Move the switch (4) at the back of power supply for selection of 3.3 or 5 VDC.

At 3.3VDC setting, indicator (15) is Off  
and at 5VDC setting indicator (15) is On.

### ***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 the current volume knob (6) 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 and then turn off the output terminal by push button (7).
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 NTP -8531, 0.8-36V, 0.1-3A 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 (0.8-36V) such as 16V.

The fixed 12V is made as the - 12V source.

The fixed 5V is made as the +5V source.

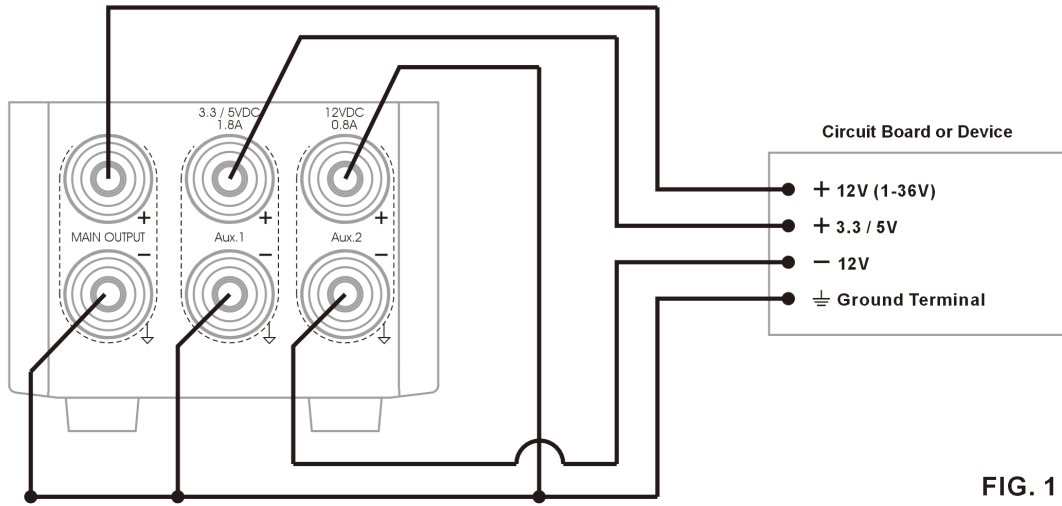


FIG. 1

**DIAGRAM SHOWING CIRCUIT BOARD OR DEVICE**

**Connecting outputs in series (using NTP-8531 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 41V with current 1.8A (Fig. 2) The 3 outputs can be connected in series to make a variable 17V to 53V with current 0.8A, (Fig. 3) There are other combination of cross connections for different positive and negative output voltages.

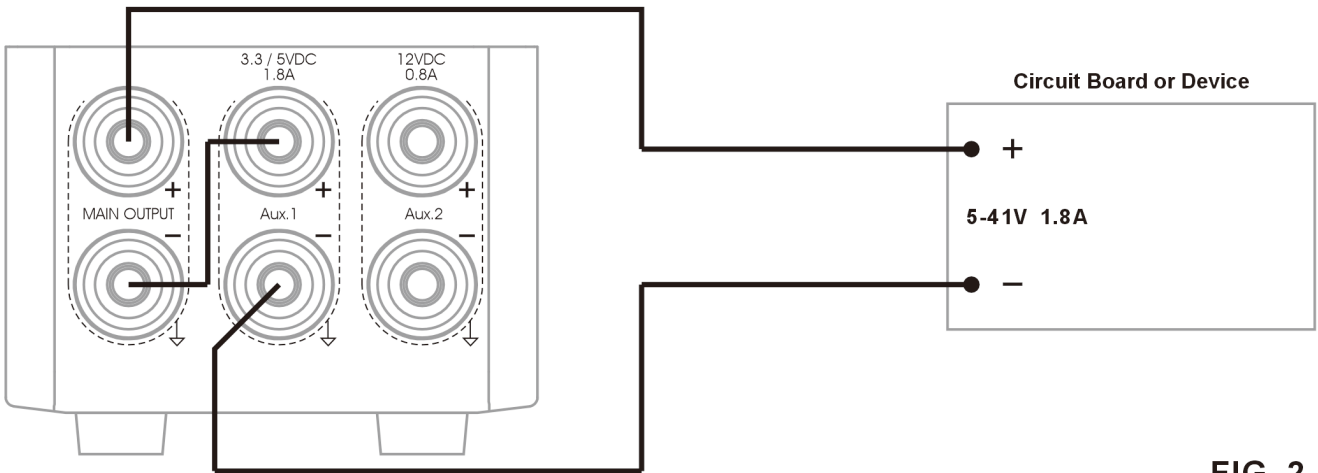


FIG. 2

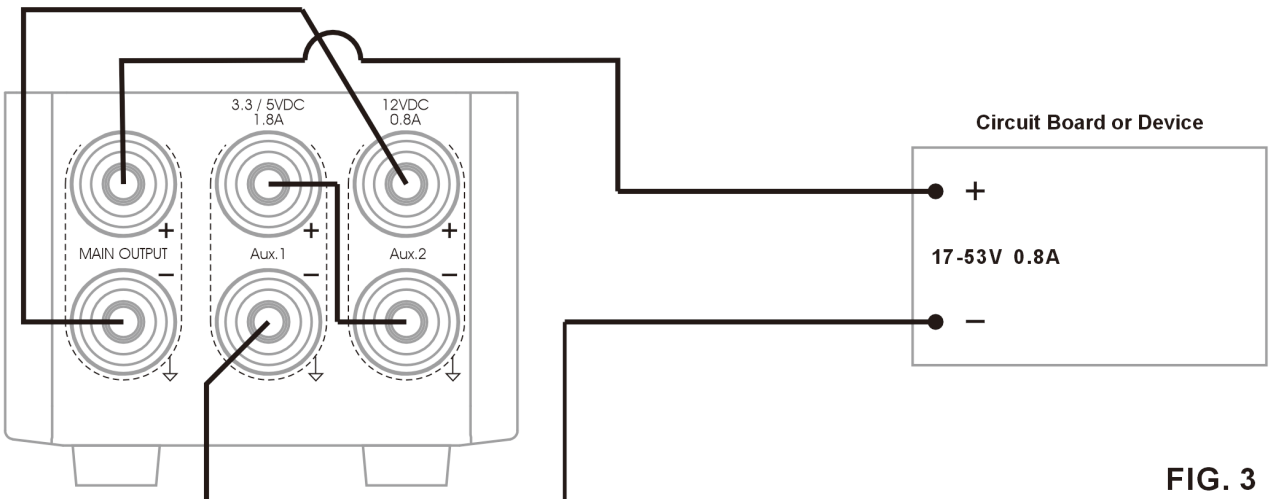
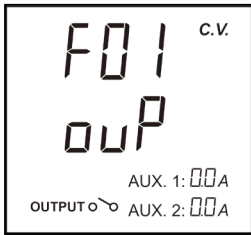


FIG. 3

### **Tracking Output Over Voltage Protection (Fault Code F01)**

This is to protect the connected load in the event that the output voltage control circuit malfunctions, the maximum output voltage will not exceed 10% (min. 1.7V) of the adjusted voltage value at the time of the operation.

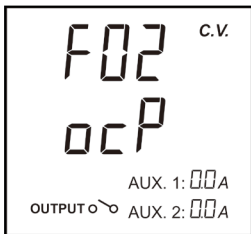
Protection will be triggered and the output power will be cut off and ouP warning appears as below.



To reset the warning, switch off the unit and remove all loading. Switch the unit back on again and it should resume normal operation. If this problem persists, please contact and consult with your agent.

### **Over Current Protection (Fault Code F02)**

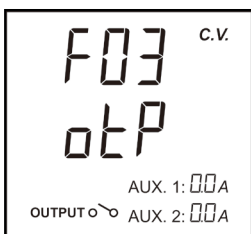
Normally the overload protection is sustained by the CC constant current mode. When the CC mode fails and goes undetected, it may cause serious damage to your test piece or load. The ocP is to minimize the extent of damage to your loads as power supplies do fail someday. Switch off your power supply as soon as you see this warning as shown below.



To reset this warning, switch off the unit and remove all loading. Switch the unit back on again and double check with caution. If this problem cannot be fixed, please contact and consult with your agent.



### **Over Temperature Protection (Fault Code F03)**

There is a thermo sensor inside the unit to monitor and to prevent the unit to gets too hot inside. At otP, there is no output and the following warning will appear on the LCD display. When you get this warning, switch off the unit and remove all loading.



Check your load and output setting. Allow the unit to cool down for at least 30 minutes. Check if any of the ventilation is blocked, check enough clearance around power supply. Switch the unit back on again and it should resume normal operation. If this problem persists, please contact and consult with your agent.

## **PC CONNECTION**

The NTP with USB can be remote control using Windows PC. Connecting the NTP to PC using provided USB cable as following connection diagram. The LCD display panel (14) will indicate   once PC connected.



It requests to install USB driver for NTP connection. Please download driver from Manson website [www.manson.com.hk](http://www.manson.com.hk)

There are two methods for remote control of NTP. You can use Manson control software or use your own program with command set provided in this manual.

The PC control software and manual can be downloaded from Manson website [www.manson.com.hk](http://www.manson.com.hk)

For the detail usage of driver and PC software. Please refer to PC software manual.

## **COMMAND SET**

<b>Command code &amp; Return Value</b>	<b>Description</b>	<b>Example</b>
Input Command: SOUT<Output>[CR] Return Value: [OK][CR]	Set Output on/off Set Output off: <Output>=0 Set Output on: <Output>=1	Input Command: SOUT0[CR] Return Value: [OK][CR] Meaning: Set Output off
Input Command: GOUT [CR] Return Value: <Output> [CR][OK][CR]	Get Output Status Output off: <Output>=0 Output on: <Output> =1	Input Command: GOUT[CR] Return Value: 0[CR][OK][CR] Meaning: Output is off
Input Command: SETD <VOLTAGE><CURRENT>[CR] Return Value: [OK][CR]	SET Voltage and Current <voltage> =0000~3640 <Current> =0000~5100	Input Command: SETD05001000[CR] Return Value: [OK][CR] Meaning: Voltage 5.00V Current 1.000A
Input Command: GETD [CR] Return Value: <Voltage><;><Current><;> <CV/CC Mode><;>[CR][OK][CR]	Get display Volt & display Curr & CV/CC mode <voltage> =0~9999 <Current> =0~9999 <CV mode> =0 CV Mode <CC mode> =0 CC Mode	Input Command: GETD [CR] Return Value: 500;1000;0;[CR][OK][CR] Meaning: The Display value is 5.00V and 1.000A It is CV mode
Input Command: GETS [CR] Return Value: <Voltage><;><Current><;>[CR][OK][CR]	Get Setting Volt & Curr <voltage> =0~3640 <current> =0~5100	Input Command: GETS[CR] Return Value: 500;1000;[CR][OK][CR] Meaning: The Memory setting voltage value is 5.00V and Current is 1.000A
Input Command: VOLT<Voltage>[CR] Return Value: [OK][CR]	Set output voltage	Input Command: VOLT 1000[CR] Return Value: [OK][CR] Meaning: Set voltage value is 10.00V
Input Command: CURR<Current>[CR] Return Value: [OK][CR]	Set output current	Input Command: CURR1000[CR] Return Value: [OK][CR] Meaning: Set Current value is 1.000A
Input Command: GMOD [CR] Return Value: <MODE>[CR][OK][CR]	Get MODE <MODE>=NTP????	Input Command: GMOD[CR] Return Value: NTP8521[CR][OK][CR] Meaning: Mode is NTP8521
Input Command: GVSH [CR] Return Value: <Voltage>[CR][OK][CR]	Get voltage set high limit <voltage>=????	Input Command: GVSH [CR] Return Value: 3700 [CR][OK][CR] Meaning: voltage set high limit is 37.00V
Input Command: GVSL [CR] Return Value: <Voltage>[CR][OK][CR]	Get voltage set low limit <voltage>=???	Input Command: GVSL [CR] Return Value: 80 [CR][OK][CR] Meaning: Voltage set low limit is 0.80V
Input Command: GISH [CR] Return Value: <Current>[CR][OK][CR]	Get current set high limit <Current>=????	Input Command: GISH [CR] Return Value: 5200 [CR][OK][CR] Meaning: Current set high limit is 5.200A
Input Command: GISL [CR] Return Value: <Current>[CR][OK][CR]	Get current set low limit <Current>=???	Input Command: GISL [CR] Return Value: 100 [CR][OK][CR] Meaning: Current set low limit is 0.100A
Input Command: GMAX [CR] Return Value: <Voltage><;><Current><;>[CR][OK][CR]	Get voltage set high limit & current set high limit <voltage> =???? <current> =????	Input Command: GMAX [CR] Return Value: 3700;3100;[CR][OK][CR] Meaning: Voltage set high limit is 37.00V & Current set high limit is 3.100A
Input Command: GMIN [CR] Return Value: <Voltage><;><Current><;>[CR][OK][CR]	Get voltage set low limit & current set low limit <voltage> =??? <current> =???	Input Command: GMIN [CR] Return Value: 80;100;[CR][OK][CR] Meaning: Voltage set low limit is 0.80V & Current set low limit is 0.100A

## **SPECIFICATIONS**

<b>Models</b>	<b>NTP-8521</b>	<b>NTP-8531</b>	<b>NTP-8561</b>
Input Voltage	220 - 240Vac, 50 / 60Hz~ (or on request)		
Full Load Input Current at 230Vac	0.85A	0.88A	0.85A
Output Voltage Adjustable Range	0.8 - 20Vdc	0.8 – 36Vdc	0.8 - 60Vdc
Output Current Adjustable Range	0.1 - 5A	0.1 - 3A	0.1 - 1.6A
<b>Voltage Regulation:</b>			
Load from 10% to 90% Variation	≤60mV	≤50mV	≤40mV
Line from 196 to 264Vac Variation	≤10mV		
Ripple & Noise (peak to peak)	≤100mV	≤100mV	≤120mV
<b>Current Regulation:</b>			
Load from 10% to 90% Variation	≤30mA		
Line from 196 to 264Vac Variation	≤10mA		
Ripple & Noise (peak to peak)	≤30mA		
<b>Other</b>			
Switching Operation Frequency	50KHz to 150KHz		
Aux output 1	Fixed 3.3 /5VDC. 1.8A cont. 2A Max		
Aux output 2	Fixed 12VDC, 800mA cont. 1A Max.		
Power Factor	Passive PFC		
Efficiency at Maximum Power	≥80.0%		
Volt and Amp Control Type	Rotary Encoder		
Voltmeter and Ammeter Display	4 Digit LCD		
Voltmeter Accuracy (Main Output)	5 counts for range V<5V (±0.1% +5 counts for range V≥5V)		
Ammeter Accuracy (Main Output)	8 counts for range I≤1A (±0.2% +6 counts for range I>1A)		
Ammeter Accuracy (Aux. Output 1 & 2)	±0.2A		
LCD Indication	CC, CV, Amp, Volt, Output ON-OFF, Aux output current, USB remote control		
Protection	Short Circuit, Overload, Over Temperature, Tracking OVP		
Command Set	SCPI		
Communication Types	USB (Bundled)		
Approval	CE		
Cooling System	Natural Convection		
Dimensions (WxHxD)	71 x 165 x 265mm / 2.8 x 6.5 x 10.4inch		
Weight	2Kgs / 4.4Lbs		
Remarks	All the data are based on 230V 50Hz~		

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