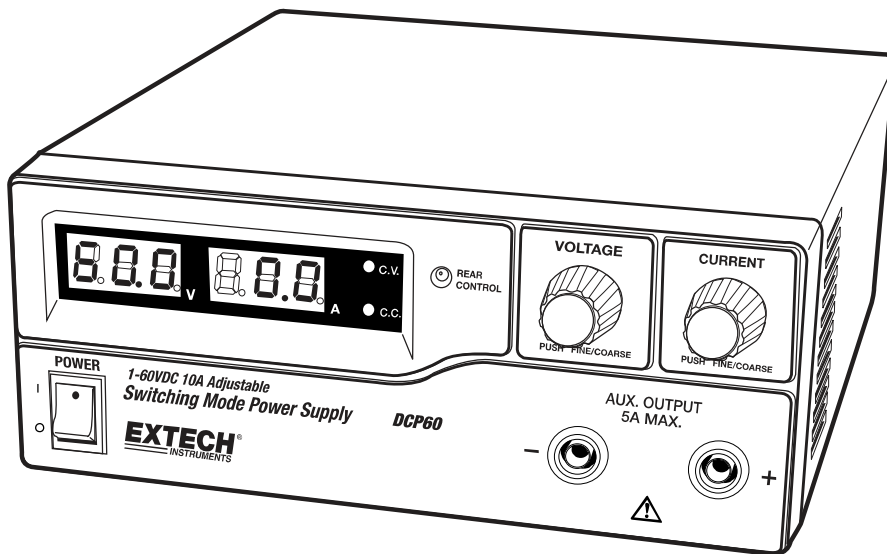


**Model DCP60 and  
Model DCP60-220  
Switching Mode DC Power Supplies  
60V / 10A Adjustable**



## ***Introduction and Features***

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Thank you for selecting the Extech DCP60 (110V) or DCP60-220 (220V) Switching Power Supply. The DCP60 is highly efficient, incorporates upgraded SMPS circuitry with small form factor, benefits from an automatic cross-over for CC and CV, has three (3) Voltage/Current presets, and can be remote controlled. The DCP60 is perfect for solving a variety of loading conditions and applications.

- Dual action (Course/Fine) tuning provides smooth, accurate, and quick setting of Voltage/Current
- Setting, changing, and verifying the current limit level is convenient and can be performed without output pole spiking
- The Remote Control feature permits output ON/OFF and Voltage/Current adjustments
- The USB port offers PC connectivity for programming and running ramp/soak cycles with 20 programmable sets of Voltage/Current and varying test durations (up to 999 cycles)
- Applications and industries where the DCP60 can be employed include laboratory, telecommunications, production testing, field testing, DC network powering, and more
- Three (3) user programmable Voltage/Current settings offer quick recall of frequently used test settings

This device is shipped fully tested and calibrated and, with proper use, will provide years of reliable service. Please visit our website ([www.extech.com](http://www.extech.com)) to check for the latest version of this User Guide, Product Updates, and Customer Support.

## Safety

---

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, determine the cause and clear up the cause first
6. Replace the AC fuse with the same type and rating as the original fuse
7. The maximum output voltage of the DCP60 exceeds 60VDC, avoid touching the metal contact parts at the output terminals

### CAUTION

1. Use a grounded 3 pin AC source
2. This unit is intended for indoor use only
3. Do not operate or place this unit in a humid, dusty location
4. Do not operate this unit in direct sunlight or near any heat source
5. Before plugging into local AC mains, check with the rating label at the back of the unit
6. Do not block any ventilation openings of the unit
7. This unit must be used within the specified rating; regular excessive continuous loading may cause damage to the power supply
8. The gauge size of the input power cable must be at least  $0.75\text{mm}^2$  and the total length of power cable must not exceed 3m
9. Input Fuse Recommended: T3AL250V (3A Time-Lag)

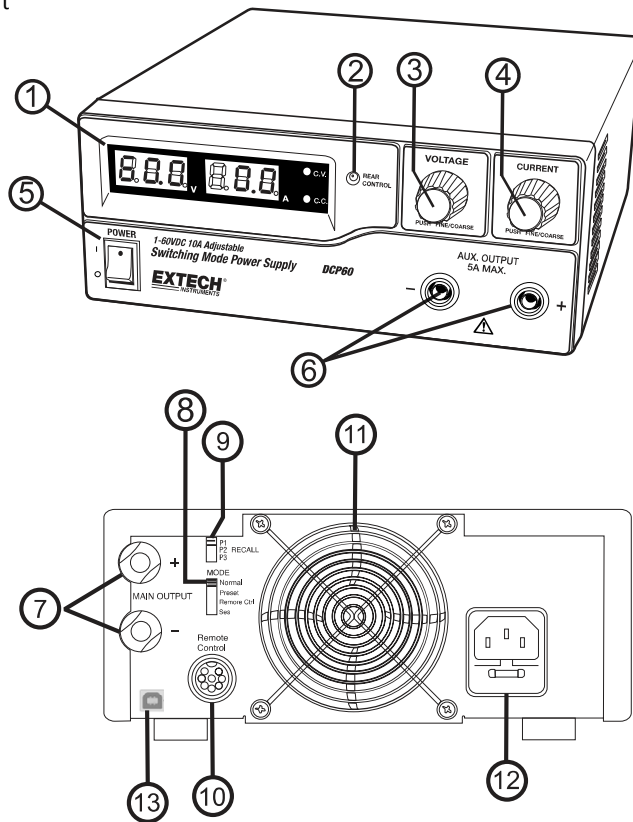
## Power Supply Description

### FRONT PANEL

- (1) LED panel meter display with CC/CV Indicator
- (2) Rear Control Indicator (lights when using Preset/ Remote Control/ Set mode)
- (3) Output Voltage Control Knob (controls both the main and auxiliary output voltage)
- (4) Output Current Control Knob (controls both the main and auxiliary output current limit)
- (5) Power ON/OFF Switch
- (6) Aux. output terminal (max 5A); The total rated current (Aux.+Main) is 10A

### REAR PANEL

- (7) Main Output Terminal (Rated for 10A); The total rated current (Aux.+Main) is 10A
- (8) Mode Selection Switch (Normal, Preset, Remote Control, Set Modes)
- (9) Recall – Preset Voltage Selection Switch
- (10) Remote Control Terminal
- (11) Cooling Fan Air Intake Grille
- (12) AC Input Plug
- (13) USB port



# Control Mode Selections

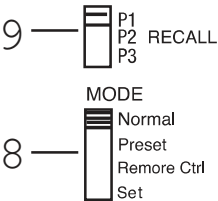
There are four control modes for the power supply: NORMAL, PRESET, SET and REMOTE CONTROL modes. Slide the Mode Selection Switch (8) to the desired Mode. The power supply is factory preset to Normal Mode with maximum current level CC.

## Normal Mode

This is the factory default mode; the power supply output Voltage and Current are controlled by the dual action gain knobs.

- 1. Push the knobs to toggle the coarse and fine tuning, notice the subtle changes in brightness of the related LED.
- 2. Adjust the knobs to the desired values using coarse and then fine tuning.
- 3. To check the preset current level, turn the Current Knob lightly in any direction.
- 4. The display will resume its normal brightness after a few seconds to re-affirm the adjustment.

**Note:** The total rated current (Aux.+Main) is 10A



## Preset Mode

- 1. In this mode, the Rear Control Light is ON to indicate that the panel V & I controls are de-activated.
- 2. There are three preset outputs P1/ P2/ P3 available using the Recall Selection Switch (9)
- 3. The preset values are factory set as shown in the table below.
- 4. The user can change these output settings; please refer to the next paragraph.

| Recall No. | Output Voltage | Output Current |
|------------|----------------|----------------|
| P1         | 5V             | Maximum        |
| P2         | 13.8V          | Maximum        |
| P3         | 55V            | Maximum        |

## Set Mode

Enter the Set Mode by pushing Switch (8) to the Set Mode slot; the power supply is now ready to be preset.

### To define the preset output P1/ P2/ P3

- 1. Move the Recall Switch (9) to position P1, P2 or P3
- 2. Adjust the front panel voltage control knob to set the desired voltage value
- 3. Adjust the front panel current control knob to set the desired current limit value
- 4. Repeat the procedure for the remaining recall locations P1, P2, P3 if desired.
- 5. Move Mode Switch (8) from Set to Preset position to confirm the settings.

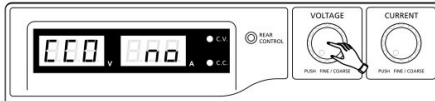
### Set Mode Notes:

All presets are saved after the power supply has been switched off. Always check the output voltage of the Preset before connecting to a Load. To check the preset values:

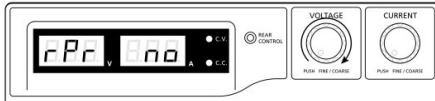
- 1. Move the Mode Switch (8) to the Preset position and then set the Recall Switch (9) to P1, P2 or P3.
- 2. The V and I settings for the corresponding RECALL P1, P2, P3 memories will be shown on the panel meter.

### To reset the preset outputs to the factory default state:

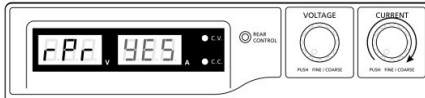
1. Press and hold the Voltage Control knob for 30 seconds to access the menu.



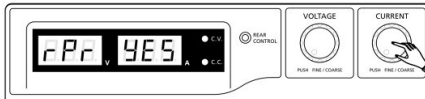
2. When the display is showing 'CCO', rotate the Voltage Control knob until the voltage meter shows 'rPr'.



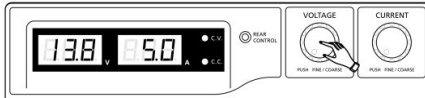
3. With the Current meter showing 'no', rotate the Current Control knob until the Current meter shows 'YES'.



4. Press the Current Control knob once to confirm.



5. Press the Voltage Control knob to exit the menu.



3.

### Remote Control Mode

To control the output voltage and current by remote control connector (10) please refer to the section entitled Remote Control.

### Reset to Factory Default settings

1. Switch OFF the power supply
2. Push and hold both front panel voltage and current control knobs at the same time
3. Switch ON the power supply again
4. Release the front panel voltage and current control knobs

### PC Interface Control

To control the power supply using the supplied Software, refer to the PC Interface Control Section.

## Operation

### Note:

The DC60 Max Output Voltage is 60VDC and the total rated current (Aux.+Main) is 10A

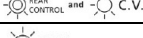
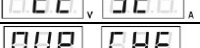
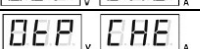
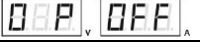
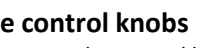
### Powering the Supply

Check the rating label of the power supply and ensure that it complies with the AC mains voltage that is to be used. Connect the power supply to the AC Mains using the provided power cord.

Ensure that the Mode Switch (8) is set to the Normal Mode position. The Model DCP60 requires a 110VAC power source and the DCP-220 requires a 220V power source.

### Switching the Power Supply ON and Self-Test Information

The power supply will perform a series of self-tests when it is switched on. The LED and other indicators on the front panel will illuminate in sequence. When the cooling fan is being checked, a high speed wind sound can be heard. After the self-tests, the CV, V and A LED indicators are lit displaying voltage and 0.0 current. To find the CC current level, turn the current control knob one click in either direction. The current display returns to 0.0 after a few seconds. The table below details the self-test sequence:

| Self-test displays                                                                  | Test                              |
|-------------------------------------------------------------------------------------|-----------------------------------|
|    | Software version                  |
|    | Segment check                     |
|    | C.V. Indicator check              |
|    | C.C. Indicator check              |
|    | Rear control indicator check      |
|    | Return to C.V.                    |
|    | Start to check                    |
|   | Over voltage protection check     |
|  | Over load protection check        |
|  | Over temperature protection check |
|  | Fan check                         |
|  | Output off (remote control mode)  |

### Using the control knobs

The rotary encoder control knobs have fine and coarse tuning with 'clicking' movement. Push the knobs to toggle between coarse and fine tuning, notice the subtle changes in brightness of the related LED. Adjust the knobs to the desired values by using coarse and then fine tuning. The display will resume its normal brightness after few seconds to confirm an adjustment.

## Connecting the Power Supply and running a test

1. Connect the equipment under test to the power supply. Red (+) is connected to the positive polarity input of the equipment and Black (-) is connected to the negative polarity input of the equipment.
2. Switch ON the power supply first; the panel meter & green CV Indicator should illuminate.
3. Next, switch ON the equipment under test; the panel meter & green CV Indicator should remain lit in green.
4. Testing can now begin.
5. When finished, switch OFF the equipment under test first and then switch off the power supply.

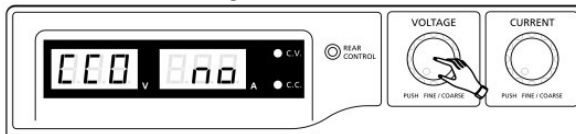
## Setting up the Power supply in Constant Current (CC) mode

1. Set current knob to minimum
2. Set voltage knob to Maximum
3. Short output leads together
4. Turn on the power supply
5. Turn up current knob until you reach the current value you want to use.
6. Turn off the power supply
7. Un-short the leads

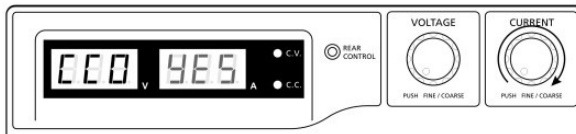
## Manual Zero Function

The power supply automatically zeroes the current metering upon power-up. To manually run a zero function without having to cycle power:

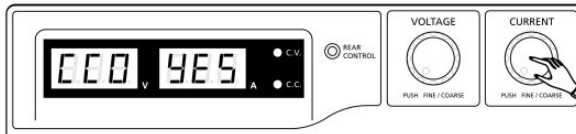
1. Press and hold the Voltage Control Knob for 30 seconds to open the menu.



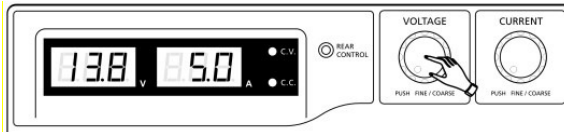
2. Rotate the Current Control knob until the meter shows the following:



3. Press the Current Control knob once to confirm. The display will show 'YES'.



4. Press the Voltage Control knob to exit the menu.



## Remote Control Operation

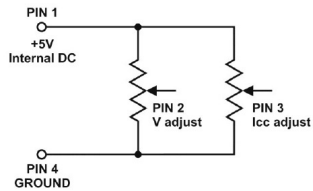
There are two methods for remotely controlling current and voltage adjustments. Current must be controlled for both methods otherwise the unit will default to CC mode.

### REMOTE CONTROL – METHOD 1: Using two external DC voltage sources

| Remote Socket Pin Assignment for external variable voltage source |                 |                         |
|-------------------------------------------------------------------|-----------------|-------------------------|
| PIN                                                               | FUNCTIONS       | REMARKS                 |
| 1                                                                 | Internal DC +5V | Lower than 50mA         |
| 2                                                                 | Voltage adjust  | 0 to 5V External VDC    |
| 3                                                                 | Current adjust  | 0 to 5V External VDC    |
| 4                                                                 | Ground          |                         |
| 5                                                                 | Output OFF      | Short to ground for OFF |
| 6                                                                 | N.A.            |                         |
| 7                                                                 | N.A.            |                         |
| 8                                                                 | N.A.            |                         |

Check the output voltage range of the power supply by varying the external voltage source. Short circuit the main output with **10AWG** wire to check the CC setting on the display while varying the external voltage source.

### REMOTE CONTROL – METHOD 2: Using two 0 to 5K Ohm variable resistors



| Remote Socket Pin Assignment for external variable resistor |                 |                          |
|-------------------------------------------------------------|-----------------|--------------------------|
| PIN                                                         | FUNCTIONS       | REMARKS                  |
| 1                                                           | Internal DC +5V | One end of resistor      |
| 2                                                           | Voltage adjust  | Variable leg of resistor |
| 3                                                           | Current adjust  | Variable leg of resistor |
| 4                                                           | Ground          | Other end of resistor    |
| 5                                                           | Output OFF      | Short to ground for OFF  |
| 6                                                           | N.A.            |                          |
| 7                                                           | N.A.            |                          |
| 8                                                           | N.A.            |                          |

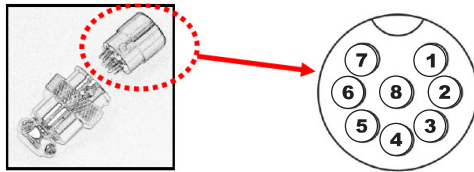
Check the output voltage range of the power supply by adjusting the 5Kohm variable resistor. Short circuit the main output with **10AWG** wire to check the CC setting on the display while adjusting the variable resistor.

## Remote Control Output ON/OFF

Remote output ON/OFF control can be activated in any of the modes Normal, Preset, Set, and Remote. Review the conditions below:

- By default, Pin 5 is open and the output is ON.
- Shorting Pin 5 to Pin 4 (ground) switches the output OFF.
- When the output is OFF, the C.V. & C.C. LEDs will flash. The present output voltage and current setting will be shown on the panel meter.
- The user can adjust the output using the voltage & current control knob to the desired value when the output is OFF.

Remark: Use only the 8-pin remote plug provided and connect with 22AWG wires. See diagram below.



Note: Pin numbers are marked on the black area of the socket

## ***PC Software Program***

---

When equipped with a USB connection, you can control the output of the power supply through a USB PC connection and the supplied software.

Please refer to the separate Software Help Guide available on the Software CD.

## Specifications

---

### Output

|                         |            |
|-------------------------|------------|
| Variable Voltage Output | 1 to 60VDC |
| Variable Current Output | 0 to 10ADC |

### Voltage Regulation

|                        |                                 |      |
|------------------------|---------------------------------|------|
| Load (10 to 100% Load) | 50mV                            |      |
| Model DCP60            | Line (90 to 130VAC Variation):  | 20mV |
| Model DCP60-220        | Line (170 to 264VAC Variation): | 20mV |

### Current Regulation

|                                |                                 |      |
|--------------------------------|---------------------------------|------|
| Load (10 to 90% rated voltage) | 100mA                           |      |
| Model DCP60                    | Line (90 to 130VAC Variation):  | 50mA |
| Model DCP60-220                | Line (170 to 264VAC Variation): | 50mA |

### Ripple and Noise

|                                |       |
|--------------------------------|-------|
| Ripple and Noise (RMS) voltage | 5mV   |
| Ripple and Noise (P-P) voltage | 100mv |
| Current Ripple and Noise (RMS) | 10mA  |

### Meter Type and Accuracy

|               |                                            |
|---------------|--------------------------------------------|
| Voltage Meter | 3-digit LED Display $\pm 0.2\% + 3$ counts |
| Current Meter | 3-digit LED Display $\pm 0.2\% + 3$ counts |

### Input

|                       |                                                                              |
|-----------------------|------------------------------------------------------------------------------|
| Input Voltage         | Model DCP60: 90 to 130VAC 50/60Hz<br>Model DCP60-220: 220 to 240CVAC 50/60Hz |
| Fuse                  | 8A/250V 5x20mm (120V); 4A/250V 5x20mm (220V)                                 |
| Full Load Current     | 6.2A (120V); 3.25A (220V)                                                    |
| Installation category | CAT 2                                                                        |

### Other

|                                        |                                                                                                 |
|----------------------------------------|-------------------------------------------------------------------------------------------------|
| Efficiency                             | 89%                                                                                             |
| Switching Frequency                    | 65 to 85 kHz (approx.)                                                                          |
| Tracking Over-Voltage Protections      | O/P 1-5V: set voltage +2V<br>O/P 5-20V: set voltage +3V<br>O/P 20-60V: set voltage +4V          |
| Transient Response Time (50-100% load) | 1.5ms                                                                                           |
| Power Factor Control                   | Power Factor correction >0.9 at optimal load                                                    |
| Cooling method                         | Thermostatic control fan from zero to full speed                                                |
| Protections                            | Overload, Short Circuit by Constant Current, Output Tracking Over Voltage, and Over Temperature |
| Operating %RH                          | 10 to 80% Relative Humidity                                                                     |
| Approvals                              | CE, EMC: EN 55011, 55022, LVD: EN 60950, 61010                                                  |
| Dimensions                             | 7.9 x 3.5 x 8.5" (200 x 90 x 215mm)                                                             |
| Weight                                 | 5.7lbs. (2.6 kg)                                                                                |
| Altitude                               | up to 6561 ft. (2000m)                                                                          |
| Pollution degree                       | 2                                                                                               |

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## Troubleshooting

### OUP: Over Voltage Protection

This unit has a built-in tracking over voltage protection feature. In the event of output voltage becoming greater than the set value (see specified range from specifications table), 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 the customer care department or the point of purchase.

### OTP: Over Temperature Protection

There is a thermo sensor inside the unit to monitor and prevent the unit from unduly heating internally. When an OTP error occurs, there is no output and the following warning will appear on the LED display.



When this warning appears, switch off the unit and remove all loading.

Check the load and output setting. Allow the unit to cool for at least 30 minutes.

Check to see if any ventilation holes are blocked, also check that there is sufficient clearance around the power supply.

Listen carefully for the short wind sound emanating from the cooling fan when the unit is switched ON again. If the wind sound is not detected, the fan may be faulty; do not use the power supply in this case, contact the customer care department or the agent from the point of purchase.

### OLP: Over Load Protection

Normally the overload protection is sustained by the CC constant current mode. When the CC mode fails and goes undetected, serious damage to the test piece or load may occur. The OLP is used to minimize the extent of damage to the loads in the event of power supply failure.

Switch off the power supply as soon as this warning is seen (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 persists, please contact the customer care department or and consult with the agent at the point of purchase.