DC POWER SUPPLY
OPERATION MANUAL

MODEL:

PW-5002/ PW-5032
PW-5003/ PW-5033

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Notice Before Operation

1. Unpack the instrument:

After receipt of the instrument, immediately unpack and inspect it for any damage which might have been sustained during transportation or shortage of accessories. If any sign of damage or shortage of accessories are found, immediately notify the dealer.

2.Environments:

Operational temperature of the instrument is 10℃ to 40℃(50℉ to 104℉) at lower than 90%R.H. Operation of the instrument outside of this temperature range may cause damage to the circuits.

3.Check the Line Voltage:

The instrument can operate on the line voltages list below and this voltage can be set by inserting the line voltage selector plugged in the corresponding position on the rear panel. Before connection the power plug to an AC outlet, be sure to check the set up with line voltage.

Selector	Line Voltage	Fuse			
		PW-5002	PW-5003	PW-5032	PW-5033
115V	100~125V 50/60Hz	T3.0A	T6.0A	T3.0A	T6.0A
230V	220~240V 50/60Hz	T1.5A	T3.0A	T1.5A	T3.0A

* Disconnect the mains plug before and during fuse replacement.

Hints for operation:

1. Do not place heavy objects on this instrument.
2. Do not place a hot soldering iron on or near this instrument.
3. Never insert wires, pins or other metal object into ventilation fan.
4. Never move or pull the instrument with power cord or output lead, especially never move instrument when power cord or output lead is connected.
5. If the instrument is used in the way not specified in this manual, the protection provided by the equipment may be impaired.
6. The power cord Rating. 125V/10A for both plug & connector 18AWG/3C/300V flexible cord.

⚠ WARNING The following precautions must be observed to prevent electric shock.

1. To avoid electrical shock, only qualified personnel should operate this instrument.
2. Do not open the cover of this instrument. Only qualified electrician should perform the needed services inside this instrument.
3. Use only a 3-wire outlet, and do not attempt to defeat the ground terminal on the power plug to fit into 2-wire outlet. The chassis and housing of the instrument are grounding through this terminal and it could cause safety hazard if the ground terminal is not well connected.
4. Do not obstruct the ventilation holes at the rear panel. As this will increase the internal temperature.
5. Never apply external voltage to the output terminal of this instrument.
6. The instrument is designed for **INDOOR USE ONLY**.
7. This instrument has been evaluated to **INSTALLATION CATEGORY II, POLLUTION DEGREE 2**.
8. Never position the equipment so that it is diffcult to operate the disconnecting device.

Maintenance

■ **GENERAL MAINTENANCE:**

1. Preventive maintenance --- Clean and re-calibrate the instrument on a regular basis to keep the instrument looking nice and working will.
2. Cleaning --- Remove any dirt, dust and grime whenever they become noticeable on the outside cover with a soft cloth moistened with a mild cleaning solution.
3. Servicing --- if the instrument ever becomes inoperative or damaged, refer servicing to a qualified repair facility.

■ **FUSE REPLACEMENT:**

If the fuse blows, the LED will not light and the instrument will not operate. Replace only with the fuse specified in this manual. The fuse is located on the rear panel adjacent to the power cord receptacle. Remove the fuse holder assembly as follows:

1. Unplug the power cord from rear of the instrument.
2. Insert a small screwdriver in fuse holder slot (located between fuse holder and receptacle). Pry fuse holder away from receptacle.
3. When reinstalling fuse holder, be sure that the fuse is installed so that the correct line voltage is selected.

General Specification [I]

ITEM	PW-5002	PW-5032
Power Transformer:	E.I. Type Transformer	E.I. Type Transformer
Max. Continual Output Power:	105VA	
Max. Raised Temperature:	< 40°C	< 40°C
Independent Output:	0~30V/0~3A, 5V Fixed / 0~3A; Dual Output	
Constant Voltage Characteristic		
Load Regulation:	± 0.05% + 2mV	± 0.01% + 10mV
Line Regulation:	± 0.05% + 2mV	± 0.01% + 5mV
Ripple & Noise:	< 0.4mVrms	< 0.4mVrms
Output Switch:	Built-in Output Switch(Master & Fixed 5V)	
Constant Current Characteristic		
Load Regulation:	< 15mA	
Line Regulation:	± 0.05% + 2mA	± 0.01% + 2mA
Ripple & Noise:	< 2.5mArms	< 2.5mArms
Current Limit Switch:	Built-in C.C. Limit Switch (Master)	
5V Fixed Output		
Regulation:	Line Regulation < 5mV, Load Regulation<10mV	
Ripple & Noise:	< 1.5mVrms	< 1.5mVrms
Voltage Accuracy:	5V ± 0.25V	
Max. Output Current:	3A	
Output Switch:	Built-in Output Switch	
Display		
Voltage:	3 Digits 0.56" Green LED	4 Digits 0.36" Green LED
Current:	3 Digits 0.56" Red LED	4 Digits 0.36" Red LED
Accuracy:	0.1% + 2 digits	0.05% + 3 digits
General		
Power Source:	ACV 115/230 ± 10%, 50/60Hz	
Dimensions(W x H x D):	230 x 170 x 310 mm	
Weight:	6.7 kg	6.8 kg

General Specification [II]

ITEM	PW-5003	PW-5033
Power Transformer:	E.I. Type Transformer	E.I. Type Transformer
Max. Continual Output Power:	195VA	
Max. Raised Temperature:	< 45°C	< 45°C
Independent Output:	0~30V/0~3A x 2, 5V Fixed / 0~3A; Triple Output	
Constant Voltage Characteristic		
Regulation:	Line<0.05%+3mV, Load<0.05%+5mv	
Ripple & Noise:	< 0.4mVrms	< 0.4mVrms
Temperature Coefficient:	< 300PPM/°C	
Output Switch:	Built-in Output Switch(Master & Slave)	
Constant Current Characteristic		
Regulation:	Line<0.2%+2mA, Load<0.2%+3mA	
Ripple & Noise:	< 2.5mArms	< 2.5mArms
Current Limit Switch:	Built-in C.C. Limit Switch (Master & Slave)	
5V Fixed Output		
Regulation:	Line Regulation < 5mV, Load Regulation<10mV	
Ripple & Noise:	< 1.5mVrms	< 1.5mVrms
Voltage Accuracy:	5V ± 0.25V	
Max. Output Current:	3A	
Tracking Operation		
Parallel Regulation:	Line< 0.01%+3mV, Load< 0.01%+5mV	
Series⊕and⊖Supply Regulation:	Line< 0.01%+3mV, Load< 0.01%+5mV Slave tracking error<0.5%+2 digital of the master	
Series Single Supply Regulation:	Line<0.01%+5mA, Load Regulation<300mV	
Display		
Voltage:	3 Digits 0.56" Green LED	4 Digits 0.36" Green LED
Current:	3 Digits 0.56" Red LED	4 Digits 0.36" Red LED
Accuracy:	0.1% + 2 digits	0.05% + 3 digits
General		
Power Source:	ACV 115/230 ± 10%, 50/60Hz, 4/2A	
Dimensions(W x H x D):	230 x 170 x 310 mm	
Weight:	8.0kg	8.0 kg

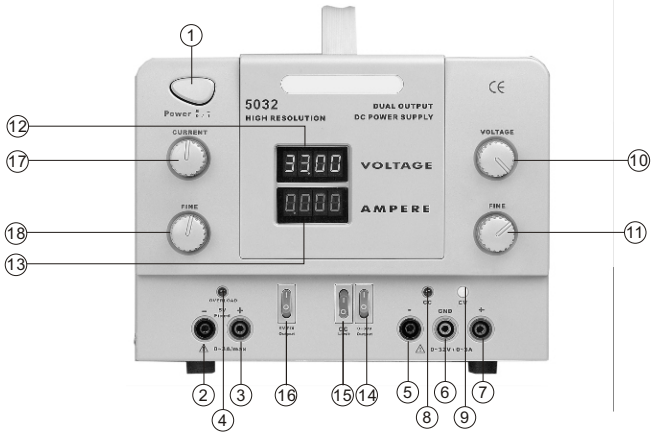
NOTE:
Limit output switch are for independent and series mode operation.
Use it under parallel mode is not recommended.

Panel Description

1. Symbol Description

- Power Off Symbol
- Power ON Symbol
- Alternating Current (AC) Symbol
- Ground and Earthed Smybol
- Coution Symbol

2. Front Panel of 5002/5032

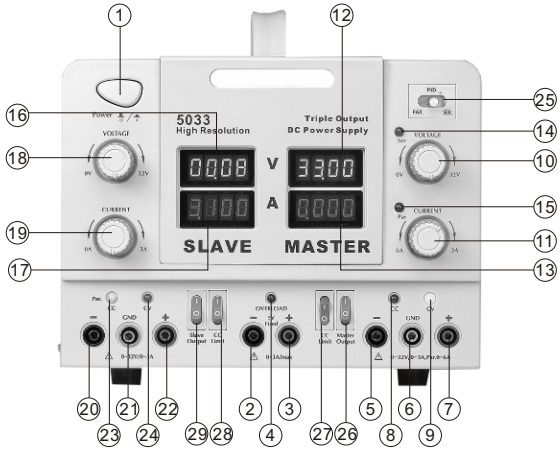


1. Power switch: Push the switch button to turn "ON" the power and the LED(12 & 13) will light up ; push the button again, to turn it "OFF" .
2. 5V⊖ output terminal: Negative output terminal of the fixed 5V/3A output (black).
3. 5V⊕ output terminal: Positive output terminal of the fixed 5V/3A output (red).
4. Over load indicator: 5V/3A over load red LED indicator.
5. Master⊖ output terminal: Negative output terminal of the MASTER 0-30V/0-3A output (black).
6. Master GND terminal: Ground terminal of the master output (green).
7. Master⊕ output terminal: Positive output terminal of the master 0-30V/0-3A output (red).
8. C.C. mode LED: Red LED to indicate constant current mode.

Panel Description

9. C.V. mode LED: Green LED to indicate constant voltage mode.
10. Master voltage adjustment knob: For adjusting master output voltage when master power is under c.v.mode.
11. Master current adjustment knob: For adjusting master output current when master power is under c.c. mode.
12. Master voltage indicator display in full 3-digits Green 0.56"LED. (5002)
    Master voltage indicator display in full 4-digits Green 0.36"LED. (5032)
13. Master current indicator display in full 3-digits Red 0.56" LED. (5002)
    Master current indicator display in full 4-digits Red 0.36" LED. (5032)
14. Master output switch.
15. Master C.C. Limit output switch: For constant current mode setting use.
16. 5V Fixed output switch.
17. 0-3A Current Control knob.
18. Current Fine adjust knob.

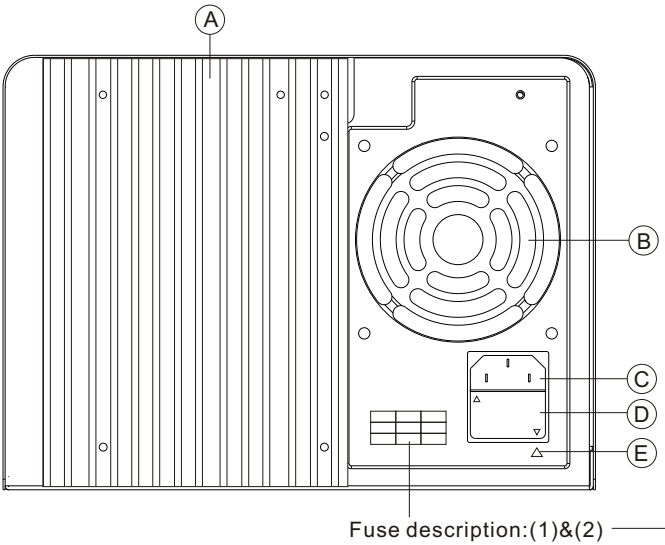
3. Front Panel of 5003/5033



1. **Power switch**: Push the switch button to turn "ON" the power and the LED(12,13,16,17) will light up; to push the button again, to turn it "OFF" .
2. **5V⊖ output terminal**: Negative output terminal of the fixed 5V/3A output (black).
3. **5V⊕ output terminal**: Positive output terminal of the fixed 5V/3A output (red).
4. **Over load indicator**: 5V/3A over load red LED indicator.

5. **Master⊖ output terminal**: Negative output terminal of the MASTER 0-30V/0-3A output (black).
6. **Master GND terminal**: Ground terminal of the master output (green).
7. **Master⊕ output terminal**: Positive output terminal of the master 0-30V/0-3A output (red).
8. **Master C.C. mode LED**: Red LED to indicate constant current mode.
9. **Master C.V. mode LED**: Green LED to indicate constant voltage mode.
10. **Master voltage adjustment knob.**
11. **Master current adjustment knob.**
12. Master voltage indicator display in full **3-digits Green 0.56"LED**. (5003)
    Master voltage indicator display in full **4-digits Green 0.36"LED**. (5033)
13. Master current indicator display in full **3-digits Red 0.56" LED**. (5003)
    Master current indicator display in full **4-digits Red 0.36" LED**. (5033)
14. **Series mode indicator**: When pull switch 10 to set the power supply in series mode, the Green LED will be light to indicate series mode.
15. **Parallel mode indicato**r: When pull switch 11 to set the power supply in parallel Mode the Red LED will be light to indicate parallel mode.
16. Slave voltage indicator display in full **3 digits Green 0.56"LED**. (5003)
    Slave voltage indicator display in full **4 digits Green 0.36"LED**. (5033)
17. Slave current indicator display in full **3 digits Red 0.56"LED**. (5003)
    Slave current indicator display in full **4 digits Red 0.36"LED**. (5033)
18. **Slave voltage adjustment knob**: For adjusting slave output voltage when slave is under C.V. Mode.
19. **Slave current adjustment knob**: For adjusting slave output current when slave is under C.C. Mode.
20. **Slave ⊖ output terminal**: Slave negative output terminal 0-30V/0-3A output (black).
21. **Slave GND terminal**: Slave ground terminal (green).
22. **Slave ⊕ output terminal**: Slave positive output terminal 0-30V/0-3A output (Red).
23. **Slave C.C. mode indicator**: Red LED to indicate constant current at slave power.
24. **Slave C.V. mode indicator**: Green LED to indicate constant voltage at slave power.
25. **Output mode switch**: Select to set the"IND", "SER", "PAR" position to turn "Independent" or "Serial Tracking" or "Parallel" output mode.

4. Rear Panel Description



(1)5002/5032

Voltage	110-120V	220-240V
Hz	50/60	50/60
Fuse	T3A	T1.5A

(2)5003/5033

Voltage	110-120V	220-240V
Hz	50/60	50/60
Fuse	T6A	T3A

A. Heat sink: heat dissipation for power transistor.

B. Ventilation Fan: 8" 24V DC fan.

C. Power input socket.

D. Fuse Holder and input voltage selector: the selected input voltage is set to the voltage marked on the holder to the ▽ mark on the rear panel.

E. The input power voltage indicator: The ▽ mark show the input line voltage been set. When the unit been shipped from factory.

Operation Instruction

⚠ COUTION

Before operating model 5002/5032, please check input voltage is correct and the ventilation holes are not been locked.

⚠ WARNING

After pressing the "SWITCH ON" button, please check the operation of ventilation fan to avoid the instrument being over heated.

A. Setting the output voltage and output current

1.Please verify the voltage and current requirements fall within the specification of this instrument.
2.Disconnect the circuit from the output terminal by turn the output enable switch off (14).
3.Adjust the current adjusting knob (18) to get the minimum current for the instrument to operate under constant voltage mode which will be indicated by the green LED.
4.Adjust the voltage adjusting knob (11) to the desired voltage setting.
5.Short the output terminal by switch the C.C. Limit switch on.
6.Switch on the output switch and adjust the current adjusting knob (18) to the desired current setting.
7.Switch the C.C. Limit switch off and star to power out to the application circuit.

[NOTE]
The power supply can automatically operate between constant voltage and constant current by quickly responding to the load changes, when the C.C. LED(Red) light up, the C.V. LED (green) will be off and vice versa .

B. Operation Modes of 5002/5032

The power supply 5002 can be operated alone or connected two or more units in inserial to obtain a higher voltage (Max. 240V). or in parallel to obtain a higher current (Max. 24A)

⚠ WARNING **Do not connected GND (green) terminal to any place under this operation.**

1. Serial Mode:

On serial mode operation the output current of the connected units must be set at equal or higher than the current desired and at least one unit in these connected units been set at the same current output as the desired current.

The total output voltage will be the sum of each unit been set. And the output current will be the same as the lowest output current been set among these connected unit.

⚠ WARNING **The total output voltage should not be higher than 240V.**

2. Parallel Mode:

On parallel mode operation. All the connect units must be set at the same output voltage as the voltage desired. The total output current will be the sum of the each unit been set.

⚠ WARNING **The output current should never be higher than 24A.**

3. Fixed 5V/3A:

This is the standard 5V/3A-power output for use by TTL logic circuit. When the load exceeds 3A. The red OVER LOAD LED (4) will light up. The output voltage will lower and the output will be under C.C. Mode.

C. Operation Modes of 5003

The power supply 5003 can be operated alone or connected two or more units in serial to obtain a higher voltage (Max. 240V). or in parallel to obtain a higher current (Max. 24A)

⚠ WARNING **Never connect GND (green) terminal to any place under this operation.**

1. Independent Mode:

The master and the slave output of 5003 can be used independently to generate voltage and current.

To operate 5003 under independent mode. Set the master output voltage/current and slave output voltage/current as described in section A and B, model 5003.

⚠ WARNING **Never switch this istrument between independent mode and tracking mode when this instrument is connecting with an application circuit beacuuse this might cause damage to the unit.**

2. Serial Tracking Mode:

[NOTE] When 5003 was operated under this mode. The master output is serial connected to the slave output automatically. The outputs are generated from the "+" of the master output terminal (7) and the "－" of the slave output terminal (20). The output voltage will be TWICE of the master output setting voltage and the current will be the same as the master setting current.

2-1. Set the function switch (25) to serial mode, the power supply 5003 will be under serial operation mode and the yellow LED (14) will light up.
2-2. Turn the slave current adjustment knob (19) clockwise to maximum.
2-3. Set the master output voltage and current as described on section A, 5003 model.
2-4.The output terminal will be "+" of the master and "－" of the slave terminals.

3. Parallel tracking Mode:

[NOTE] when 5003 is operated under "PARALLEL" mode. The master output terminals are parallel connected to the slave output terminal automatically. The parallel output are generated from the master output for both "+" and "－" termimals. The output voltage is the same as the master set value and the output current is twice the master output current setting.

3-1. Set the output mode switch (25) to parallel mode and the red LED (15) will light up.
3-2. Be sure to turn both of the voltage adjustment knob (18) and current adjustment knob (19) of the slave output clockwise to maximum.
3-3. Set the master output voltage and current as described on section A, model 5003.
3-4. The output terminal can be the "+","－" terminals of the master output or "+" master and "－" terminals of the slave output .

4. Serial mode:

The power supply 5003 can be connected two or more units in series to obtain a higher voltage output (Max. 240V).
4-1. Set all the 5003 which would be connected in serial operation under serial tracking mode as described on section 2.

4-2. Connect the "－" slave output terminal of the unit 1 to the "+" master output terminal of the unit 2.
4-3. The output voltage terminals will be the "+" master output terminal of the unit 1 and the "－" slave output terminal of the unit 2.

⚠ WARNING **The maximum output voltage of the system should never exceeds 240V.**

4-4. If the connected units are more than 2. Connect the "+" master output terminal of the 3rd unit to the "－" slave output terminal of the unit 2. etc. The output voltage of the system will be the "+" master output terminal of the 1st unit to the "－" slave output terminal of the last unit.

5. Parallel Mode:

The power supply 5003 can be connected two or more units in parallel to obtain a higher current output (Max. 24A only).

5-1. Set all the 5003 which will be connected in parallel operation under parallel tracking mode as described on section 3, parallel tracking mode and adjust all units to the same output voltage

5-2. Parallel connected the "+" master output of all unit and "－" slave output of all units in the system.

5-3. The output voltage of the system is the same as the units been set. The output current of the system is the sum of each unit.

⚠ WARNING **The Max. output current of the parallel system should never exceeds 24A.**

6. Fixed 5V/3A output:

This is the standard 5V/3A-power output for use of TTL logic circuit. When the load exceeds 3A, the red overload LED will light up. The output voltage will lower and the power supply will be under C.C. mode.

D. Operation Modes of 5033

⚠ WARNING **Never switch this istrument between independent mode and tracking mode when this instrument is connecting with an application circuit beacuuse this might cause damage to the unit.**

To set the output mode switch(25) at:

1. Independent Mode: To set the switch at " IND " position.

2. Serial Tracking Mode: To set the switch at " SER " position.

3. Parallel Tracking Mode: To set the switch at " PAR " position.

4. Serial mode:

The power supply 5033 can be connected two or more units in series to obtain a higher voltage output (Max. 240V).

4-1. Set all the 5033 which would be connected in serial operation under serial tracking mode as described on section 2.

4-2. Connect the "－" slave output terminal of the unit 1 to the "+" master output terminal of the unit 2.

4-3. The output voltage terminals will be the "+" master output terminal of the unit 1 and the "－" slave output terminal of the unit 2.

4-4. If the connected units are more than 2. Connect the "+" master output terminal of the 3rd unit to the "－" slave output terminal of the unit 2. etc. The output voltage of the system will be the "+" master output terminal of the 1st unit to the "－" slave output terminal of the last unit.

⚠ WARNING **The maximum output voltage of the system is never exceeds 240V.**

5. Parallel Mode:

The power supply 5033 can be connected two or more units in parallel to obtain a higher current output (Max. 24A only).

5-1. Set all the 5033 which will be connected in parallel operation under parallel tracking mode as described on section 3, parallel tracking mode and adjust all units to the same output voltage

5-2. Parallel connected the "+" master output of all unit and "－" slave output of all units in the system.

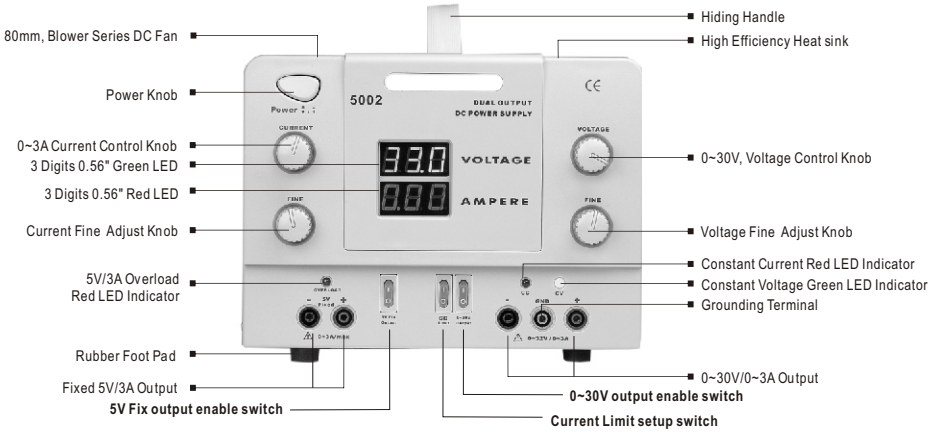
5-3. The output voltage of the system is the same as the units been set. The output current of the system is the sum of each unit.

⚠ WARNING **The Max. output current of the system never exceeds 24A.**

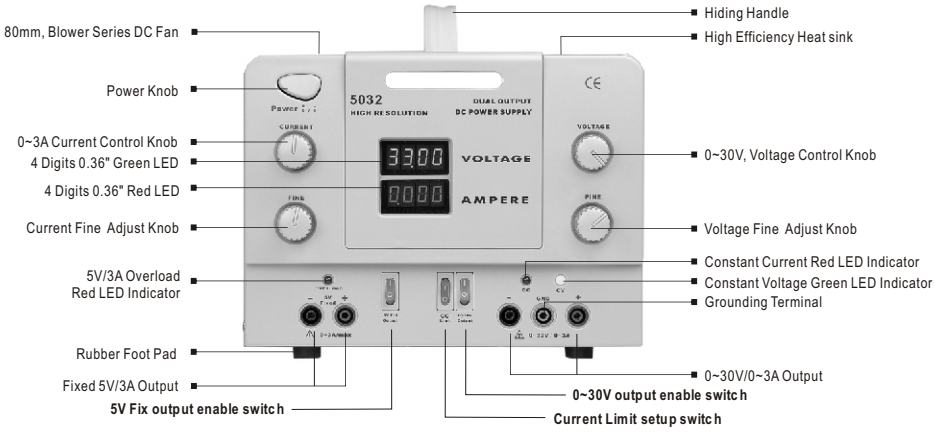
6. Fixed 5V/3A output:

This is the standard 5V/3A-power output for use of TTL logic circuit. When the load exceed 3A, the red overload LED will light up. The output voltage will lower and the power supply will be under C.C. mode.

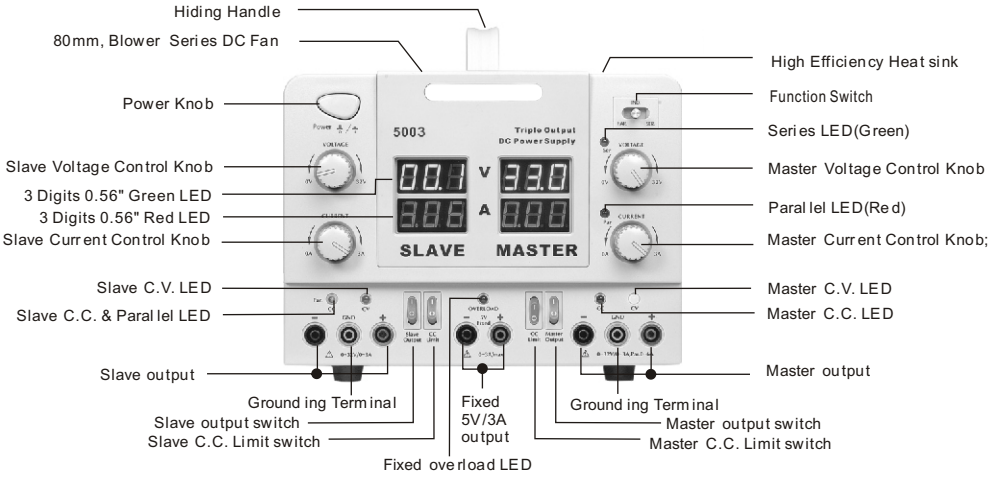
PW-5002 Front Panel



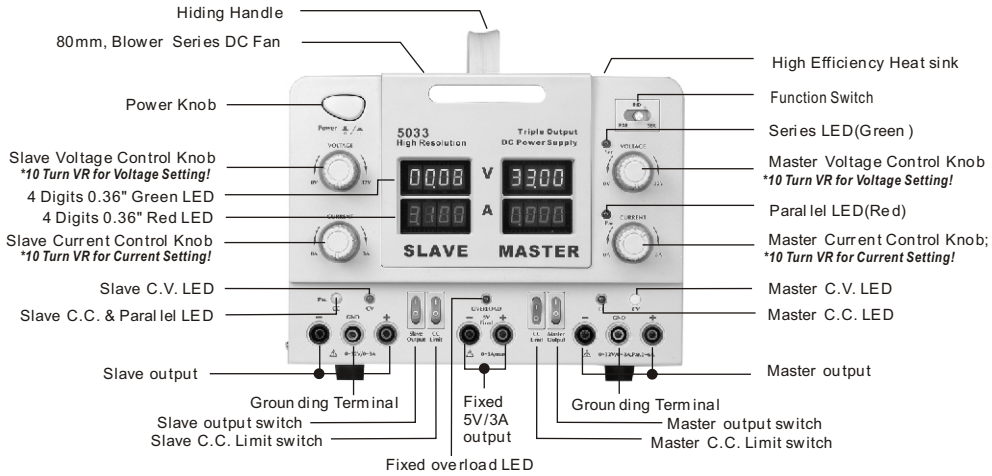
PW-5032 Front Panel



PW-5003 Front Panel



PW-5033 Front Panel



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