

KENWOOD

REGURATED DC POWER SUPPLY

PR18-1.2 **PR36-1.2**
PR18-3 **PR36-3**
PR18-5 **PR70-1**

INSTRUCTION MANUAL

KENWOOD CORPORATION

CONTENTS

1. OUTLINE.....	3	7. MAINTENANCE.....	14
2. FEATURES	3	7 - 1.REMOVING THE CASE.....	14
3. SPECIFICATIONS	4	7 - 2. CHANGING THE SOURCE.....	14
4. PRECAUTIONS FOR USE.....	6	VOLTAGE	
5. EXPLANATION OF PANELS.....	7	7 - 3. FUSE REPLACEMENT	14
5 - 1.FRONT PANEL	7	8. TROUBLESHOOTING.....	15
5 - 2.REAR PANEL.....	9		
6. OPERATION PROCEDURES.....	10		
6 - 1.STAND - ALONE OPERATION	10		
6 - 2.OPERATION IN SERIES	10		
6 - 3.OPERATION IN PARALLEL.....	11		

1. OUTLINE

The PR Series is a serial control - type regulated DC power supply. It is a constant voltage / constant current power supply whose output can be varied from 0 up to the rated values.

It is a compact unit which, provided with both voltage - and current - calibrated meters, allows both voltage and current to be monitored simultaneously. In terms of operability, the unit enables high - precision, continuous variability via coarse and fine adjust knobs. We are confident that the unit's design -- conceived with the user's convenience in mind to enable advantages such as arrangement in easy - to - use configurations -- and its reliability will satisfy your needs very well.

With the PR Series, multiple units of the same model can be connected in parallel to set up a "one - control" master / slave configuration having increased current output.

2. FEATURES

1. The PR Series is a constant voltage / constant current supply which features extremely low voltage and load fluctuations and ripple noise.

2. The unit features separate voltage and current meters so that both voltage and current can be monitored simultaneously.

3. Output voltage and current can be adjusted continuously to any desired values.

Furthermore, the voltage can be preset easily and precisely using coarse and fine adjust knobs.

4. The constant current circuit operates to protect against overload and output shorting. The limiting current can be preset from 0 up to the rated current, and the unit can also be used as a constant current supply.

5. The unit enables "one - control" operation via connection in series, or via parallel connection in a master / slave configuration.

6. Using an optional rack - mounting frame (sold separately), the PR Series can be installed on a E' or JIS rack.

4. PRECAUTIONS FOR USE

1. Confirming the supply voltage

* Use this unit within the specified range.

The unit's rated voltage is single-phase 100/120/220/240 V AC $\pm 10\%$ (max, 250 V) at 50/60 Hz.

* The rated voltage is indicated on the specification and name plate located beside the input connector on the rear panel.

* See the Maintenance section (7 - 2. Changing the supply voltage) for information on how to change the rated voltage.

2. Precautions for connection of output terminals

This unit is a floating type power supply. For ordinary use, be sure that the MASTER/SLAVE switch on the rear panel is set to MASTER, and that either the (+) output terminal or the (-) output terminal is connected to the GND terminal (case GND) via the shorting bar.

3. Set-up environment

* Be sure to use this unit within the specified ambient temperature range of 0 to 40 deg C.

* Because the unit is cooled by natural convection, do not place objects on top, place the unit on or near any heat-emitting device, or use multiple units in any stacked configuration. Also, use the unit in an environment that is as well cross-ventilated as possible.

5. EXPLANATION OF PANELS

5 - 1. Front Panel

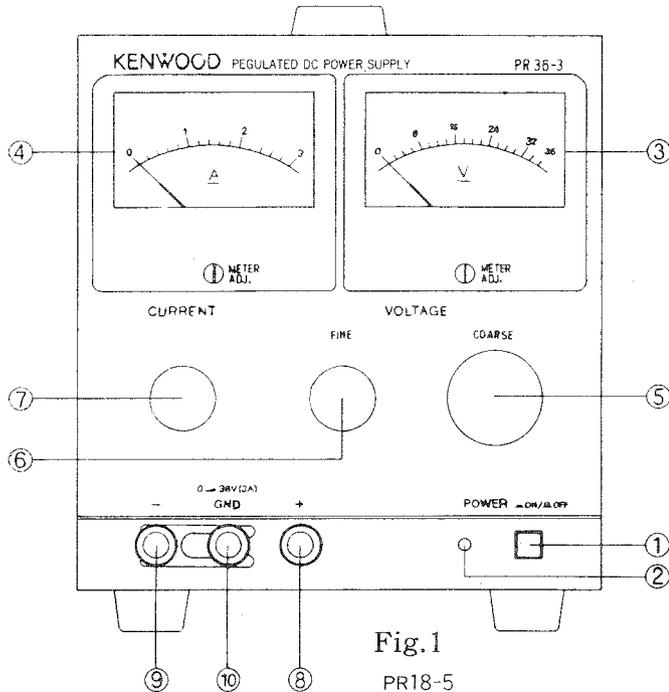


Fig.1

PR18-5

PR.

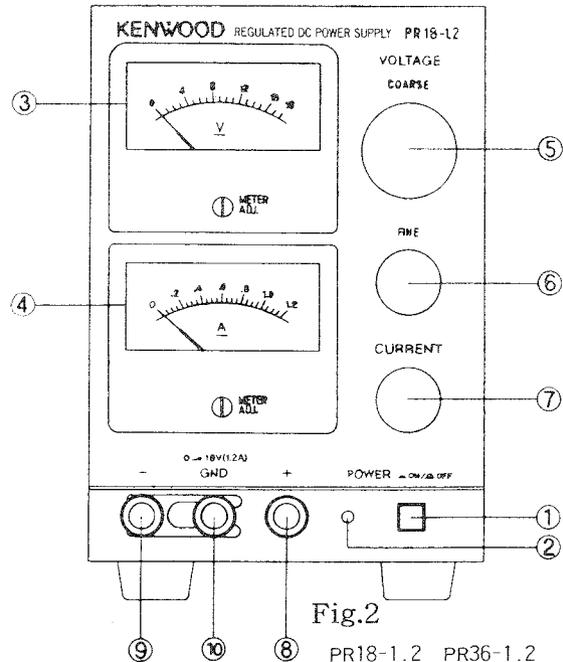


Fig.2

PR18-1.2 PR36-1.2

.8-3 PR70-1

(1) POWER ON  / OFF 

The power switch. The power supply should be on and operating when this switch is depressed.

(2) POWER LED

A red LED that indicates the unit is in operation.

(3) Voltmeter

A DC voltmeter that indicates the output voltage.

(4) Ammeter

A DC ammeter that indicates the output current.

(5) VOLTAGE COARSE

Coarse adjust knob for the output voltage.

(6) VOLTAGE FINE

Fine adjust knob for the output voltage.

(7) CURRENT

Knob for setting the current value in the constant current mode. It can be used to set the limiting value for the output current.

(8) Output terminal (+)

Terminal for tapping of (+) output voltages.

(9) Output terminal (-)

Terminal for tapping of (-) output voltages.

(10) GND terminal

The ground terminal, it is connected to the main chassis. Normally, this terminal is connected to either the (+) or (-) terminal.

5 - 2. Rear panel

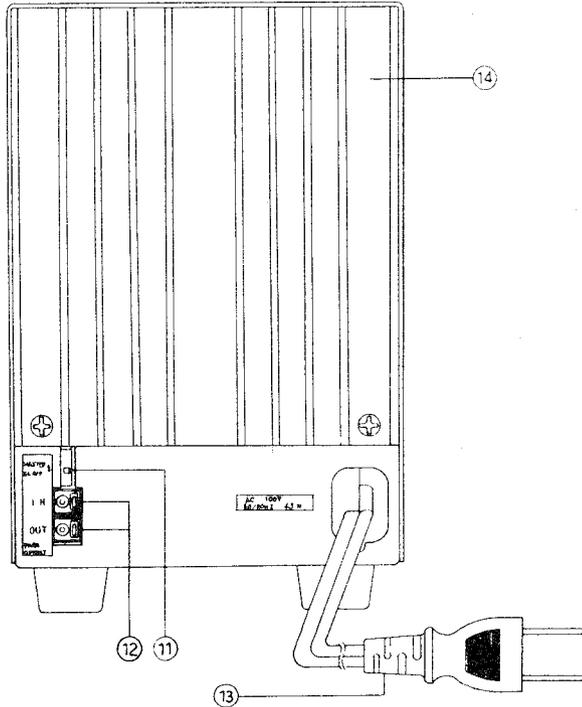


Fig. 3

(11) MASTER/SLAVE switch

Used during "one - control" parallel operation in the master/slave configuration.

During normal operation, the switch should be set to MASTER. (For details, see section 6 - 3 ; "Parallel Operation.")

(12) IN / OUT terminals for parallel operation

Control terminals for use in the "one - control" parallel operation mode.

(13) Power cable

Approx, 2 meter - long power cable, equipped with standard wall plug.

(14) Heat sink

A heat dissipator for the transistors. be careful as this area can become quite hot during operation.

6. OPERATION PROCEDURES

6 - 1. Stand - alone operation

* When using the power supply in stand - alone, simply operate by manipulation of the panel switches as needed. However, be sure that the MASTER/SLAVE switch is set to MASTER.

6 - 2. Serial connection

* Two or more units of the power supply can be hooked up in series to achieve in increase in output voltage. The final output will be the sum of the outputs of the individual units. In this situation, however, care must be taken that the voltage of niether of the terminals with respect to the chassis GND exceeds the ground proof voltage.

* In the case of serial operation of two units (both same model) ;

a. For connection as in Fig.4, the output voltage, but output current will be limited to within the value specified for a single

unit.

b. For connection as in Fig.5, where an intermediate point is hooked up to ground, the configuration can be used as a plus/ minus power supply.

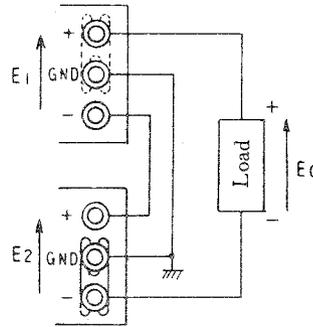


Fig.4.Connection of GND
For positive ground
(dotted line)
For negative ground
(solid line)
 $E_0 = E_1 + E_2$

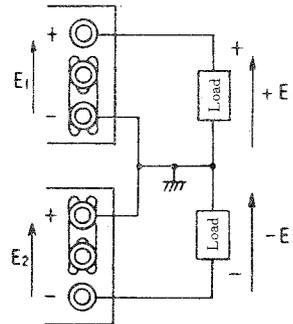


Fig.5.
Intermediate point is hooked
up to ground.

6 - 3. Parallel operation (master - slave control)

* Two or more units of the same machine can be hooked up in parallel to give an increase in output current capacity. The total output current capacity will be the sum of the output currents of the individual machines.

* In parallel operation, one machine will act as the master and all others will act as slaves. The output voltages and output currents are all set from the master machine.

* When hooking the machines up in parallel, be sure that all the power ON/OFF switches are OFF.

HOOK - UP PROCEDURE :

- 1) Turn the power switches of the master unit and slave unit (s) all to "OFF"
- 2) Turn the MASTER/SLAVE switch (located on the back panel) on all the slave units from "MASTER" to "SLAVE".
- 3) Hook up the parallel operation - use terminals (IN/OUT, located on the rear pa-

nel) of the master and slave (s) as shown in Figure 6.

4) For connecting the output terminals of each of the machines to the load, use all cords of the same length.

5) For (+) and (-) grounding to the GND terminal, hook up the master and slave machines via the terminals on the panels.

Figure 7 shows the output connection scheme for (-) grounding.

6) Set the voltage and current knobs of all the slave unit (s) to the maximum setting.

7) Turn the power switches of the master unit and slave unit (s) all to "ON".

Control the output voltage and current as desired via the voltage and current knobs on the master unit.

* When the output goes to 0 amperes in the parallel operation mode, output voltage can no longer be controlled by the master machine. Be sure to keep a current flowing that is several % of the rated current.

Hook - up of rear panel terminals in the parallel operation mode

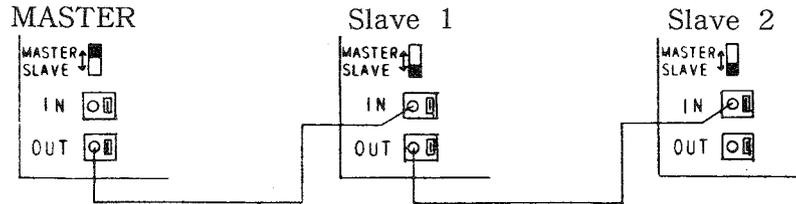
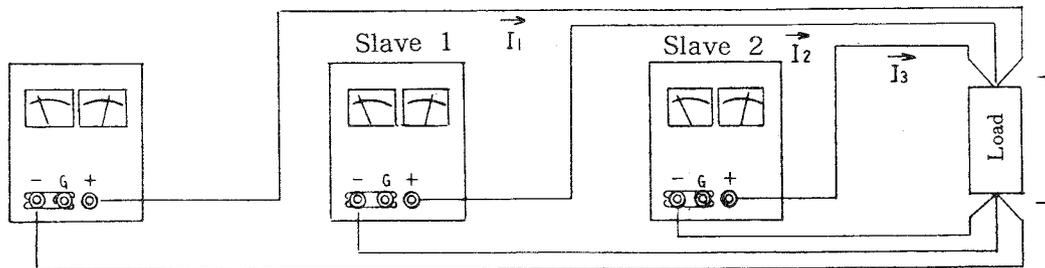


Figure 6.

Hook - up of front panel terminals in the parallel operation mode.



NOTE ; $I = I_1 + I_2 + I_3$

The voltage presets on all the slave machines are set to maximum, The master

operates in constant voltrtage mode and the slaves opeate in constant current mode.

Figure 7.

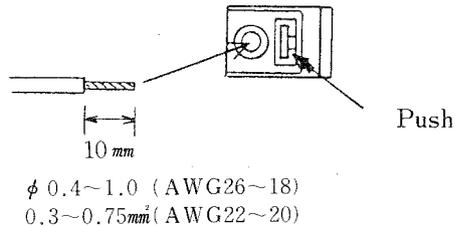
For instructions on how to achieve parallel operation of multiple machines of different models, p. use consult with your

place of purchase or a sevice outlet.

* Connection of Terminal on Rear Panel

While pressing on the slit portion of the terminal with an ordinary (-) screwdriver, insert the connecting cable into the round juck. When insertion is complete, remove the screwdriver. The cable will remain locked into the terminal even after the screwdriver is removed.

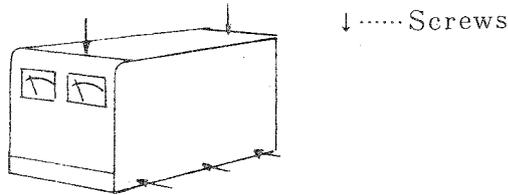
NOTE: When using stranded (twisted) cable, the connector should be attached by soldering.



7. MAINTENANCE

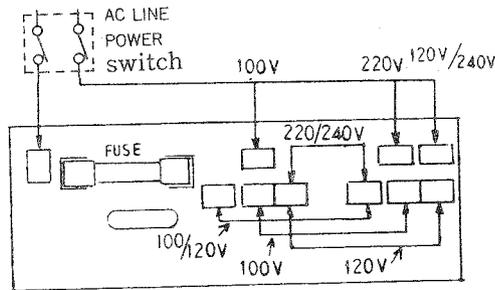
7 - 1. Removing the case

The case can be removed by taking out the screws on the top and side panels and pulling the case upwards.



7 - 2. Changing the rated source voltage

To change the AC source voltage of the machine, change the internal power transformer and fuse specifications as shown in the figure below.



(Supply voltage onversion and fuse replacement)

7 - 3. Fuse replacement

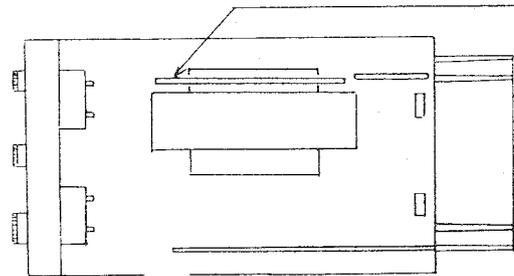
When a fuse blows, replace it after investigating the cause of the blow - out.

Furthermore, since alterations of the supply voltrtage is accompanied by a change in fuse type, select a fuse that has the appropriate rating according to the chart below.

NOTE ; When changing the supply voltage or replacing a fuse, remove the power cord from the AC outlet.

Modelname	PR18-1.2	PR18-3	PR18-5	PR36-1.2	PR36-3	PR70-1
100/120V	1.5 A	3 A	5 A	2.5 A	5 A	3 A
220/240V	0.8 A	2 A	3 A	1.5 A	3 A	2 A

Supply voltage conversion and fuse replacement



8. TROUBLESHOOTING

Problem	Indicators or Areas to check	Cause
Power supply will not go on.	Power ON lamp does not light up.	<ul style="list-style-type: none"> * Poor connection of power cord, or broken wire * Bad power switch * Fuse meltdown
No output voltage.	Voltmeter does not move.	* Circuit malfunction
No output current.	Ammeter does not move.	* Circuit malfunction
Excessively large output.	Output voltmeter and ammeter readings do not decrease.	<ul style="list-style-type: none"> * Bad power transistor or control mechanism * Circuit malfunction
Unstable output.	Input voltage is wrong. Machine is vibrating. Strong magnetic or electrical field nearby.	<ul style="list-style-type: none"> * Operating outside the rated voltage range * Oscillations due to special load type * Remove from source of oscillations.

A product of
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