

MODEL 7133A

REGULATED DC POWER SUPPLY

OPERATION MANUAL

KIKUSUI ELECTRONICS CORP.

Power Requirements of this Product

Power requirements of this product have been changed and the relevant sections of the Operation Manual should be revised accordingly.

(Revision should be applied to items indicated by a check mark)

Input voltage

The input voltage of this product is _____ VAC,
and the voltage range is _____ to _____ VAC. Use the product within this range only.

Input fuse

The rating of this product's input fuse is _____ A, _____ VAC, and _____.

WARNING

- To avoid electrical shock, always disconnect the AC power cable or turn off the switch on the switchboard before attempting to check or replace the fuse.
- Use a fuse element having a shape, rating, and characteristics suitable for this product. The use of a fuse with a different rating or one that short circuits the fuse holder may result in fire, electric shock, or irreparable damage.

AC power cable

The product is provided with AC power cables described below. If the cable has no power plug, attach a power plug or crimp-style terminals to the cable in accordance with the wire colors specified in the drawing.

WARNING

- The attachment of a power plug or crimp-style terminals must be carried out by qualified personnel.



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GENERAL

Kikusui Electronics Model 7133A is a transistorized regulated DC power supply of series type. It is provided with a knob for continuously varying voltage in a range of 0 to 70 V and a knob for making fine adjustment of ± 1.0 V. The maximum applicable output current is 2.5A. As the output current can be limited to 0.5, 1, 1.5, 2, 2.5A respectively, Model 7133A is capable of operating safely even in case of a non-linear load or short-circuit of output.

A voltmeter and an ammeter of large size are provided on a front panel, and sampling terminals are equipped for output.

Model 7133A renders it possible to perform series operation between the same models and also remote programming for them. Further, both series and parallel operations are possible between the Models 7133A and 7133.

SPECIFICATIONS

AC Input	----- V 50 or 60 Hz Full load approx. 380 VA
Dimensions	430 (W) x 167 (H) x 390 (D) mm
(Max.)	435 (W) x 184 (H) x 440 (D) mm
Weight	Approx. 19 kg
Ambient Temperature	Max. 40°C
Accessories Supplied	Short bar (long) 1 (short) 2
	Operation manual 1
	Test data sheet 1

OUTPUT:

Terminals	Horizontally aligned; classified by colors
Polarity	Positive or negative
Floating voltage	Max. ± 150 V
Voltage	Continuously variable: 0 - 70 V fine adjustment : ± 1 V approx.
Current	Max. 2.5 A
Ripple	0.5 mVrms
Regulation	Line fluctuation (against ± 10 % fluctuation of input voltage) 5 mV
	Load fluctuation (against 0 - 100 % fluctuation of load) 10 mV

Overload Protection

Automatic crossover current limiting current (fold-off type)

Overload lamp lighting

Switchable to 5 ranges of : 0.5, 1, 1.5, 2, 2.5A

Operation

Series, parallel, remote programming

Meter

Voltmeter : 70 V accuracy 2.5 % of full scale

Ammeter : 2.5 A accuracy 2.5 % of full scale

FRONT PANEL

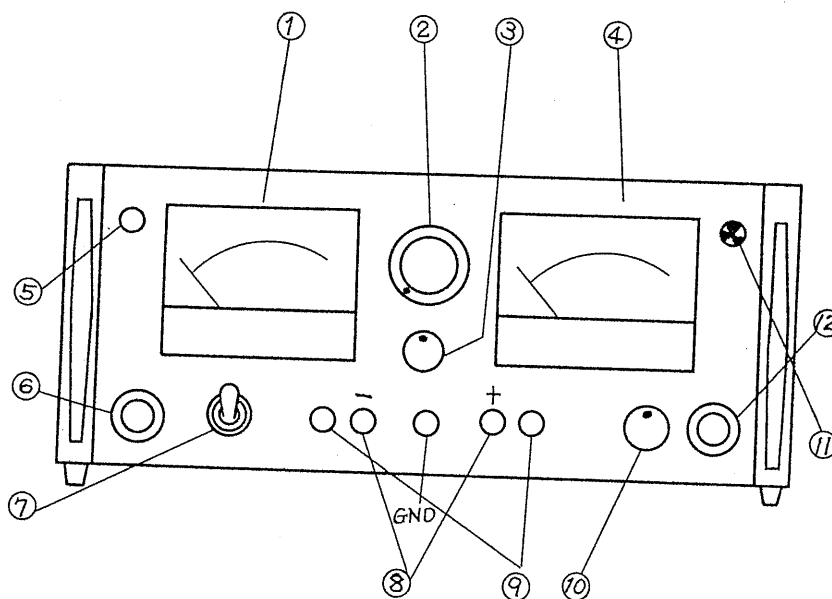


Fig. 1

- ① Output voltmeter (full scale : 70 V)
- ② Output voltage control knob : Clockwise rotation increases voltage, which can be continuously varied in a range of 0 to 70 V.
- ③ Knob for fine adjustment of ② : Capable of varying approximately ± 1 V.
- ④ Output ammeter (full scale : 2.5 A)
- ⑤ Pilot lamp for AC input
- ⑥ 4-ampere slow-blow type fuse : Provided on AC input side.
- ⑦ Power switch : Setting to ON-side turns on power and lights pilot lamp.

- ⑧ Output terminals : Normally Model 7133A is used with positive or negative terminal connected with GND terminal (electrically connected with chassis and panel) by means of accessory short bar. It is also possible to operate the equipment by applying DC bias of ± 150 V maximum.
- ⑨ Sampling terminals : To be used when load current is great and lead wire from output terminal to load becomes long, and resultant voltage drop can not be ignored. Connection is shown in Fig. 2.

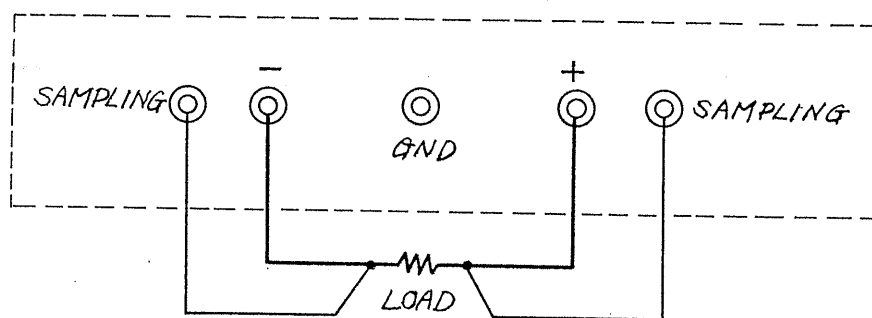


Fig. 2

- ⑩ Knob for selectively setting current limiting range : Capable of switching to 0.5, 1, 1.5, 2, 2.5A respectively.
- ⑪ Overload display lamp: Lights when short circuit occurs or any load beyond preset current limiting range is connected. Be careful not to allow the equipment to operate for many hours under this condition.
- ⑫ 2.5 ampere fuse : Provided on DC output side.

OPERATION

1. Preparation

- (1) Confirm that AC input voltage is within a range of the rated voltage $\pm 10\%$.
- (2) Be particularly careful when using Model 7133A under such conditions as insufficient ventilation, exposure to direct rays of the sun or to radiation from any heat source, high humidity, dusty place, or ambient temperature above 40°C or below 0°C .
- (3) Confirm that the rear terminals are properly connected.

2. Single Operation

This is the case where Model 7133A is singly operated. Connection of the rear terminals is shown below.

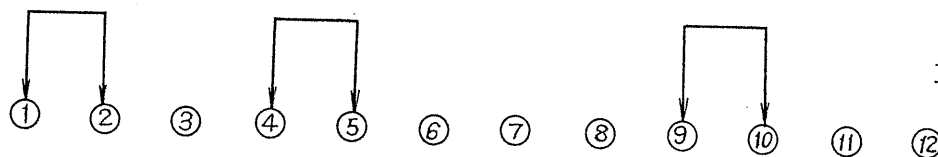


Fig. 3

just confirm the connection, as it is already completed at the time of shipment.

Set the output voltage by means of the respective output control knobs for coarse and fine adjustment, and set the output current by means of the current limit selector.

When a load beyond the preset current limit value is connected, the overload display lamp lights, and both output voltage and output current decrease.

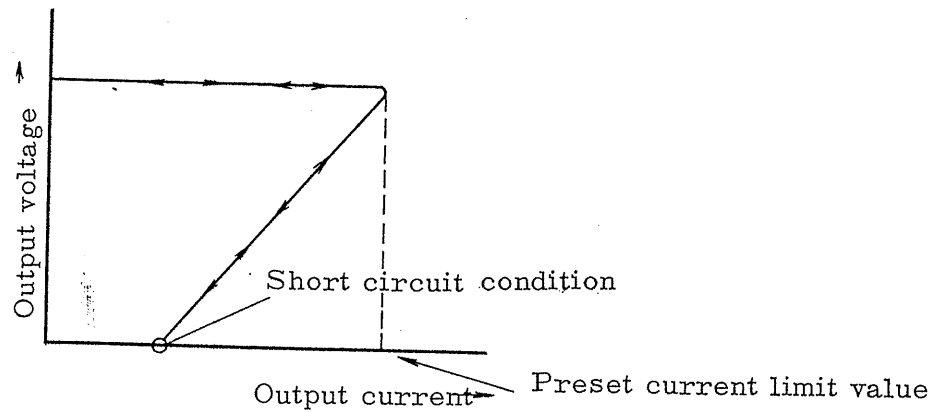
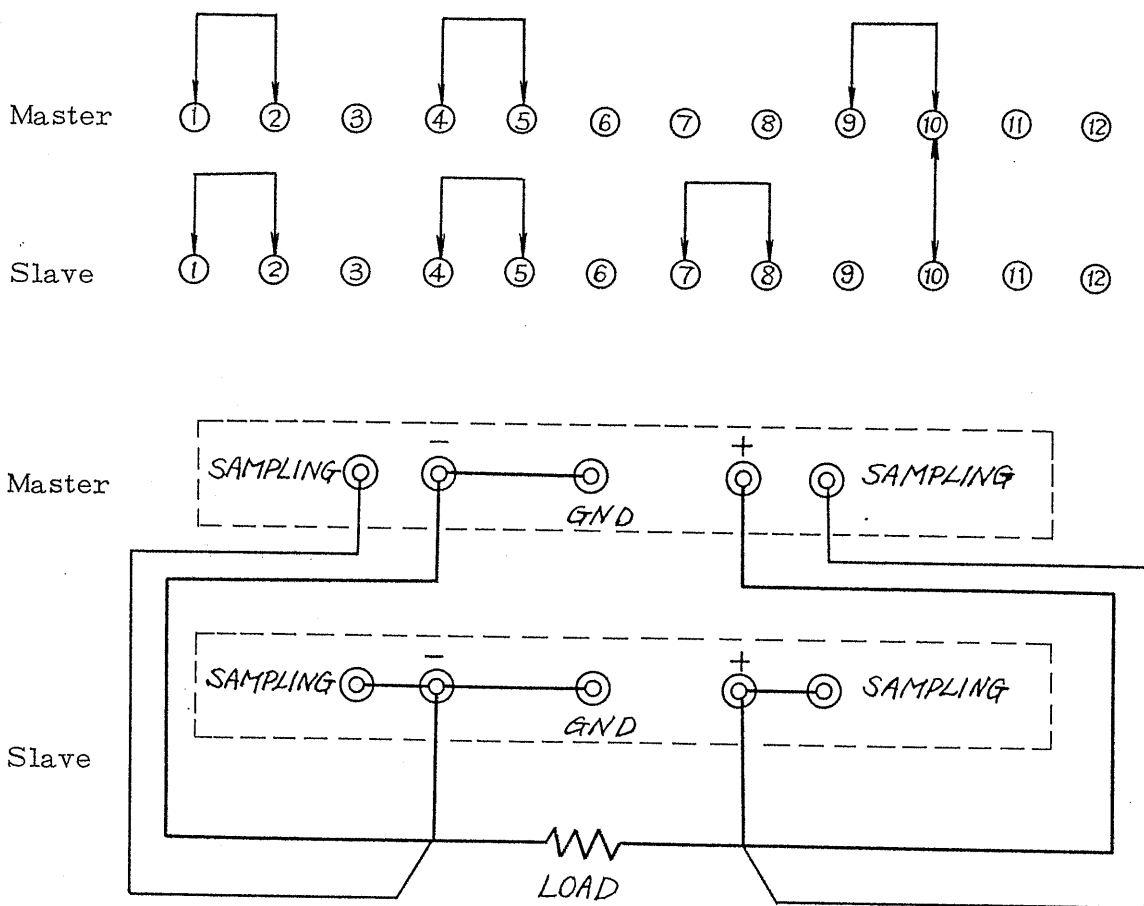


Fig. 4

The output current becomes minimum in the case where a load is short-circuited. When the load returns to be within the preset current limiting range, the equipment resumes its constant voltage operation automatically and continuously.

3. Parallel Operation

Parallel operation is performed when it is desired to use more than 2.5 A of output current. In this case, connection is to be made as shown below. In this operation, one unit functions as a master while the other as a slave. Output is controlled in a master unit by one-control system.



Parallel operation with sampling terminals connected (negative grounding)

Fig. 6

- (1) Turn the output voltage control knob of the slave clockwise to its extreme position, and set the output current limit knob to the same range as that of the master.
- (2) Turn on the power switch. Then the output voltages of both master and slave can be increased or decreased at the same rate by means of the output voltage control knob of the master.

- (3) The master and slave must be so grounded as to become coincident with respect to their polarity by the short bars. Never ground them in different polarity.
- (4) Output fluctuation in parallel operation somewhat increases as compared with the case of single operation.

4. Parallel Operation between Model 7133A and 7133.

Connection of the output terminals is the same as shown in Fig. 6.

In this case, Model 7133 is a master and Model 7133A is a slave.

Connection on the rear terminal strip is shown in Fig. 7.

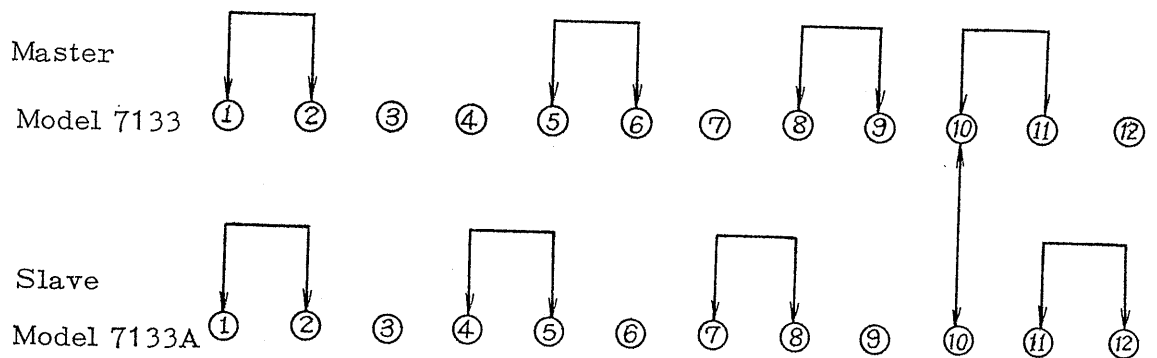


Fig. 7

The operation is the same as described in 3. Parallel Operation.

It is desired that a thick wire be used for connecting 11 and 12 of the slave.

5. Series Operation

Connect the output terminals in series as shown below in case of using a voltage higher than 70 V.

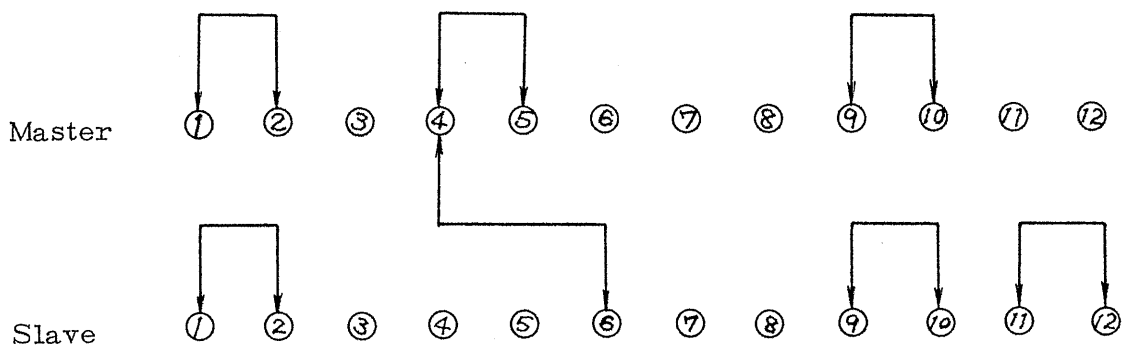


Fig. 8

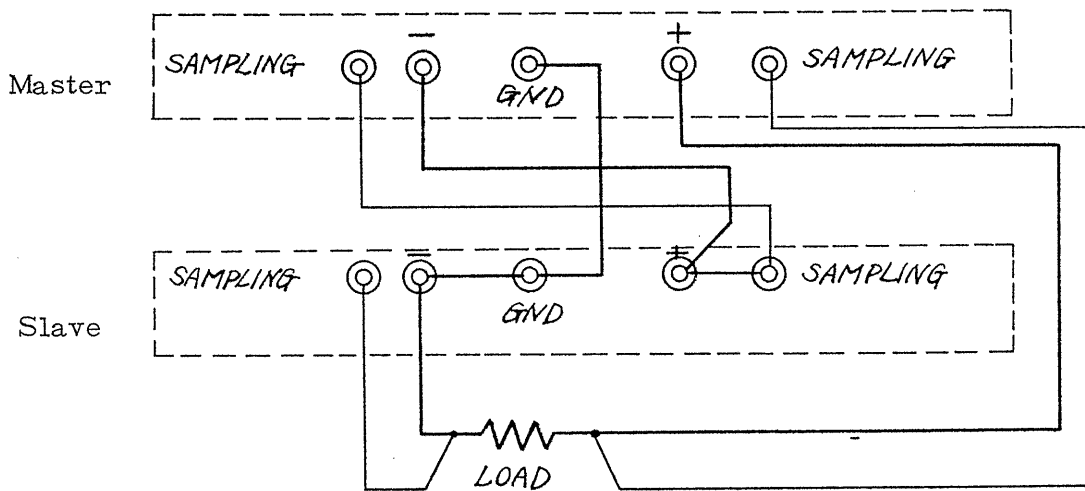


Fig. 9

(Negative grounding)

- (1) After connecting the equipment as illustrated in Figs. 8 and 9, turn the output voltage control knob of the slave clockwise to its extreme position, and then control the output voltage by means of the output voltage control knob of the master. Turning the knob increases or decreases the output voltage of both equipments substantially at the same rate.

In this case, be sure to turn on the power switch for the slave first.

- (2) Output current limit setting is performed by the current limit selector of the master. Set the selector of the slave to a 2.5 A range.
- (3) Connect the GND terminals by a wire, and ground either positive or negative terminal by the short bar. In this case, be sure to make the wire as short as possible.
- (4) Output fluctuation occurring in series operation becomes about twice as much as that in single operation.
- (5) It is also possible to operate the equipments by connecting the respective output terminals in series.

Overload protection in series operation

When overload condition occurs in the operation of more than two equipments connected in series, an inverse voltage is impressed on the equipment of which overload protection circuit operated first, and it may cause breakdown of the series transistors. In order to prevent this, protective diodes are connected with the output terminals of

the respective power supplies as illustrated in Fig. 10.

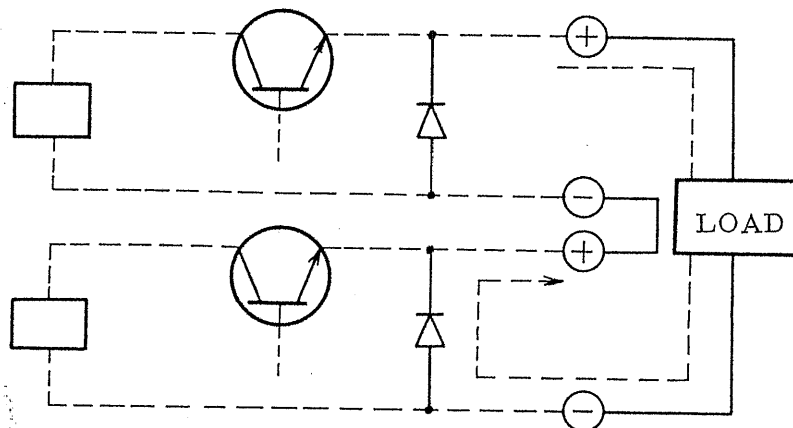


Fig. 10

6. Series Operation between Model 7133A and 7133.

The output terminals and the SAMPLING terminals are connected in the same way as Fig. 9. Connections on the rear terminal strips are shown in Figs. 11 and 12.

1) When Model 7133 is a master :

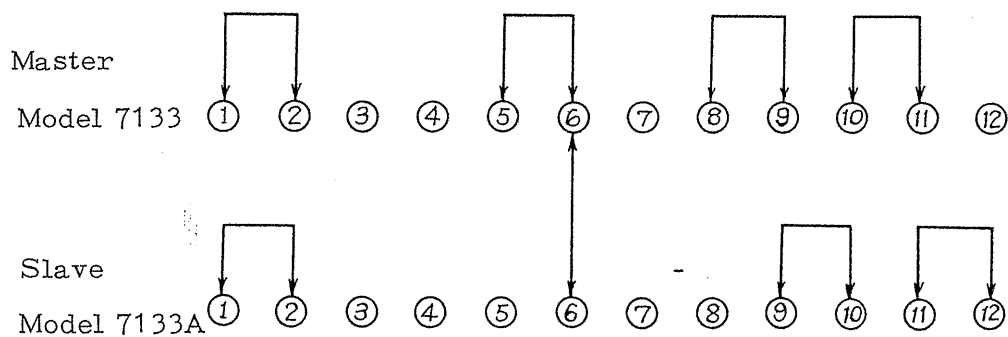


Fig. 11

2) When Model 7133 is a slave :

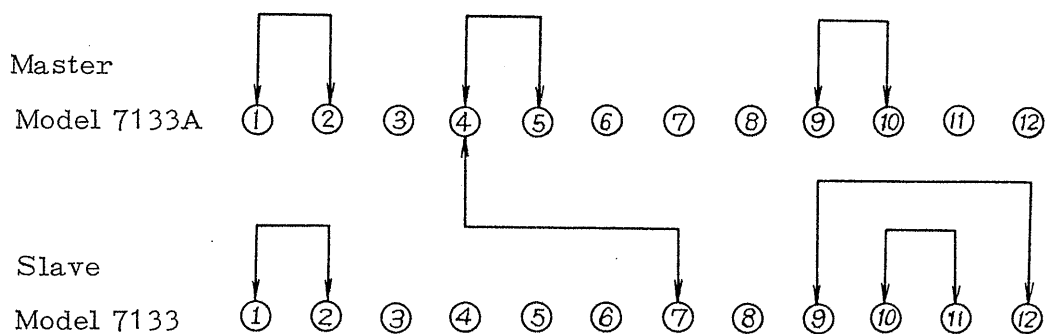


Fig. 12

The operation is the same as the case of series operation between equipments of the same model.

7. Remote Programming

Remote programming is possible for Model 7133A in any case of single, parallel, or series operation. Fig. 12 illustrates connection on the rear terminal strip in case of single operation.

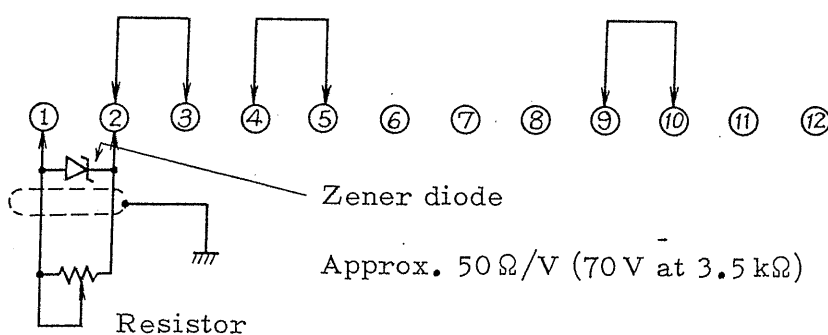


Fig. 13

- (1) In remote programming, the output voltage control knob COARSE on the front panel becomes unusable, and output voltage is controlled by means of the resistor externally connected. Since the value of the resistor is $3.5 \text{ K } \Omega$ at 70 V, the index becomes $50 \text{ } \Omega / \text{V}$. When it is desired to prevent the output voltage from increasing beyond a certain value, connect a zener diode of little leakage current as shown in Fig. 13.

Then the output is not increased any further than the desired voltage.

- (2) When a distance between Model 7133A and the external resistor is long, the wire from the resistor picks up induced signals on the way and therefore the output characteristic is deteriorated.

To avoid this, be sure to use a double-conductor shielding wire, and connect its outer conductor with the GND terminal of Model 7133A.

- (3) In remote programming in the case of parallel or series operation, the output voltage is controlled by connecting the external resistor. with (1) - (2) and short-circuiting (2) - (3) of the master as in the case of single operation. As for other operations, refer to the respective pages describing the corresponding operations.

MAINTENANCE

When any component part is replaced in case of trouble or output voltage is not as usual, make 0V and 70V adjustments in the following procedure.

Turn the output voltage control knob COARSE to its maximum position (state of full clockwise rotation) and also to its minimum position, and adjust the semi-fixed resistors (LOW ADJ and HIGH ADJ) shown in Fig. 14 so that the output voltage may become 70 V and 0 V respectively. (In this case, set the FINE knob to the center position) As both adjustments have effects on each other, it is necessary to repeat the above adjustment several times at the two points of 70 V and 0 V.

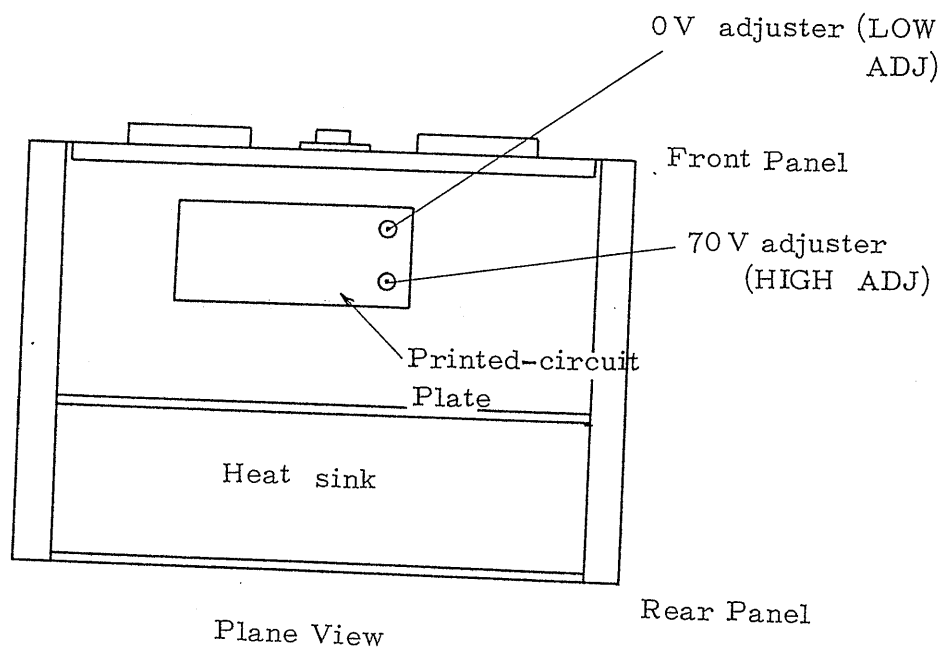


Fig. 14

Block Diagram

