OPERATION MANUAL

REGULATED DC POWER SUPPLY

MODEL PAF 20 - 1

KIKUSUI ELECTRONICS CORPORATION

8121120

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.

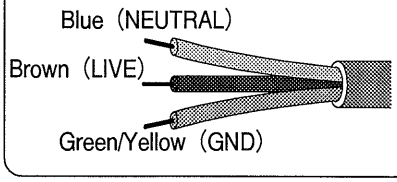
☐ AC power cable

The product is porvided 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.

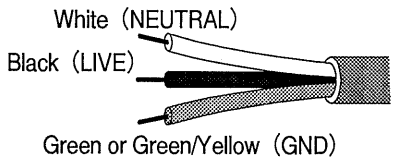
WARNING

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

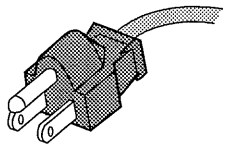
☐ Without a power plug



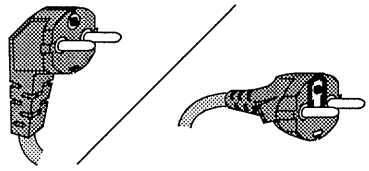
☐ Without a power plug



☐ Plugs for USA



☐ Plugs for Europe



☐ Provided by Kikusui agents

Kikusui agents can provide you with suitable AC power cable.
For further information, contact your Kikusui agent.

☐ Another Cable _____

 Kikusui Part No. Z9-000-027 IB001681

KIKUSUI

CONTENTS

1. GENERAL

Model PAF20-1 is a transistorized, regulated DC power supply of series control type. It is designed to be especially suitable for use in adjustment and test of radio receivers and tape recorders. For these purposes, Model PAF20-1 is equipped with two voltage control knobs which can be selected by switch operation. (The voltage control range may be either 1 - 10 V or 10 - 20 V.)

The maximum current output is 1 A. Linked with a current limiting circuit, the ammeter range can be set to 0.1 A or 1 A.

The current limiter is a fold-back type by which both voltage and current decrease in case of an overload. For allowing the voltages set by the voltage controls to be switchable from an external switch, a remote switch connector is provided on the rear of the equipment.

2. SPECIFICATIONS

Model:	PAF20-1
AC Input:	100 V ± 10%, 50/60 Hz AC
Power consumption:	Approx. 55 VA (at full load of 20 V, 1 A)
Operating ambient temperature range:	0 to 40°C
Operating ambient humidity range:	10 to 90% RH
Dimensions:	106W x 140H x 139D mm (4.17W x 5.51H x 5.47D in.)
(Maximum)	111W x 148H x 225D mm (4.37W x 5.83H x 8.86D in.) (When a remote plug is connected.)
	REMARKS: Four units of Model PAF20-1 can be mounted on a 19" (with RMF-4) or 500 mm (with RMF-4M) standard rack.
Weight:	Approx. 2.4 kg (5.3 lbs.)
Accessories:	Short bar 1
	Plug for remote control 1
	Operation manual 1 copy

OUTPUT

Terminals:	Colored in red and white, horizontal layout
Polarity:	Positive or negative
Floating voltage:	Max. ±100 V
Voltage:	Continuously variable in two ranges of 1 - 10 V or 10 - 20 V
Current:	Max. 1 A
Ripple:	1 mV rms
Regulations:	Line regulation (against ±10% fluctuation of line voltage) 10 mV
	Load regulation (against 0 - 100% fluctuation of load) 10 mV
Voltage control:	Two variable resistors, one of which is selected by switch operation. A connector is provided for allowing the selection from an external switch.

Overload protection circuit:	Fold-back type voltage and current limiting circuit. Two ranges 0.1 A and 1 A, interlinked with ammeter range.
Voltmeter:	12 V and 22 V ranges, accuracy of ±2.5% of full scale.
Ammeter:	0.12 A range, accuracy of ±3% of full scale.
	1.2 A range, accuracy of ±2.5% of full scale.

3. EXPLANATION OF PANELS

3.1 Explanation of Front Panel

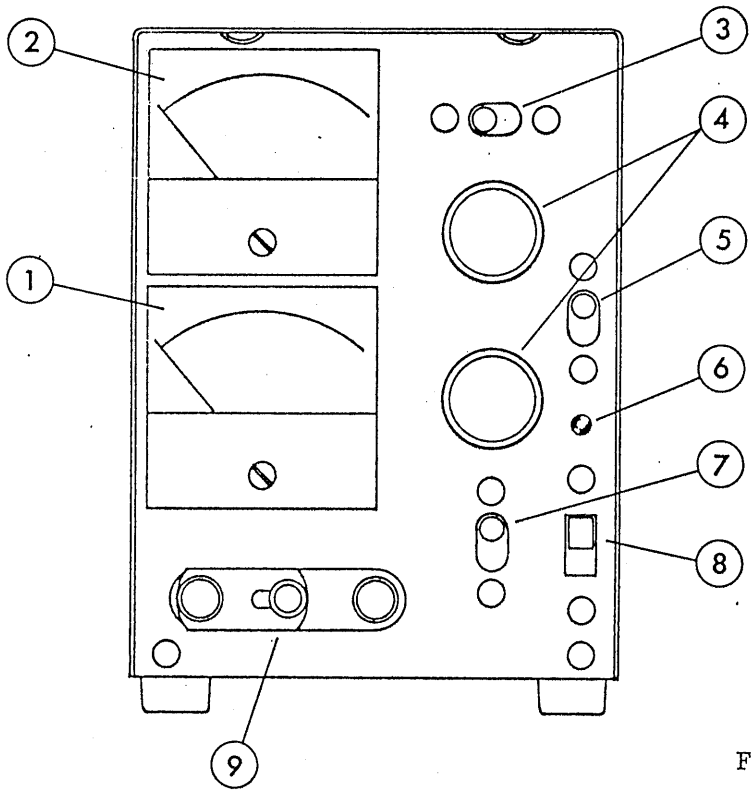


Figure 3-1

(1) OUTPUT AMMETER 0.12 A/1.2 A full scale

(2) OUTPUT VOLTMETER 12 V/ 22 V full scale

(3) OUTPUT VOLTAGE RANGE SWITCH (Linked voltmeter range)

(4) OUTPUT VOLTAGE CONTROL KNOBS

(5) OUTPUT VOLTAGE SELECTOR

Selects the voltage set with either voltage control I or II.

(6) PILOT LAMP (LED)

(7) AMMETER RANGE SELECTOR

Selects the range (0.12A, 1.2A) of the ammeter, and simultaneously sets the range of the output current limiting circuit so that the equipment and external circuits are protected from an accidental overload or short circuit.

(8) POWER SWITCH

(9) OUTPUT TERMINALS

Model PAF20-1 is normally used with the positive (+) or negative (-) terminal connected to the ground (GND) terminal (electrically connected to the chassis and panel) by using the accessory short bar. The equipment may also be operated by applying a maximum DC bias of ±100 V.

3.2 Explanation of Rear Panel

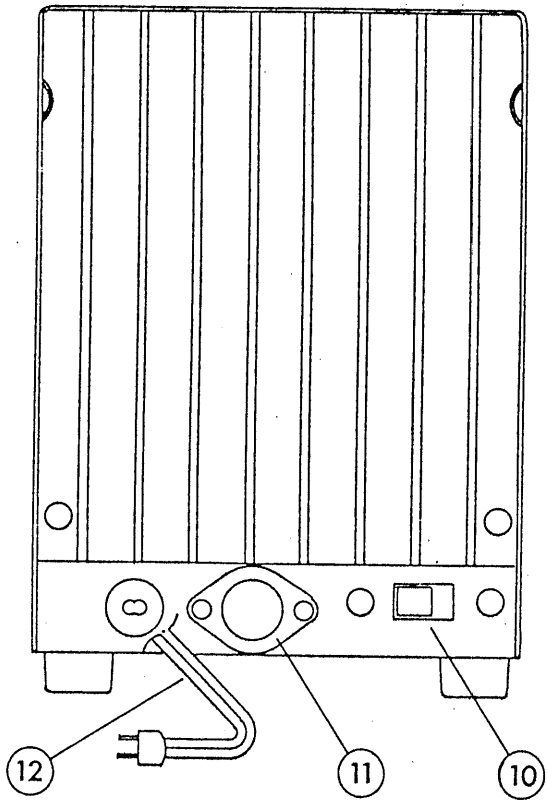


Figure 3-2

(10) VOLTAGE CONTROL (INT, REMOTE) SELECTOR

(11) CONNECTOR FOR REMOTE SWITCH

(12) AC POWER CORD

4. OPERATIONS

(1) According to the desired output voltage range, set the output voltage range selector to either the higher range (10 - 20 V) or the lower range (1 - 10 V) position. (See Figure 4-1.)

(2) Considering the current capacity of the load, set the ammeter range selector appropriately.

(3) Turn on the power switch, slide the voltage control selector to the "I" side, and set the voltage control I to one of the desired voltages. Slide the voltage control selector to the "II" side, and set the voltage control II to the other desired voltage.

The above permits to obtain two different voltages by slideing the voltage control selector to "I" or "II" side.

When selection from the two voltages is desired to be effected by using a remote switch, follow the instructions below:

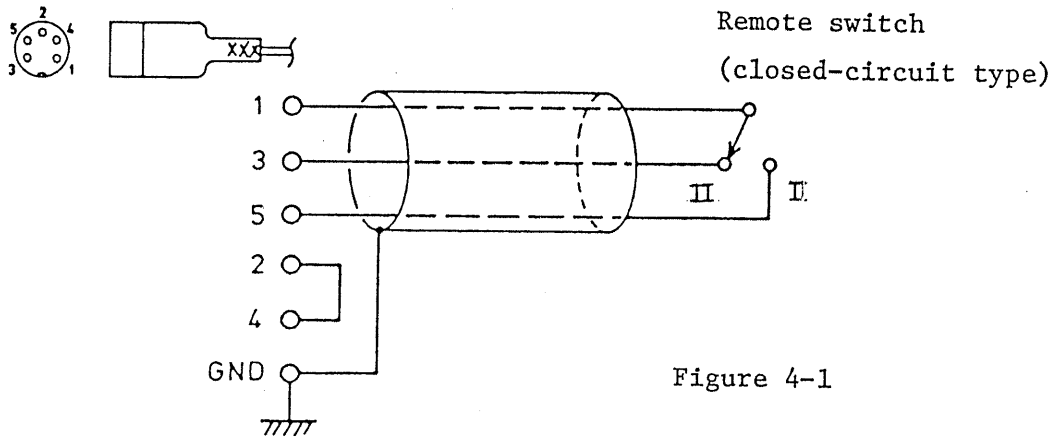


Figure 4-1

Connect a remote switch to the connector located on the rear of the equipment, as shown above, and set the voltage control (INT - REMOTE) selector to the "REMOTE SWITCH" position. Then the remote switch will operate identically with the voltage control selector on the front panel.

NOTE: A closed-circuit switch must be used for the above purpose. If an open-circuit switch is used, a voltage similar to non-regulated input voltage will be applied to the output terminals when the switch is operated.
(1 - 10 V range: Approx. 13 V, 10 - 20 V range: Approx. 22 V)

4.1 Current Limiting Circuit

To protect series transistors, DC ammeter, and other parts from damage when the output terminals are accidentally shorted, Model PAF20-1 is provided with an output current limiting circuit which is a trouble-free electronic circuit. This circuit is of the fold-back type which decreases both output voltage and current when the output current reaches the preset value.

The setting of the limiting current is linked with the ammeter range selector located on the front panel. With the ammeter range selector set to 0.1 A or 1 A, the current limiting function operates below 115% of the current value preset. When the load resumes its normal condition, the equipment recommences its regulated voltage operation automatically and continuously.

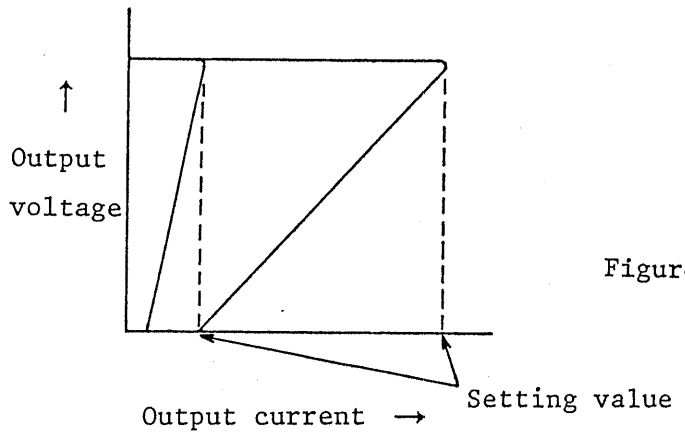


Figure 4-2

4.2 Series Operation

It is possible to supply a higher output voltage than 20 V by connecting more than two units of Model PAF20-1 in series. In this case, floating voltage at any terminal must not exceed ±100 V against the panel and chassis. (See Figure 4-3.)

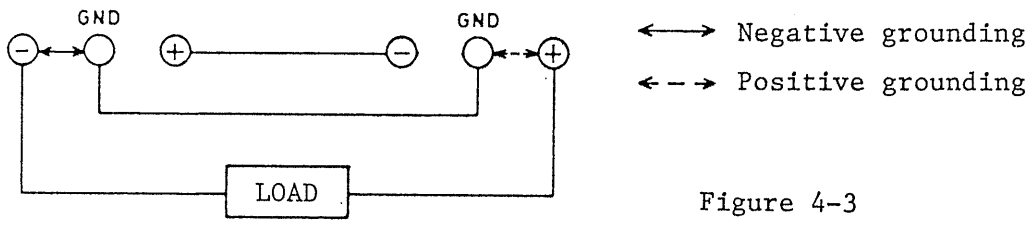


Figure 4-3

When overload condition occures in the operation of more than two units of Model PAF20-1 connected in series, inverse voltage is ~~applied~~ applied to the unit of which overload protection circuit operated first. In order to prevent this, diodes are connected between the respective output terminals as shown as in Figure 4-4.

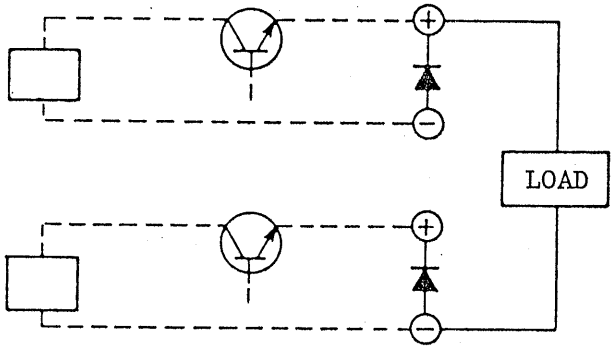


Figure 4-4
Protection for series connection

4.3 Parallel Operation

It is possible to obtain greater output current than 1 A by connecting the output terminals of more than two units of Model PAF20-1 in parallel. However, the applicable range is limited due to its characteristics as shown in Figure 4-5. In case of Figure 4-5 there appears a step of ΔV in the output voltage. Therefore the output voltage of both equipment must be adjusted to become as close to each other as possible.

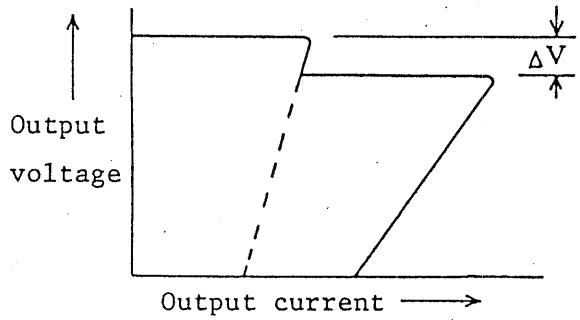


Figure 4-5
Two units parallel connection characteristic

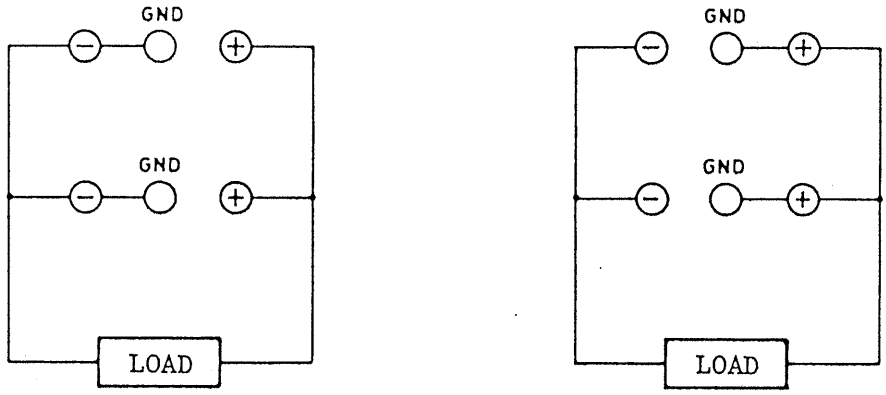


Figure 4-6 Parallel connection

4.4 Caution for Installation

Avoid using Model PAF20-1 in a place where ambient temperature exceeds 40°C (104°F). The maximum output current must be properly limited when the equipment is exposed to direct rays of the sun or radiation from any heat source.

The safety range of input line voltage for Model PAF20-1 is from 90% to 100% of the rated voltage.

4.5 Overshoot of Output Voltage

In Model PAF20-1 its output voltage is prevented from increasing any further than the preset value when line power is turned on or off.

5. MAINTENANCE

When any defective component part is replaced and output voltage indication needs calibration, make adjustment in the following procedure.

o Preparation

(a) Set the output voltage range selector to the higher range (10 - 20 V) position.

(b) Turn the voltage controls fully clockwise, switch the voltage control selector to positions "I" and "II" alternately, and adjust, as below, the semi-fixed resistors with respect to the lower output voltage. If the meter pointer deflects over the scale, appropriately adjust the output voltage with calibration resistor EO. For adjusting parts, see Figure 5-1.

(1) Adjustment of voltmeter

Connect a voltmeter to output terminals, and set the output voltage to 20 V. Adjust the semi-fixed resistor VM in Figure 5-1, so that an output voltmeter of the Model PAF20-1 indicates 20 V.

(2) Adjustment of max. output voltage

Set the voltage range selector to the 10 - 20 V range, and turn the output voltage control knob counterclockwise to its extreme position. Then adjust the output voltage to 20.5 V by truning the semi-fixed resistor EO in Figure 5-1.

(3) Adjustment of output current limiting circuit

Set the ammeter range selector to the 1 A range. Connect a load to output terminals, and decrease the value of the load resistance. Adjust the semi-fixed resistor IO in Figure 5-1, so that the indication of ammeter increases up to approximately 1.15 A with decrease of the value of the load resistance, and then it decreases.

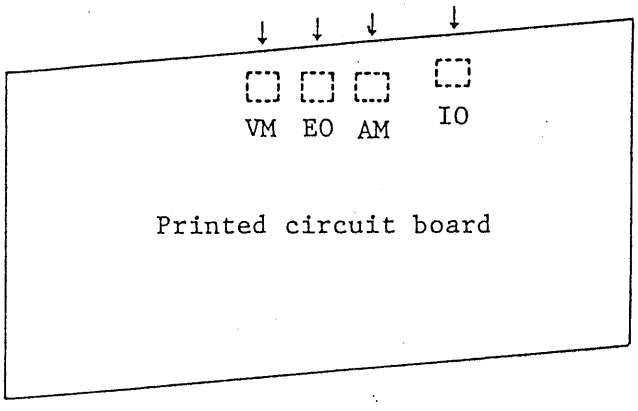


Figure 5-1