

PFS SERIES
REGULATED DC POWER SUPPLY
OPERATION MANUAL

KIKUSUI ELECTRONICS CORP.

177 10 21

710410

On Power Supply Source, it is requested to replace the related places in the instruction manual with the following items.

(Please apply the item of mark.)

- Power Supply Voltage: to _ _ _ _ _ V AC
- Line Fuse: to _ _ _ _ _ A
- Power Cable: to 3-core cable (See Fig. 1 for the colors.)

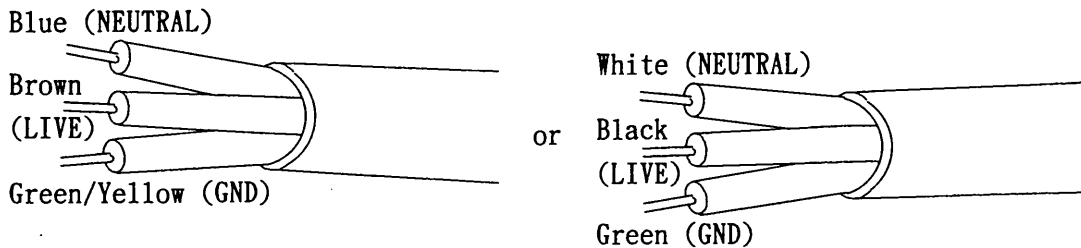


Fig. 1

Please be advised beforehand that the above matter may cause some alteration against explanation or circuit diagram in the instruction manual.

- * AC Plug: In case of Line Voltage 125V AC or more, AC Plug is in principle taken off and delivered, in view of the safety.
(AC Plug on 3-core cable is taken off in regardless of input voltages.)
To connect the AC plug to the AC power cord, connect the respective pins of the AC plug to the respective core-wires (LIVE, NEUTRAL, and GND) of the AC power cord by referring to the color codes shown in Fig. 1.

Before using the instrument, it is requested to fix a suitable plug for the voltage used.

190. 11. 14

905181

1. General

PFS series is a highly reliable and stabilized DC source which incorporates high speed switching system for compact, light weight and high efficiency. It is provided with various protecting circuit to cope with any kind of load with complete satisfaction of users.

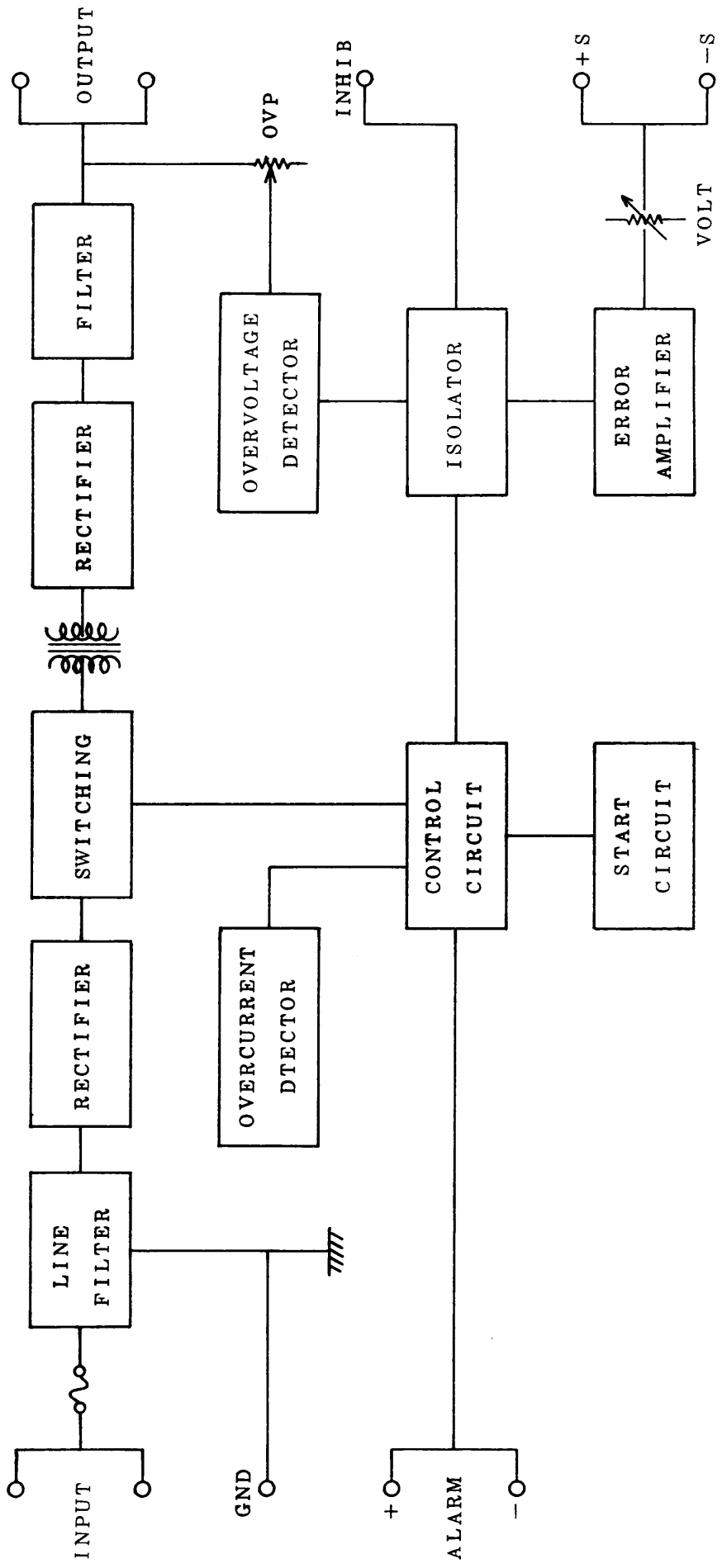
2. Features

- 1) Extremely wide input voltage range of AC $100\text{ V} \pm 15\%$.
DC $135\text{ V} \pm 15\%$ operate it is AC/DC universal type.
- 2) Sampling terminal is provided to each kind.
- 3) Remote programming is enabled.
- 4) Alarm signal can be taken out on overvoltage operation.
- 5) Built-in input/output filter
- 6) Series/parallel operation is enabled.
- 7) Built-in fuse in input line
- 8) Insulated input/output circuits

3. Circuit diagram

AC input passes line filter and is rectified, then converted to AC of 20 KHz or more by switching transistor. Further it is stepped up or down by transformer, then rectified and converted to DC power. Then, after noise removal by low-pass filter, DC output is obtained. In control of output voltage, output voltage is detected, passed through error

772405



BLOCK DIAGRAM

amplifier and isolator, then pulse width modulated in control portion to drive switching transistor, thus output voltage is kept stable.

4. Precautions for operation

- 1) PFS series can not be used in a range in excess of $\pm 15\%$ of input rating. Do not use it outside of the specified range.
- 2) Connect light emitting diode to ALARM terminal or short-circuit it with attached short bar.
- 3) Connect sampling terminals (+S, -S) to each output terminal. Otherwise, output voltage may become abnormally higher than the rated one, thus causing output interruption by the operation of overvoltage protecting circuit.
- 4) In PFS series, rush current on source application may amount to 50 - 100 times the rated input current, so be careful to input switch sufficiently.
- 5) PFS series is carefully designed in radiation noise, line radiation noise. However, if it is installed close to high gain circuit, high impedance, it may cause induction noise, so be sufficiently careful.
- 6) Do not use the equipment in such location as dusty location or that of direct sunbeam.
- 7) In case of application in narrow location or in parallel arrangement of the equipments, take sufficient spacings to facilitate ventilation. Around the equipment, take

spacing of 10 mm or more at minimum.

5. Overcurrent protection

Overcurrent protection system of PFS series incorporates drooping system where setting is 110 - 120 % of the rated current (however, in case of 25 W series, setting is made at 120 - 130 % of the rated current, so that noise may be generated during short-circuit. But this does not mean abnormality.).

6. Overvoltage protection (OVP)

Before the delivery of PFS series, setting is made in such a condition that output is interrupted at approx. 120 % of the rated voltage. In case that the operating voltage change is required, use variable resistor of front panel OVP for setting. Turn it clockwise, then setting value becomes higher. In addition, in case that overvoltage protection circuit operates, approx. 1 minute is necessary before resetting is made after the interruption of input source.

7. Alarm (ALARM)

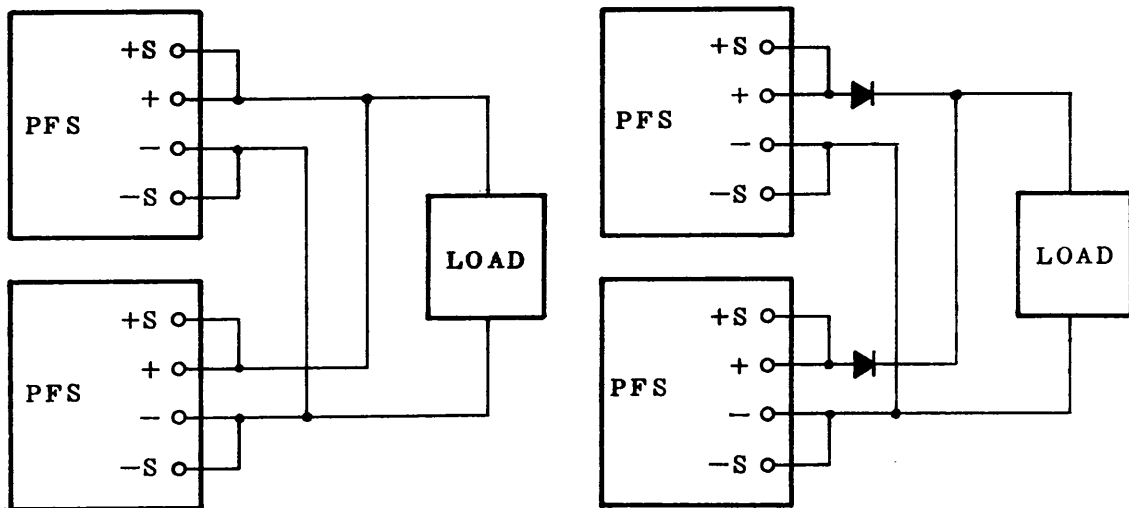
In case of overvoltage protection circuit operation, current conducts from (+) to (-) terminals of ALARM terminals. If light emitting diode is connected to these terminals in accordance with polarities, it is lit during overvoltage protective operation. In case that it is not used, short-circuit

it with attached short bar without fail.

8. Ripple

PFS series incorporates filter to reduce ripple sufficiently. However, if smaller value is required or lead wire becomes excessively long to the load depending on the condition of applicable load, connect electrolytic condenser or film condenser to far terminals to reduce impedance sufficiently for the application.

9. Parallel operation

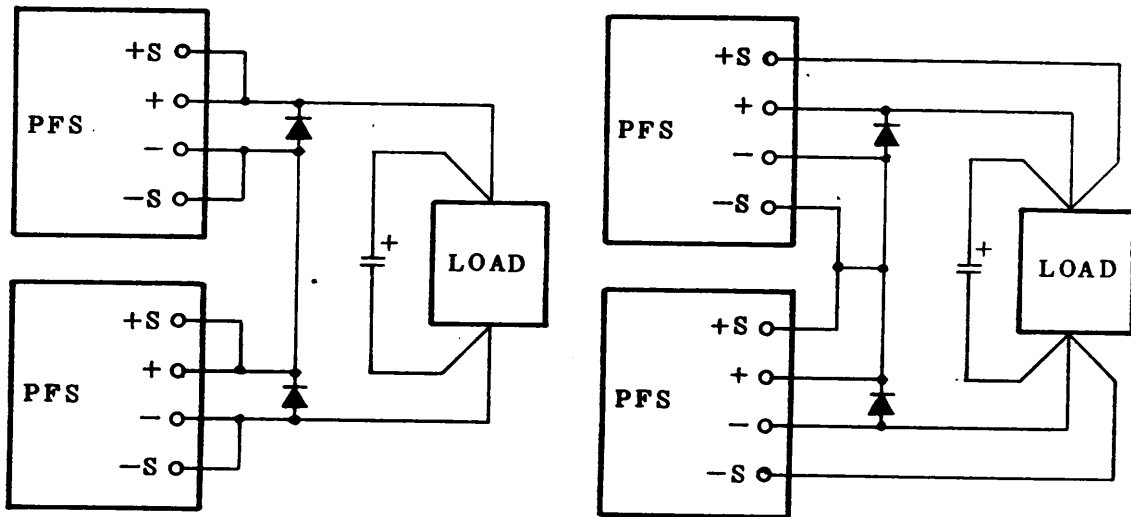


By operating PFS series parallel, output current can be generated equal to the summation of rated currents. In this case, balance the setting of output voltages. If unbalanced, power participation of higher-set one becomes larger

772409

or sometimes ripple value becomes larger. Also, in case that sampling terminals are used, connect those to location to be stabilized after removing them from each output terminal. In this case, attach electrolytic condenser or film condenser to load terminals.

10. Series operation



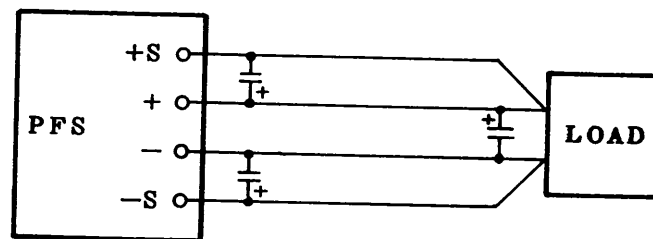
By the series connection of PFS series, output voltage can be generated equal to the summation of rated voltages. Apply this with same kind of units. In case that different units are connected in series, consult our company. In addition, connect diode corresponding to output current to output terminals of each unit. For the removal of noise, connect film condenser or electrolytic condenser to load terminals.

11. Method of sampling application

Sampling is possible since all kinds of PFS series are provided with sampling terminals. However, compensating

772410

range is 0.3 V or less. As shown in the figure, connect wires of +S and -S to the point subject to sampling. Also attach condenser as shown in the figure. Apply 0.1 μF ~ 10 μF film condenser or electrolytic condenser to +S ~ +, -S ~ -. Apply electrolytic condenser of 47 μF or more and film condenser of 0.1 μF to load terminals.

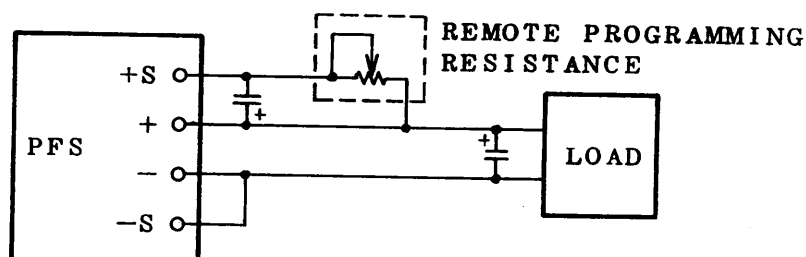


12. Remote programming

Output change of unit can be made in PFS series by external application of resistance or power source.

1) Method of remote programming with resistance

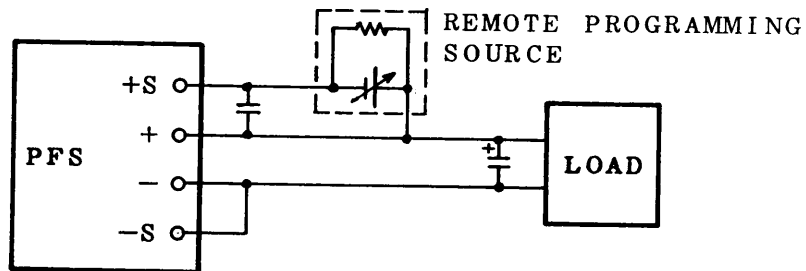
Connect a resistance between +S and + terminals of unit for the application. In this case, output voltage changes by approx. 1 V per 1 $\text{K}\Omega$.



In case that sampling is required, apply the method of sampling terminal application.

2) Method of remote programming with power source

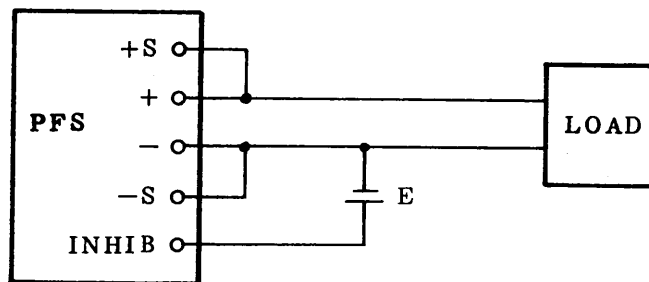
Connect power source between +S and + terminal of unit for the application. In this case, do not forget to conduct current of 2 mA or more by attaching resistance parallel to the power source.



In case of remote programming, securely turn output voltage controlling resistor (VOLT) in advance fully in counter clockwise direction. Also use resistance and source having excellent temperature coefficients for programming purpose.

13. Method of INHIB terminal application

In PFS series, output voltage can be switched on or off from INHIB terminal. Connection diagram is as shown below.



The voltage E can make output voltage off with the high

772412

level of TTL (7400, etc.). Output voltage is made on with the low level or open. In case of parallel connection of several PFSS, connect INHIB terminal parallel and attach current booster after TTL.

Specifications

(Table of output current)

Voltage Rated output	5 V	12 V	15 V	24 V	48 V
25 W	5 A	2 A	1.5 A	1 A	—
50 W	10 A	4 A	3 A	2 A	1 A
100 W	20 A	8 A	6.5 A	4 A	2 A
150 W	30 A	12 A	10 A	6 A	3 A

	25 W	50 W	100 W	150 W
Input voltage and frequency	AC 100V \pm 15% 47-500Hz or DC135V \pm 15%			
AC input current (TYP)	0.6 A	1.3 A	2.5 A	3.7 A
Efficiency (TYP)	65 %	70 %	75 %	75 %
Output ripple noise (20MHz)	100mVpp	50mVpp	50mVpp	50mVpp
Line regulation (at AC100V \pm 15%)	Not more than 0.2 %			
Load regulation (at 0-100% of load)	Not more than 0.3 %			
Overload protection	Voltage drooping system automatic return type (not less than 110%)			
Overvoltage protection	Interruption type manual reset (120%)			
Sampling	Applicable			

770413

Inhibit (INHIB)	Applicable			
Temperature coefficient (TYP)	$\pm 0.01 \% / ^\circ\text{C}$			
Operating temperature	0 - 50 $^\circ\text{C}$			
Operating humidity	Not more than 90 % RH			
Storage temperature	-25 - 85 $^\circ\text{C}$			
Storage humidity	Not more than 90 % RH			
Cooling system	Natural air			
Withstanding voltage (input ↔ case)	AC 1000 V 1 minute			
Isolation (input ↔ case)	30 M Ω at DC 500 V			
(output ↔ case)	20 M Ω at DC 500 V			
Temperature rise	Not more than 40 $^\circ\text{C}$			
Size *1	35x140x150	50x140x202	70x140x202	106x140x202
Weight	0.6 kg	1 kg	1.6 kg	2.1 kg

* 1 W x H x D

(Variable range of output voltage)

5 V	12 V	15 V	24 V	48 V
4.5 ~ 5.5 V	11 ~ 13 V	14 ~ 16 V	22 ~ 26 V	44 ~ 52 V