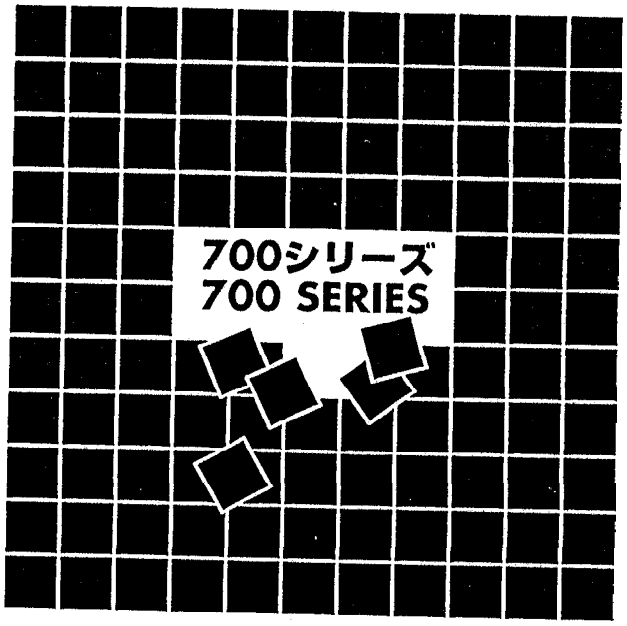
LEADER

直流安定化電源

取扱説明書

REGULATED DC POWER SUPPLY

INSTRUCTION MANUAL



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LEADER INSTRUMENTS CORP.

CONTENTS

SAFETY TERMS AND SYMBOLS

These terms may appear in this manual or on the product:

WARNING. Warning statements identify condition or practices that could result in injury or loss of life.

CAUTION. Caution statements identify conditions or practies that could result in damage to this product or other property.

The following symbols may appear in this manual or on the product:

DANGER
High Voltage

DANGER
Hot Surface

ATTENTION
refer to Manual

Protective
Conductor
Terminal

Equipotentiality

1. INTRODUCTION

The regulated DC power suppy have been designed to provide the most often required in the laboratory, schools and production lines.
The output voltage is continuously adjustable between 0 to rating voltage in one range by means of a coarse and fine potentiometer, the load current may have any value from 0 to rating current and adjusted by means of a coarse and fine potentiometer. Both outputs can accurately read on voltmeter and ammeter.
Both stability and ripple are extremely good to meet the requirements of modern circuit design. The unit can be used as either constant voltage or current source. The various operation mode are described in more detail in the Operation Instruction section.
For applications when output greater than V or A is need, the unit can be connected up in series or parallel.
For applications in audio production lines, the continuous or dynamic load internal selectable.

2. SPECIFICATIONS

2.1 GENERAL

Operation Environment	Indoor use
Altitude	Up to 2,000 m
Installation Categories	II
Pollution Degree	2
Operation Temperature	0 ℃～40 ℃
Operation Humidity	< 80%RH
Strage Temperature	-10 ℃～70 ℃
Strage Humidity	< 70%RH
Main Supply	AC100 /120 /220 /240 V± 10% (250 Vmax) (Switch selectable) 50/60 Hz
Accessories	Fuse·····1 Test lead ·····1 GTL-105(current< 4 A), GTL-104(current≦10 A) Note: Current>10 A without Test lead. Instruction Manual·····1

2.2 INDIVIDUAL SPECIFICATIONS

MODEL		718-3D	718-5D	730-3D	718-10D	760-3D	* 718-20D	735-10D	775-5D	7110-3D
OUTPUT VOLTAGE		0～18 V	0～18 V	0～30 V	0～18 V	0～60 V	0～18 V	0～35 V	0～75 V	0～110 V
OUTPUT CURRENT		0～3 A	0～5 A	0～3 A	0～10 A	0～3 A	0～20 A	0～10 A	0～5 A	0～3 A
C.V.	LINE REGULATION	≦0.01% + 3 mV								
	LOAD REGULATION	≦ (0.01%+3 mV)	≦ (0.01%+5 mV)	≦ (0.01%+3 mV)	≦ (0.02%+5 mV)	≦ (0.01%+5 mV)	≦ (0.02%+5 mV)		≦ (0.01%+5 mV)	
	RIPPLE AND NOISE	≦0.5 mVrms (5 Hz～1 MHz)	≦1 mVrms (5 Hz～1 MHz)	≦0.5 mVrms (5 Hz～1 MHz)	≦1m Vrms (5 Hz～1 MHz)					
	RECOVERY TIME	≦100 μs (50% Load change, Minimum load:0.5 A)								
	TEMP. COFFICIENT	≦300 ppm/°C								
C.C.	LINE REGULATION	≦0.2% + 3 mA								
	LOAD REGULATION	≦0.2% + 3 mA								
	RIPPLE AND NOISE	≦3 mArms					≦5 mArms			
INDIC-ATOR	INDICATOR	3 1/2 dgts LED, ±(0.5% rdg + 2 dgts) VOLTAGE AND CURRENT SWITCHABLE			Voltage: 3 1/2 dgts LED, ±(0.5% rdg + 2 dgts) Current: 3 1/2 dgts LED, ±(0.5% rdg + 2 dgts)					
	VOLTAGE RANGE FULL SCALE	19.99 V	199.9 V		19.99 V	199.9 V	19.99 V	199.9 V		
	CURRENT RANGE FULL SCALE	19.99 A					199.9 A	19.99 A		
INSULATION		Chassis - Output terminal: ≧20 MΩ (DC500 V) Chassis - AC coad: ≧30 MΩ (DC500 V)					Chassis - Output terminal: ≧100 MΩ (DC1 kV) Chassis - AC coad: ≧100 MΩ (DC1 kV)			
POWER CONSUMPTION		120 W/150 VA max.	190 W/230 VA max.	160 W/200 VA max.	390 W/480 VA max.	360 W/450 VA max.	720 W/850 VA max.	720 W/850 VA max.	720 W/850 VA max.	550 W/700 VA max.
FUSE RATING	AC100 V/120 V	T 2 A	T 2.5 A	T 2.5 A	T 8 A	T 6.3 A	T 10 A	T 10 A	T 10 A	T 8 A
	AC220 V/240 V	T 1 A	T 1.25 A	T 1.25 A	T 4 A	T 3.15 A	T 5 A	T 5 A	T 5 A	T 4 A
DIMENSION		128 (W) × 145 (H) × 285 (D) mm			255 (W) × 145 (H) × 335 (D) mm		255 (W) × 145 (H) × 420 (D) mm			
WEIGHT		4.0 kg	5.5 kg	5.0 kg	11.5 kg	11.5 kg	18.5 kg	18.5 kg	18.5 kg	13.5 kg
SPECIAL FUNCTION		Tracking (Series or Parallel) operation and Remote control			———		Remote - sensing	———		

3. PANEL CONTROLS AND INDICATORS

3.1 Front Panel

1	CV indicator	lights when the power turn on and constant voltage operation.
2	CC indicator	lights when this unit in constant current operation.
3	Voltage coarse	for the coarse adjustment of the output voltage.
4	Voltage fine	for the fine adjustment of the output voltage.
5	Current coarse	for the coarse adjustment of the output current.
6	Current fine	for the fine adjustment of the output current.
7	"+" output terminal	positive polarity (Red).
8	"GND" terminal	earth and chassis ground (Black).
9	"−" output terminal	negative polarity (White).
13	Power control	on/off switch.

<718-3D, 718-5D, 730-3D>

12	A/V selects switch	selects the meter indicates of the output voltage or current.
14	Current HI/LO control	current indicates HI/LO range SELECTS.

<718-10D, 718-20D, 735-10D, 760-3D, 775-5D, 7110-3D>

10	Voltage/Current Indicator	indicates the output voltage or current.
11	Current Indicator	indicates the output current.

718-3D 718-5D 730-3D

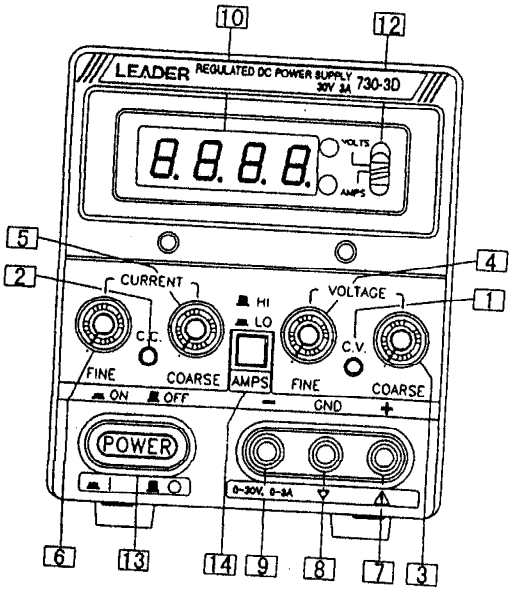

Fig. 3.1.1 FRONT PANEL

718-10D 718-20D 735-10D 760-3D 775-5D 7110-3D

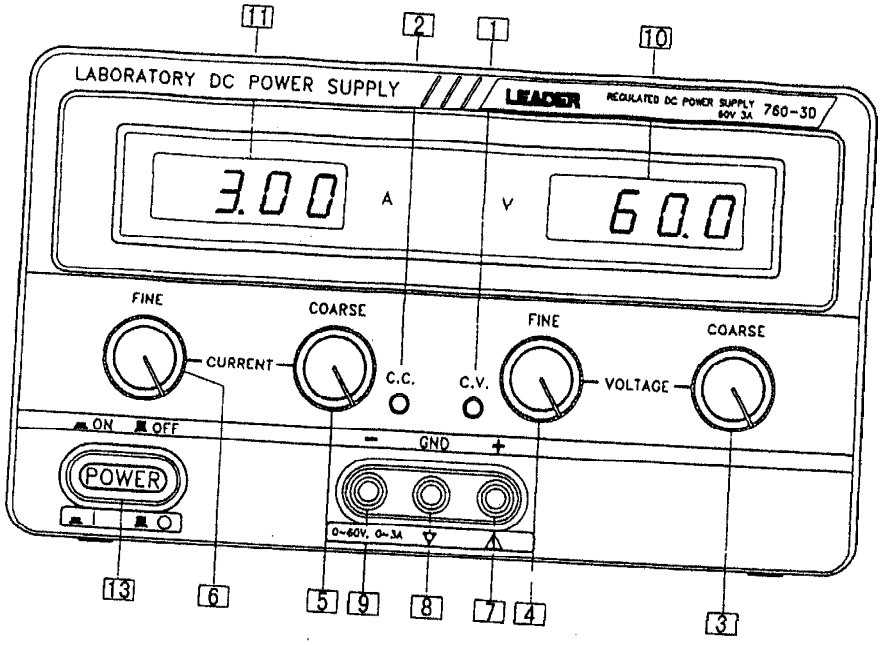

Fig. 3.1.2 FRONT PANEL

3.2 Rear Panel

15	Fuse holder	
16	Power socket	
17	AC selects switch	With 18 switch selects the line voltage at the high end (Right position) of the range 120 V or 240 V and at the low end (left position) of the range 100 V or 220 V.
18	AC selects switch	Selects the line Voltage is in the 100 V-120 V range (left position) or is in the 220 V-240 V range (Right position).

<718-3D, 718-5D, 730-3D>

19	Master-Slave Switch	Selects for Master (internal control) or Slave (external remote control) tracking operation.
20	Programming connector	With 19 Master-Slave switch selects, permit from the Master unit (SER. or PAR.) output connected to Slave unit (SER. or PAR.) inputs.

<718-20D, 735-10D, 775-5D, 7110-3D>

21	Cooling FAN	Ventilates the hot air out, to prevent output stage from thermo shock, and also improves the temperature coefficient.

<718-20D>

22	"GND" terminal	Earth and chassis ground.
23	"S+" terminal	Positive polarity sense terminal.
24	"+" terminal	Positive polarity output terminal.
25	"−" terminal	Negative polarity output terminal.
26	"S−" terminal	Negative polarity sense terminal.

NOTE : If the load current of 718-20D is great than "10 A", then the 22 - 26 terminal is used, and the output is connected from the rear panel

718-3D 718-5D 730-3D

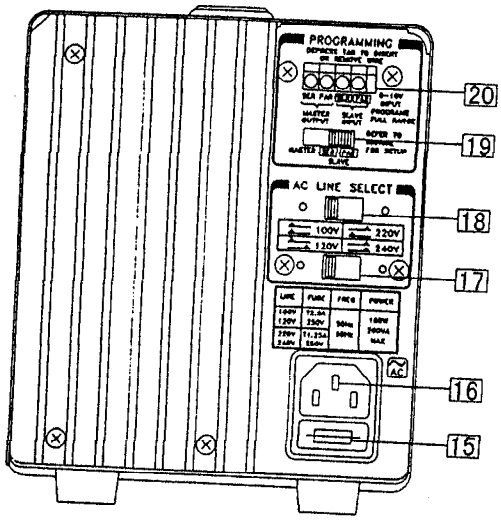

Fig. 3.2.1 REAR PANEL

718-10D 760-3D

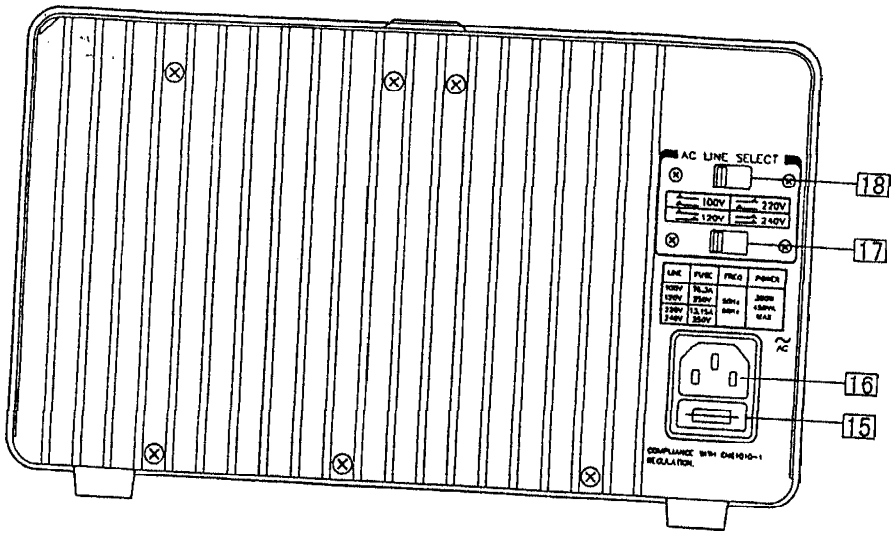

Fig. 3.2.2 REAR PANEL

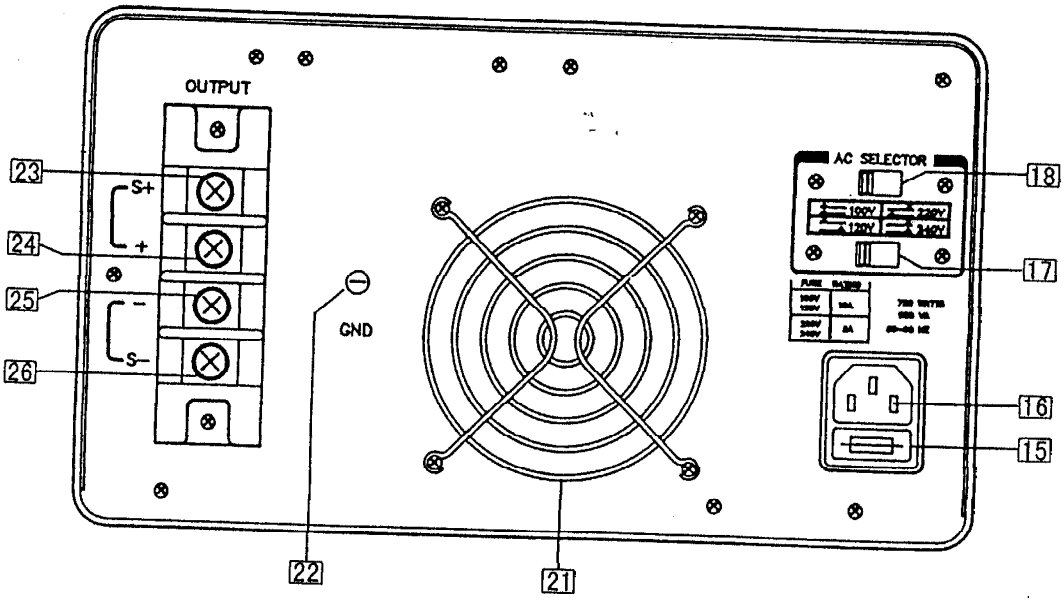

Fig. 3.2.3 REAR PANEL

4. OPERATION INSTRUCTIONS

4.1 Precaution

(1) AC input

AC input should be within the range of line voltage ± 10% 50/60 Hz.

⚠ **WARNING. To avoid electrical shock, the power cord protective grounding conductor must be connected to ground.**

(2) Installation

Avoid using the supply in a place where the ambient temperature exceeds 40 ℃. The heat sink located at the rear of the supply must have sufficient air space for radiation.

⚠ **CAUTION. To avoid damaging the power supply, don't use it in a place where ambient temperature exceeds 40 ℃.**

(3) Output voltage overshoot

Voltage between output terminals never exceeds the preset value when the power is turned on or off.

4.2 Setting Current Limit

(1) Determine the maximum safe current for the device to be powered.
(2) Temporarily short the "+" and "−" terminals of the power supply together with a test lead.
(3) Rotate the COARSE VOLTAGE control away from zero sufficiently for the CC indicator to light.
(4) Adjust the CURRENT control for the desired current limit. Read the current value on the Ammeter.
(5) The current limit (overload protection) has now been preset. Do not change the CURRENT control setting after this step.
(6) Remove the short between the "+" and "−" terminals and hook up for constant voltage operation.

4.3 Constant Voltage/Constant Current Characteristic

The working characteristic of this series Power Supplies is called a constant voltage/constant current automatic crossover type. This permits continuous transition from constant current to constant voltage modes in response to the load change. The

intersection of constant voltage and constant current modes is called the crossover point. Fig. 4.3 shows the relationship between this crossover point and the load.

For example, if the load is such that the power supply is operating in the constant voltage mode, a regulated output voltage is provided. The output voltage remains constant as the load increases, up until the point where the preset current limit is reached. At that point, the output current becomes constant and the output voltage drops is proportion to further increases in load. The crossover point is indicated by the front panel LED indicators. The crossover point is reached when the CV indicator goes off and the CC indicator comes on.

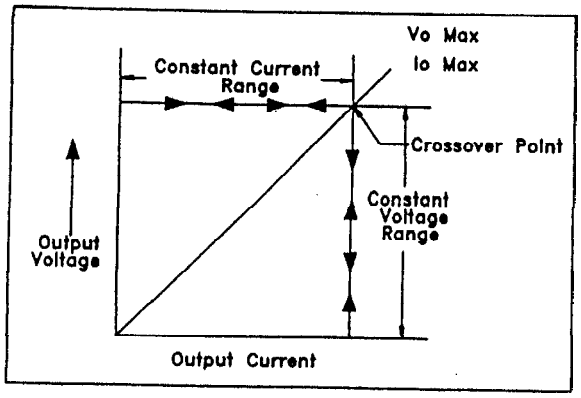

Fig. 4.3

Similarly, crossover from the constant current to the constant voltage mode automatically occurs from a decrease in load. A good example of this would be seen when charging a 12-volt battery. Initially, the open circuit voltage of the power supply may be preset for 13.8 volts. A low battery will place a heavy load on the supply and it will operate in the constant current mode, which may be adjusted for a 1 amp charging rate. As the battery becomes charged, and its voltage approaches 13.8 volts, its load decreases to the point where it no longer demands the full 1 amp charging rate. This is the crossover point where the power supply goes into the constant voltage mode.

4.4 Single Operation

Use the supply as it is for single operation.

(1) Set Power switch to "OFF" position.
(2) Make sure that line voltage is correct for the input power voltage.
(3) Plug power cord into the power outlet.
(4) Set Power switch to "ON" position
(5) Adjust "Voltage" and "Current" control to the desired output voltage and current.
(6) Connect the external load to the output binding posts. Make sure both "+" and "−" terminals are connect correctly.

4.5 Series Operation

Two power supplies may be connected in series to provide higher voltage and rating current output. See Fig. 4.5 for the connection scheme.

When connected in series, the VOLTAGE controls of each power supply exercise control over a 0 to rating range.

Add the two voltmeter readings together to determine the total output voltage, or an external voltmeter may be connected across the load.

Load current may be monitored from either supply; the readings will be identical since they are connected in series. Also, since the supplies are connected in series, it is only necessary to set the current limit on one of the supplies ; the other may be set for maximum.

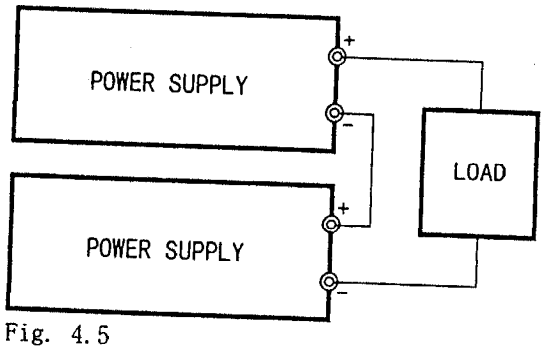

Fig. 4.5

⚠ WARNING.

Voltages more than 60 V DC are a lethal shock hazard to the user.

Be careful when connecting power supplies in series to achieve voltages higher than 60 V DC total or 60 V DC, between any connection and earth ground.

4.6 Master-Slave system (718-3D, 718-5D, 730-3D)

4.6.1 Series Operation

Two power supplies can be connected in series to provide higher voltage and rating current output. See Fig. 4.6.1 for the connection scheme.

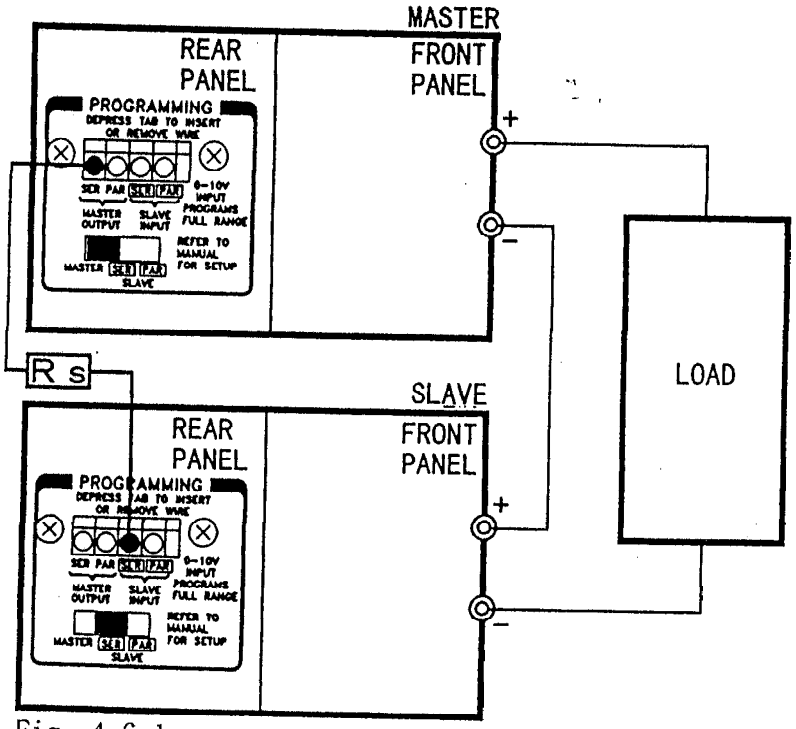

Fig. 4.6.1

(1) Set power switch to "OFF" position.

(2) Set the "MASTER" power supply MASTER-SLAVE switch to "MASTER" position and set the "SLAVE" power supply MASTER-SLAVE switch to "SER-SLAVE" position.

(3) From the "MASTER" power supply "PROGRAMMING·SER MASTER OUTPUT" terminal series a Rs resistance and connected to "SLAVE" power supply "PROGRAMMING·SER SLAVE INPUT".
The Rs value calculate as follows formula:
Rs = (Em - Rin × 1 mA)/ 1 mA
Rs: Series resistance
Em: Master power supply rating
Rin: Input resistance is 10 kΩ of power supply (a control current source approx. 1 mA)
For example: If the master power supply rating voltage is 30 volts than the series resistance as follows:
Rs = (30 V − 10 kΩ ×1 mA)/1 mA = 20 kΩ

(4) Set power switch to "ON" position

⚠ **WARNING. Voltages more than 60 V DC are a lethal shock hazard to the user. Be careful when connecting power supplies in series to achieve voltages higher than 60 V DC total or 60 V DC, between any connection and earth ground.**

(5) Set the SLAVE VOLTAGE and CURRENT control to maximum output.

(6) When connected in series, from the master VOLTAGE controls of each power supply exercise control over 0 to rating range. Add the two voltmeter readings together to determine the total output voltage, or an external voltmeter may be connect across the load.

(7) Load current may be monitored from either supply; the reading will be identical since they are connected in series. Also, since the supplies are connected in series, it is only necessary to set the current limit of the master power supply; the slave would set for maximum.

4.6.2 Parallel Operation

Two power supplies may be connected in parallel to provide rating voltage and higher current output. See Fig. 4.6.2 for the connection scheme.

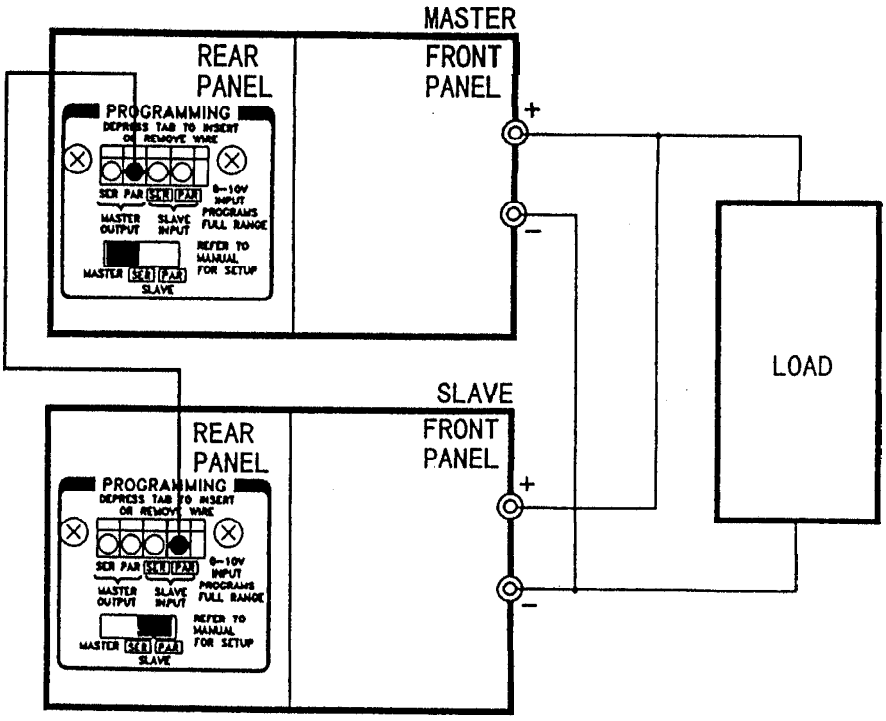

Fig. 4.6.2

(1) Set power switch to "OFF" position
(2) Set the "Master" power supply MASTER-SLAVE switch to "MASTER" position and set the "SLAVE" power supply MASTER-SLAVE switch to "PAR-SLAVE" position.
(3) From the "MASTER" power supply "PROGRAMMING · PAR MASTER OUTPUT" terminal connected to "SLAVE" power supply "PROGRAMMING · PAR SLAVE INPUT".
(4) When connected in parallel the VOLTAGE controls of each power supply exercise control over a 0 to rating range. Add the two ammeter readings together to determine the total output current or an external ammeter may be connected series the load.
(5) The output voltage may be monitored from either supply; the readings will be identical since they are connected in parallel. Also, since the supplies are connected in parallel, it is only necessary to set the current limit of the master power supply the slave would set for maximum.
(6) Set power switch to "ON" position.
(7) Set the SLAVE VOLTAGE and CURRENT control to maximum output.
(8) Set the MASTER output voltage lower than 0.2-0.5 V of SLAVE output voltage, this point is very important.

4.7 Remote control (718-3D, 718-5D, 730-3D)

4.7.1 Remote control of output voltage

The output voltage of the power supply can be remote-controlled with an external voltage, the connection scheme as follow. See Fig. 4.7.1

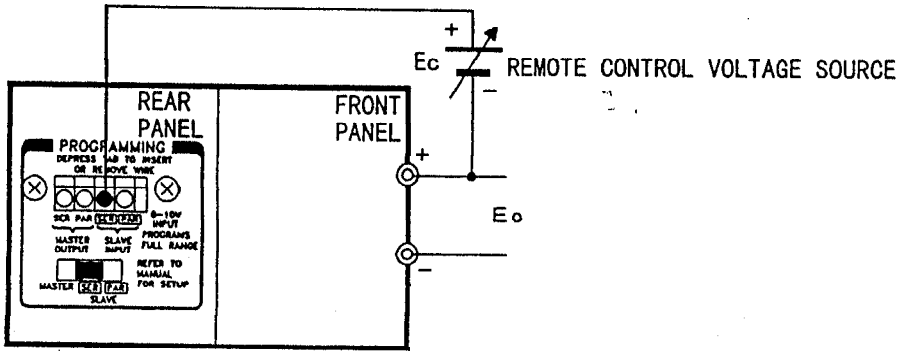

Fig. 4.7.1

(1) Set the power supply MASTER-SLAVE switch to "SER-SLAVE" position.

(2) The "+" line of control voltage source is connected to the "PROGRAMMING·SER SLAVE INPUT" terminal and the "−" line of control voltage source is connected to the power supply output "+" terminal.

(3) The output voltage Eo calculate as follows formula:

Eo = (Er × Ec)/10

Eo: Output voltage of the power supply.

Er: Rated voltage of the power supply.

Ec: Remote control voltage.

$0 \leq Ec \leq$ approx. 10 V

(4) For the remote voltage source Ec, use a device which provides a stable, low noise voltage source.

4.7.2 Remote control of output current

The output current of the power supply can be remote-controlled with an external voltage, the connection scheme as follow. See Fig. 4.7.2

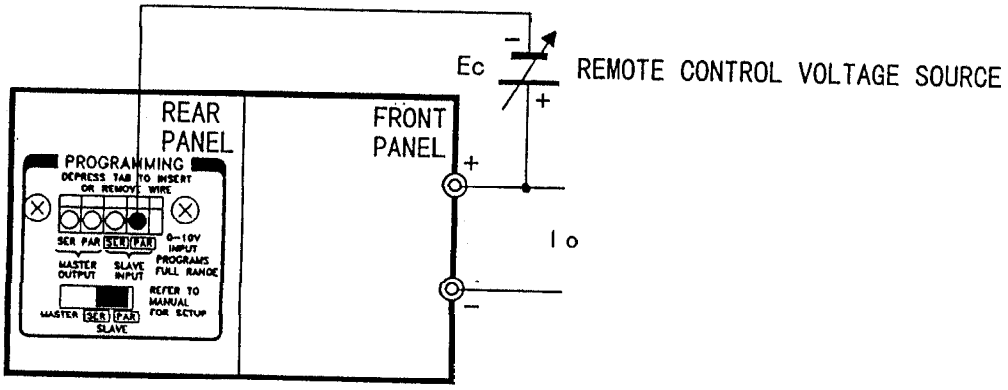

Fig. 4.7.2

(1) Set the power supply MASTER-SLAVE switch to "PAR-SLAVE" position.

(2) The "−" line of control voltage source is connected to the "PROGRAMMING·PAR SLAVE INPUT" terminal and the "+" line of control voltage source is connected to the power supply output "+" terminal.

(3) The output current Io calculate as follows formula:

Io = (Ir × Ec)/10

Io: Output current of the power supply.

Ir: Rated current of the power supply.

Ec: Remote control voltage.

$0 \leqq Ec \leqq$ approx. 10 V

(4) For the remote control voltage source Ec, use a device which provides a stable, low noise voltage source.

5. MAINTENANCE

⚠ **WARNING The following instructions are for use by qualified personnel only. To avoid electrical shock, do not perform any servicing other than contained in the operating instructions unless you are qualified to do so.**

5.1 Fuse Replacement

If the fuse blows, the CV or CC indicators will not light and the power supply will not operate. The fuse should not normally open unless a problem has developed in the unit. Try to determine and correct the cause of the blown fuse, then replace only with a fuse of the correct rating and type.

The fuse is located on the rear panel (see Fig. 3.2.1, 3.2.2, 3.2.3).

⚠ **WARNING. For continued fire protection. Replace fuse only with 250 V fuse of the specified type and rating, and disconnect the power cord before replacing fuse.**

5.2 Line Voltage Conversion

The primary winding of the power transformer is tapped to permit operation from 100, 120, 220, or 240 VAC, 50/60 Hz line voltage. Conversion from one line voltage to another is done by change AC selects switch as shown in Fig.3.2.1, 3.2.2, 3.2.3.

The rear panel identifies the line voltage to which the unit was factory setted. To convert to a different line voltage, perform the following procedure:

(1) Make sure the power cord is unplugged.
(2) Change the AC selects switch to the desired line voltage position.
(3) A change in line voltage may also require a corresponding change of fuse value. Install the oorrect fuse value as listed on rear panel.