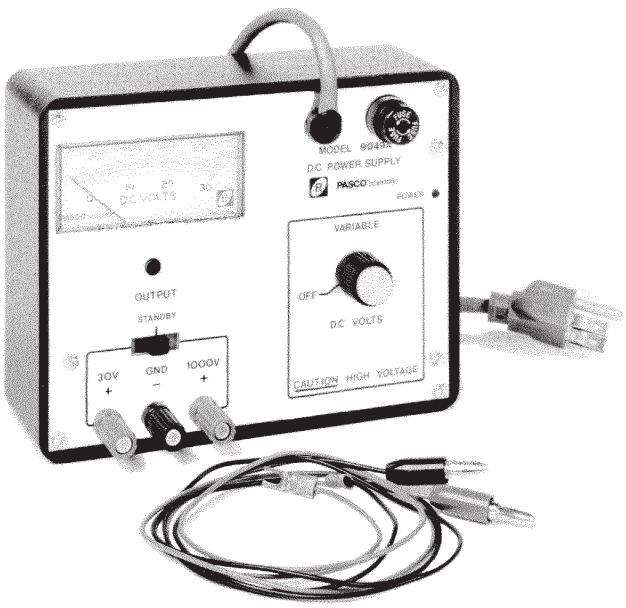
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Instruction Sheet for the PASCO Model ES-9049A

POWER SUPPLY

Introduction



The PASCO Model ES-9049A Power Supply is a two range supply providing all the necessary potentials for PASCO electrostatics equipment.

Operating Instructions

Turn the unit ON by turning the VARIABLE control knob clockwise.

Select the 30 VDC or 1000 VDC range using the OUTPUT switch. The center position of the switch (STANDBY) will produce a zero output at the terminals, regardless of the voltage control settings.

When using the 30 VDC range use the red and black binding posts. The black binding post is connected to the third prong (ground) on the power cord.

When using the 1000 VDC range use the black and green binding posts. When the green binding post is used there is a 100 MΩ resistor in series with the output. This eliminates the hazard of shock if the green terminal is accidentally touched. However, if one attempts to measure the output of this terminal with a meter having less than several hundred MΩ of input impedance the meter on the ES-9049A and the measuring meter will not read the same. This is due to the voltage drop across the 100 MΩ resistor produced by the current needed to drive the meter.

Voltage output is varied by the voltage control knob.

Specifications:

① **Ranges:**

a) 1000 VDC, less than 2% ripple peak-to-peak, unregulated (maximum short circuit current less than 0.01 mA)

b) 30 VDC at 20 mA, 0.3% ripple peak-to-peak, line and load regulation to within 1%.

② **Meter:** Two scale, +/- 3% of full-scale accuracy.

③ **Power:**

a) 110-130 VDC, 60 Hz

b) 220/240 VDC, 50 Hz

④ **Fuse:**

a) 0.2 A, Slo-Blo. (110-130 VDC)

b) 0.1 A, Slo-Blo. (220/240 VDC)

⑤ **Dimensions:** 17.5 x 13.5 x 6 cm

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better ways to teach science

CAUTION

RISK OF ELECTRIC SHOCK DO NOT OPEN

CAUTION:
TO PREVENT THE RISK OF ELECTRIC SHOCK, DO NOT REMOVE COVER ON UNIT. NO USER SERVICEABLE PARTS INSIDE. REFER SERVICING TO QUALIFIED SERVICE PERSONNEL.



The lightning flash with arrowhead, within an equilateral triangle, is intended to alert the user of the presence of uninsulated "dangerous voltage" within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.



The exclamation point within an equilateral triangle is intended to alert the user of the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.

Maintenance

There is no routine maintenance required for the ES-9049A Power Supply. However, power line surges can blow the protective fuse without damaging the instrument. Therefore, should the instrument fail to operate and the fuse is blown, replace it with a new fuse of the appropriate value. If the instrument subsequently works properly, no further action is necessary. If the fuse blows again (it may take 15 seconds), refer to the 'Repairs' section in this manual.

Repairs

Should the ES-9049A Power Supply require repair, it is strongly recommended that the unit be returned to PASCO scientific. Because PASCO is thoroughly familiar with the instrument and maintains a complete stock of replacement parts, repairs can be made quickly and at low cost.

If field repair is desired, a schematic and parts list are included in the following section. A brief list of malfunctions and their probable causes are also given.

Troubleshooting Tips

① No output on any range:

Fuse blown

② Low output on 1000 VDC range:

Defective capacitor C2, C3, C4, or C5.

③ No output on 30 VDC range but other range is all right:

Defective zener diode CR5 or power transistor Q1.

④ Proper output, but no meter readings:

Defective meter M1.

Limited Warranty

PASCO scientific warrants this product to be free from defects in materials and workmanship for a period of one year from the date of shipment to the customer. PASCO will repair or replace, at its option, any part of the product which is deemed to be defective in material or workmanship. This warranty does not cover damage to the product caused by abuse or improper use. Determination of whether a product failure is the result of a manufacturing defect or improper use by the customer shall be made solely by PASCO scientific. Responsibility for the return of equipment for warranty repair belongs to the customer. Equipment must be properly packed to prevent damage and shipped postage or freight prepaid. (Damage caused by improper packing of the equipment for return shipment will not be covered by the warranty.) Shipping costs for returning the equipment, after repair, will be paid by PASCO scientific.

Equipment Return

Should this product have to be returned to PASCO scientific, for whatever reason, notify PASCO scientific by letter or phone BEFORE returning the product. Upon notification, the return authorization and shipping instructions will be promptly issued.

➤NOTE: NO EQUIPMENT WILL BE ACCEPTED FOR RETURN WITHOUT AN AUTHORIZATION.

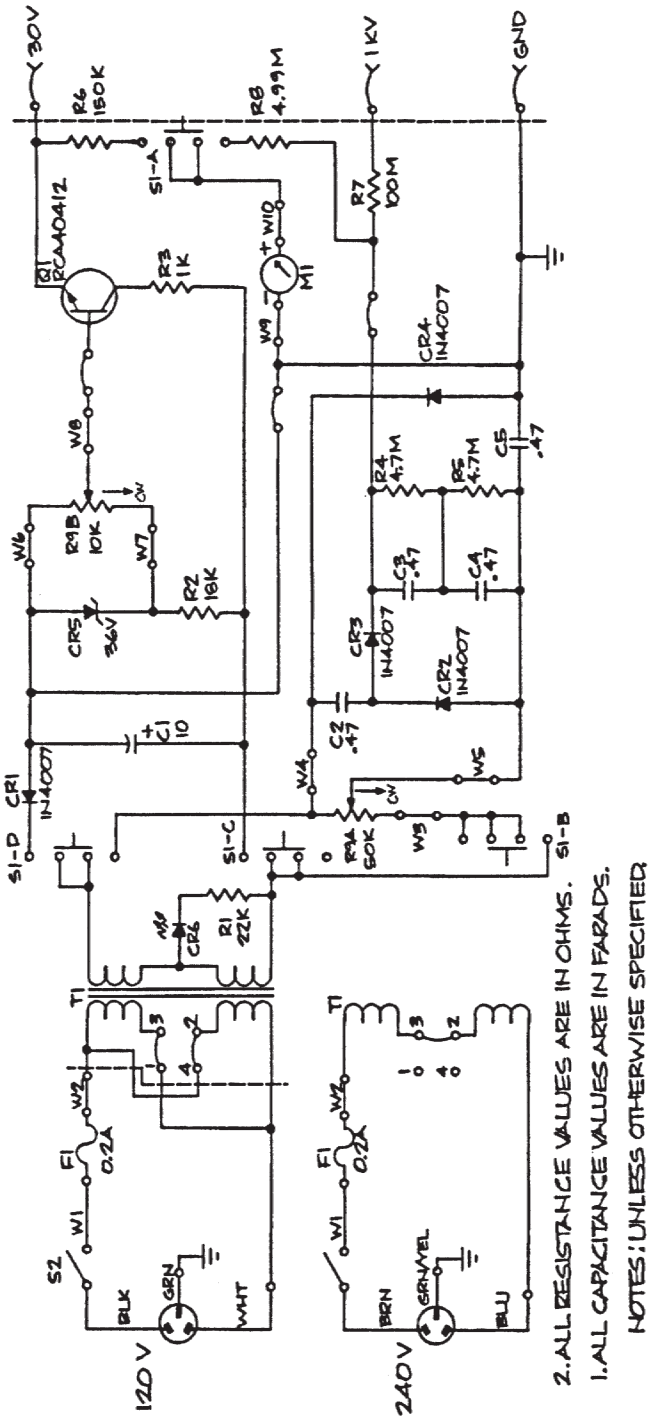
When returning equipment for repair, the units must be packed properly. Carriers will not accept responsibility for damage caused by improper packing.

PARTS LIST

Specification	Pasco part no.	Reference
Resistors:		
22K, 1/4W, 5%	113-223	R1
18K, 2W, 5%	110-183	R2
1K, 2W, 5%	110-102	R3
4.7M, 1/4W, 5%	113-475	R4, R5
150K, 1/2W, 1%	122-064	R6
100M, 1/2W, 5%	150-006	R7
4.99M, 1/2W, 1%	150-015	R8
POT, Two Section	140-032	R9A/B*, S2*
Capacitors:		
10mF, 450V, Electrolytic	222-003	C1
.47mF, 400V, Mylar	214-007	C2-C5
Transformer:		
Power, 115/230-2X115V	322-009	T1
Diodes/Semiconductors:		
1N4007, 1000PIV, 1A Silicon Rect	410-002	CR1-CR4
1N4753A, 36V, 1W, 5% Zener	412-004	CR5
LED Red	527-001	CR6
Power Transistor RCA40412 NPN	420-005	Q1
Switch:		
Slide, 4Pole, 3Position	512-016	S1
Fuse/Meter:		
.2A SLO-BLO (110-130VDC)	530-001	F1
.1A SLO-BLO (220/240VDC)	530-006	F1
Meter	525-00804	M1
Mechanical:		
Bakelite Case, Black	650-01462	
Front Panel	648-00803	
Control Knob	620-002	
Binding Post, Red	517-013	
Binding Post, Black	517-014	
Binding Post, Green	517-015	
Fuse Holder	520-003	
Power Cord, Domestic	516-001	
Power Cord, European	516-003	
Dissipater	624-001	

➤NOTE: R9A/B and S2 are concentrically mounted on the Variable Control shaft and comprise a single unit.

SCHEMATIC


30V
1KV
GND
R6 150K
R8 4.99M
R7 100M
S1-A
Q1 2SA0412
R3 1K
M1
W10
W9
W8
W6
W7
R9B 10K
CW
R2 16K
CR5 36V
CR4 IN4007
R4 4.7M
R5 4.7M
C5 .47
C3 .47
C4 .47
CR3 IN4007
CR2 IN4007
C2 .47
C1 10
CR1 IN4007
W4
W5
W3
R9A 50K
S1-D
S1-C
S1-B
CR6
R1 22K
T1
F1 0.2A
W1
W2
S2
BLK
GRN
WHT
120 V
BRN
GRN/YEL
BLU
240 V
2. ALL RESISTANCE VALUES ARE IN OHMS.
1. ALL CAPACITANCE VALUES ARE IN FARADS.
NOTES: UNLESS OTHERWISE SPECIFIED