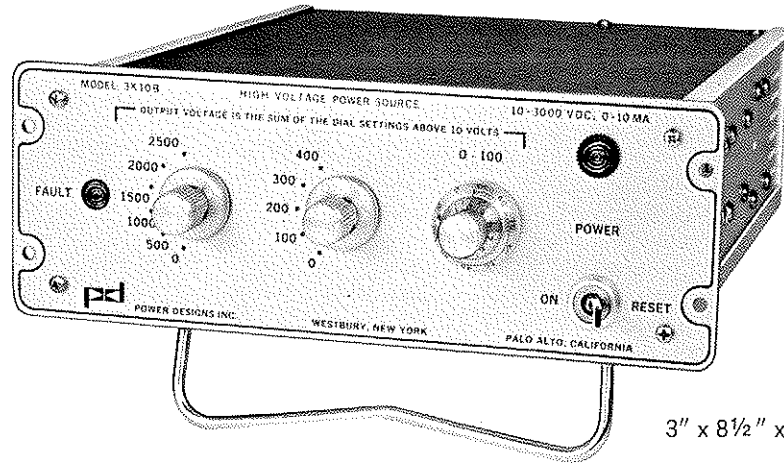


MODEL 3K10B

# PHOTOMULTIPLIER HIGH VOLTAGE CALIBRATED POWER SOURCE

**10-3000 VDC  
0-10 MA**



3" x 8½" x 11½"

## GENERAL DESCRIPTION

The Model 3K10B is a calibrated laboratory power source ideally suited for photomultiplier and similar applications requiring high stability, low noise and superior regulation.

This all solid-state supply achieves high efficiency and unusually compact construction through the use of high frequency technology.

The Model 3K10B incorporates proprietary overvoltage and arc protection circuitry which prevents damage to the supply and its load in the event of failure or voltage transients generated by sustained arcing at the load. The power supply is automatically shut off and a fault indicator illuminated. Normal function is restored by turning the AC switch off, then on again.

The Model 3K10B may be remote resistance or voltage programmed over its entire range. It may also be programmed over a limited range around a preset voltage by an analog signal to provide automatic amplitude or drift compensation control for a photomultiplier tube system. (See options.)

The power supply may be operated in either positive or negative output polarity by means of a reversing switch on the rear of the unit.

Two paralleled Safety High Voltage (SHV) BNC connectors provide dual output or meter monitoring at the rear panel. These connectors are National Bureau of Standards approved per DWG ND-545A.

High voltage transformers and critical circuit elements are environmentally isolated in vacuum encapsulated epoxy modules.

## ELECTRICAL CHARACTERISTICS

**INPUT:** 103-129 VAC, 47-440 Hz, 65 watts

**OUTPUT:** Adjustable from 10-3000 volts DC at 0-10 milliamperes

**CALIBRATION ACCURACY:** 0.25% of the dial settings from 500-3000 volts; 0.5% from 200-500 volts; 2% below 200 volts

**RESOLUTION:** 50 millivolts (10-turn vernier potentiometer with 100 volt range)

**RESETABILITY:** 0.1% or 50 millivolts, whichever is greater

**NOISE AND RIPPLE:** 3 millivolts peak-to-peak to 15 MHz

**REGULATION:** .001% or 3 millivolts, whichever is greater, for line or load variations

**STABILITY:** Drift is less than 100 PPM or 10 millivolts per hour, whichever is greater; less than 300 PPM or 30 millivolts per day (measured under constant load, line voltage and ambient temperature conditions at output levels over 200 volts)

**TEMPERATURE COEFFICIENT:** Less than 50 PPM per °C change in output voltage at levels over 200 volts

**OPERATING ENVIRONMENT:** 0-60°C at relative humidities up to 90% and altitudes to 10,000 feet

**VOLTAGE CONTROLS:** 0-2500 volts in five 500 volt steps; 0-400 volts in four 100 volt steps, 0-100 volts, continuously adjustable 10-turn potentiometer with calibrated dial and lock. Minimum useful output is 10 volts.

**POWER DESIGNS**

MODEL 3K10B

**OUTPUT POLARITY:** Reversing switch on rear of unit permits operation with either the positive or negative output terminal at ground potential.

**OVERCURRENT PROTECTION:** Output current is limited to approximately 15 milliamperes. The power supply can be operated in an overload or short circuited condition indefinitely and will restore automatically to normal operation upon fault removal.

**OVERVOLTAGE PROTECTION:** An electronic sensor monitors output voltage and shuts down the supply if internal or external malfunction results in output voltages or transients 500 volts (approximately) over a preset output level. Operation is indicated by a lamp on the front panel. Normal function is restored if the AC toggle switch is turned off, then on again.

**ARC PROTECTION:** Proprietary electronic system protects power supply components against damage in the presence of sustained arcing at the load. L di/dt voltage transients are controlled by the action of the overvoltage protection circuits.

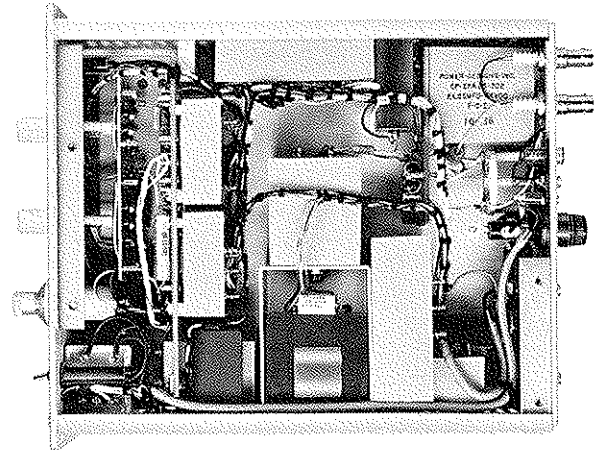
**OUTPUT CONNECTORS:** Two "safety" BNC receptacles (SHV type per National Bureau of Standards ND-545A) at rear of supply. One SHV mating connector (approved type) is furnished.

**MECHANICAL CHARACTERISTICS**

Size: 3" x 8½" x 11½"

Weight: 8.5 lbs.

Finish: Natural aluminum panel and chassis; blue vinyl dust cover.



**OPTIONS**

(-A) Remote resistance programming ..... \$50

(-B) Remote voltage programming ..... \$50

(-C) Incremental analog programming  
(±250V around a preset level) ..... \$50

Note: These options available for negative output polarity only. The polarity switch is removed.

(-D) 220V, 50 Hz operation. External transformer .. \$25

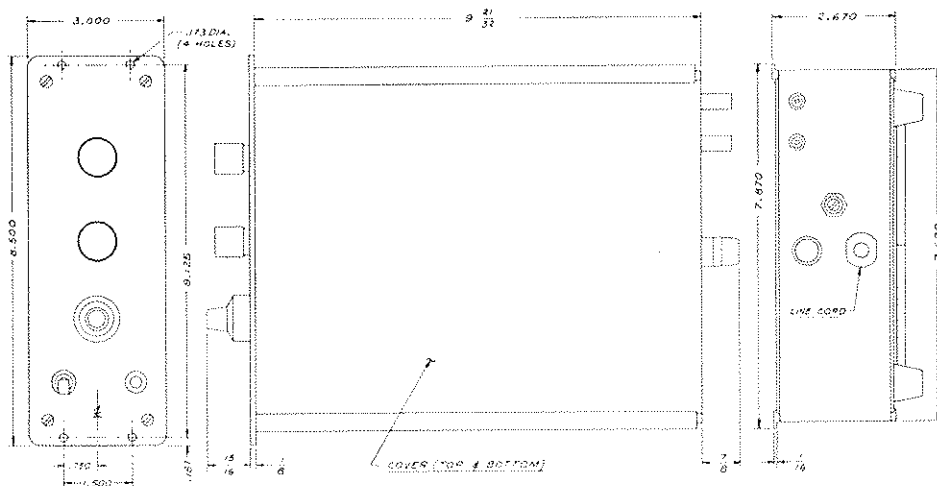
**MOUNTING:** Two Model 3K10 units may be mounted in a 3½" high rack adapter designed for standard 19" EIA mounting

Available adapters include:

RRG-4—Mounts one 3K10 centered ..... \$17.50

RRG-5—Mounts two 3K10 units ..... \$17.50

**PRICE:** \$390 F.O.B. Westbury, New York



**POWER DESIGNS**

## 3K10B

### SECTION 1 GENERAL DESCRIPTION

#### 1-1. DESCRIPTION

The Model 3K10B is a calibrated laboratory power source ideally suited for photomultiplier and similar applications requiring high stability, low noise and superior regulation.

This all solid-state, highly efficient and compact power supply incorporates proprietary overvoltage and arc protection circuitry which prevents damage to the supply and its load in the event of failure or voltage transients generated by sustained arcing at the load. It is automatically shut off and a fault indicator illuminated. Normal function is restored by turning the AC switch off, then on again.

The Model 3K10B may be remote resistance or voltage programmed over its entire range. It may also be programmed over a limited range around a preset voltage by an analog signal to provide automatic amplitude or drift compensation control for a photomultiplier tube system.

The power supply may be operated in either positive or negative output polarity by means of a reversing switch on the rear of the unit.

#### 1-2. ELECTRICAL CHARACTERISTICS

INPUT: 103-129 VAC, 47-440 Hz, 65 watts.

OUTPUT: Adjustable from 10-3000 volts DC at 0-10 milliamperes.

CALIBRATION ACCURACY: 0.25% of the dial settings from 500-3000 volts; 0.5% from 200-500 volts; 2% below 200 volts.

RESOLUTION: 50 millivolts (10-turn vernier potentiometer with 100 volt range).

RESETABILITY: 0.1% or 50 millivolts, whichever is greater.

NOISE AND RIPPLE: 3 millivolts peak-to-peak to 15 MHz.

REGULATION: 0.001% or 3 millivolts, whichever is greater, for line or load variations.

STABILITY: Drift is less than 100 ppm or 10 millivolts per hour, whichever is greater, less than 300 ppm or 30 millivolts per day (measured under constant load, line voltage and ambient temperature conditions at output levels over 200 volts).

TEMPERATURE COEFFICIENT: Less than 50 ppm per °C change in output voltage at levels over 200 volts.

OPERATING ENVIRONMENT: 0-60°C at relative humidities up to 90% and altitudes to 10,000 feet.

**VOLTAGE CONTROLS:** 0-2500 volts in five 500 volt steps; 0-400 volts in four 100 volt steps, 0-100 volts, continuously adjustable 10-turn potentiometer with calibrated dial and lock. Minimum useful output is 10 volts.

**OUTPUT POLARITY:** Reversing switch on back of unit permits operation with either the positive or negative output terminal at ground potential.

**OVERCURRENT PROTECTION:** Output current is limited to approximately 15 milliamperes. The power supply can be operated in an overload or short circuited condition indefinitely and will restore automatically to normal operation when the fault is removed.

**OVERVOLTAGE PROTECTION:** An electronic sensor monitors output voltage and shuts down the supply if internal or external malfunction results in output voltages or transients 500 volts (approximately) over a preset output level. Operation is indicated by a lamp on the front panel. Normal function is restored if the AC toggle switch is turned off, then on again.

**ARC PROTECTION:** Proprietary electronic system protects power supply components from damage in the presence of sustained arcing at the load.  $L di/dt$  voltage transients are controlled by the action of the overvoltage protection circuits.

**OUTPUT CONNECTORS:** Two "safety" BNC receptacles (SHV type per National Bureau of Standards ND-545A) at rear of supply. One SHV mating connector (approved type) is furnished.

### 1-3. MECHANICAL CHARACTERISTICS

**DIMENSIONS:** 3" x 8-1/2" x 11-1/2"

**WEIGHT:** 8.5 lbs.

**FINISH:** Natural aluminum panel and chassis; blue vinyl dust covers.

## 3K10B

### SECTION 2 INSTALLATION AND OPERATION

#### 2-1. INSTALLATION

The Model 3K10B may be operated on a bench, or two units mounted in a 3-1/2" high rack adapter for standard 19" EIA mounting.

#### 2-2. OPERATION

Set the POWER switch in the RESET position and connect the supply to a source of AC power of the correct voltage and frequency rating.

Set the reversing switch on the rear of the unit for the desired polarity and the front panel switches for the desired output voltage. The output voltage is the sum of the switch and vernier settings.

The POWER switch may now be set to the ON position. The pilot light will come on and high voltage will appear at the output of the supply.

**CAUTION:** Because of the high voltages which this power supply can produce, ALWAYS OPERATE THE POWER SUPPLY WITH A THREE-WIRE LINE CORD, OR WITH A SOLID GROUND CONNECTION TO THE CASE.

To reverse the output polarity, turn the POWER switch to RESET, wait 30 seconds for the output voltage to decay, turn the reversing switch to the desired polarity, and turn the POWER switch to ON. The polarity reversal switch should not be operated with high voltage on.

Indefinite operation into a short circuit is possible because of the fast-acting electronic overload and short circuit protection system. Operation of the power supply is restored automatically as soon as the fault is corrected. This protection system operates at output load currents of 13 milliamperes nominal.

When operation below 10 volts is attempted, the output voltage drops abruptly. Regulation in this region is uncertain.

The nature of the power supply is such that high frequency switching transients appear across the output terminals. These transients are fast-rise pulses in the order of a microsecond in duration and are 1 to 5 millivolts peak-to-peak amplitude in a 50 MHz system.

## 3K10B

### SECTION 3 THEORY OF OPERATION

#### 3-1. GENERAL

The Model 3K10B contains two separate regulating loops; one a fast regulator of the conventional series pass transistor type; the other a pre-regulator operating to hold the voltage across the series pass transistor constant and in its operating range.

The sub-assemblies making up the Model 3K10B are encapsulated in a series of epoxy modules to minimize corona noise and provide high voltage isolation as well as environmental protection. Since the power supply is made up of physically separate modules, the operation of the unit is described in terms of the function of each module.

#### 3-2. AUXILIARY POWER SUPPLY

This section, mounted on an insulated terminal board, is powered by transformer T3 (3003B) and produces bias voltages for the control circuitry. The outputs from this section are:

- +40 volts (unregulated)
- +20 volts
- +15 volts
- 20 volts
- 10 volts
- 5 volts
- Constant Current Source for the reference zener diode

#### 3-3. FEEDBACK DIVIDER

This is a voltage divider which senses the regulated output voltage, compares it with a reference voltage and feeds an error signal back to the regulator.

The high voltage end of this divider is in the FB-03 block. The resistors in this block are temperature compensated.

The low voltage end of the divider is made up of resistors R41 through R48 and vernier potentiometer R49. These low temperature coefficient precision wirewound resistors are switched in and out of the circuit by the front panel voltage selector switches. Trimmer potentiometer R50 provides a small voltage adjustment for use in calibrating the power supply.

#### 3-4. DC AMPLIFIER

This is a 3-stage DC amplifier housed in module PE-320. The input to the amplifier is derived from the feedback divider. The output feeds the series pass transistor in such a manner as to maintain the regulated output voltage and degenerate output noise and ripple.

Series pass transistor Q6 is mounted externally on the PE-320 module. This series element acts as a variable resistance in series with the output of the power supply. As line

or load conditions vary, the resistance of this series element is changed electronically to hold the regulated output voltage constant.

The PE-320 module also contains a current limiter, which limits the output current from the supply to 13 milliamperes (nominal) under any overload condition, including a short circuit. The current limiter is self-restoring and the power supply automatically resumes normal operation when the overload is removed.

### 3-5. PREREGULATOR AND DRIVER

The preregulator circuit is housed in the PR-02 module and develops the drive signal for the inverter transistors Q3 and Q4. The PR-02 module senses the voltage drop collector-to-emitter on the series pass transistor (Q6) and by controlling the duty cycle of its 4.5 KHz drive signal, which feeds Q3 and Q4 through transformer T1 (2001-H), holds the voltage on Q6 to approximately 22 volts.

### 3-6. RECTIFIER AND FILTER

The IV-120 module rectifies the incoming AC line to provide appropriate DC voltages for the operation of the inverter power transistors. These power transistors operate on DC potentials derived from the AC power line and provide the input to high voltage transformer T2 (A3K02). No isolation transformer is used to obtain maximum efficiency and minimum weight and size.

### 3-7. AC LINE FILTER

This is contained in the 3021-C module and is intended to keep transients generated in the inverter section from feeding back into the AC line. This filter reduces the noise level to less than 1 millivolt rms.

### 3-8. OUTPUT CAPACITOR

The output capacitor consists of capacitor C10 (one section) and inductor L4. It provides energy storage on the output of the supply and acts as a filter to reduce the output noise and ripple.

### 3-9. OVERVOLTAGE FAULT PROTECTION

This circuit is housed in the OVF-01 module. It senses the voltage at the summing junction and clamps the input to the preregulator module upon an error signal corresponding to an overvoltage condition of 750volts (nominal). The output voltage will drop to zero and can be reset only by interrupting the AC input. A switch marked "POWER", "ON", "RESET" is provided on the front panel.

## SECTION 4 MAINTENANCE

### 4-1. GENERAL

All maintenance and adjustments should be made with the power supply set for negative output. Most of the low-level regulation circuits are tied electrically to the positive output bus. Setting the supply for negative output brings most of these circuits close to ground potential.

### 4-2. CALIBRATION

To check or reset the calibration of the unit, the power supply should be set for negative output and the voltage selector switches for 2000 volts output, with the vernier control at its minimum setting.

The output of the supply should be connected, through an appropriate voltage divider to the input of a differential or digital voltmeter of 0.1% accuracy or better. Allow the supply to warm up for 10 minutes or more, then adjust potentiometer R50, if necessary, for an output voltage the same as the selector switch settings to within 0.25% as measured on the external meter.

The same measuring setup may be used to check the calibration of the unit at other output voltages and the tracking of the vernier control.

### 4-3. LOAD REGULATION

To adjust load regulation, set the power supply for negative polarity and 500 volts output. Monitor the output voltage by means of a differential voltmeter. Adjust trimmer potentiometer R20, if necessary, until the change in output voltage when a 10 milliamperere load is applied or removed is less than 0.001% or 3 millivolts (load regulation can generally be set closer than this). Load regulation should also be checked at 3 KV output, but will be well within specification at this voltage level if it has been correctly set at 500 volts.

**CAUTION:** THE IV-120 BLOCK, THE TRANSISTORS ON THE HEAT SINK, THE PRIMARY OF T2 AND THE SECONDARY OF T1 ARE OPERATED DIRECTLY FROM THE LINE WITHOUT AN ISOLATION TRANSFORMER. FOR SAFETY AND TO PREVENT DAMAGE TO THE POWER SUPPLY, OPERATE THE SUPPLY FROM A 1:1 ISOLATION TRANSFORMER WHEN SERVICING OR TROUBLESHOOTING THIS SECTION OF THE CIRCUIT.

DANGEROUS POTENTIALS MAY EXIST INSIDE THIS POWER SUPPLY. CAPACITORS MAY HOLD THEIR CHARGE FOR SOME TIME AFTER THE UNIT HAS BEEN TURNED OFF. TAKE ALL PRECAUTIONS NORMALLY OBSERVED IN WORKING ON HIGH VOLTAGE EQUIPMENT. CONTROL CIRCUITS AND SEMICONDUCTORS ARE OPERATING AT HIGH VOLTAGE IN THE POSITIVE OUTPUT POLARITY POSITION AND DANGEROUS POTENTIALS MAY EXIST ON THE SEMICONDUCTOR CIRCUITRY.



## A P P E N D I X

### 1. INTRODUCTION

This Appendix contains an Electrical Parts List, Schematic Diagram, Parts Location Diagram and equipment Warranty.

### 2. ELECTRICAL PARTS LIST

All electrical and electronic parts are listed in the sequence of their circuit numbers as shown on the Schematic Diagram. A brief description of each part is given, followed by the code number of the manufacturer and his part number. All manufacturers' code numbers are taken from Cataloging Handbooks H4-1 and H4-2, Federal Supply Code for Manufacturers. These handbooks can be obtained from Federal Agencies or ordered directly from the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402.

We recommend that all parts with the code number 98095 be ordered directly from Power Designs, Inc. The commercial equivalents of these parts may have wide parameter tolerances or require special factory inspection or modification before they can be used in the power supply.

All components used in the power supply or supplied as replacements are carefully inspected at the factory. Inspections are performed on a 100% basis or at AQL levels to Military Specification MIL-Q-9858 under which Power Designs, Inc. has been qualified.

All semiconductors are inspected on a 100% basis, not only for operating parameters, but also for critical characteristics related to reliability and predictable life expectancy. Some of these characteristics are observed when the device is taken beyond its normal operating regions. These test techniques have been developed under a "predictable reliability" program in operation at Power Designs, Inc. for the past twelve years. Under this program, quality control procedures are constantly reevaluated and updated as advances are made in solid state technology and experience is gained from field history.

Semiconductor manufacturers are continually modifying their products. Complete lines are discontinued to be replaced by devices having improved gain, operating voltage levels and frequency responses. The high gain, closed loop DC amplifiers used in regulator circuits are particularly sensitive to slight changes in these parameters. Commercial or military "equivalent" transistors may affect the performance of the power supply. We can assure compliance with the original specifications if replacement semiconductors are ordered from the Factory.

All replacement semiconductors are processed and stocked at the factory to insure complete interchangeability with the devices in the original equipment. These devices are coded with a Power Designs, Inc. part number. For example:

|                                      |                             |  |
|--------------------------------------|-----------------------------|--|
| <u>MS</u>                            | <u>1028</u>                 | <u>A</u>                                 |
| Semiconductor<br>Manufacturer's Code | Power Designs, Inc.<br>Type | Suffix Identifying<br>Special Parameters |

When ordering replacements, please identify the device as thoroughly as possible, giving the model and serial number if available.

The replacement part you receive may not have the same part number as that shown on the Electrical Parts List. This can be due to several factors:

- a. A different prefix indicates that Power Designs, Inc. is using another vendor source. The operating characteristics of the devices are identical.
- b. A completely different part number indicates:
  1. The original vendor has discontinued manufacture of the item or can no longer manufacture it to the original specifications.
  2. A better device for use in a particular circuit has been substituted.
  3. Tighter controls for interchangeability have provided greater assurance of reliability with the replacement.

## ELECTRICAL PARTS LIST

NOTE: Before replacing semiconductors, see paragraph 2 of this Appendix.

| <u>Circuit Number</u> | <u>Description</u>                                  | <u>Mfr Code Number</u> | <u>Part Number</u> |
|-----------------------|---|------------------------|--------------------|
| C9                    | Capacitor, plastic film, dual, 0.5 $\mu$ f, 2 kvdc  | 98095                  | CP-2XA.5-102       |
| C10                   | Capacitor, plastic film, dual, 0.25 $\mu$ f, 3 kvdc | 98095                  | CP-2XA.25-302      |
| C25, C26              | Capacitor, electrolytic, 51 $\mu$ f, 50 vdc         | 98095                  | CEX-51-50          |
| C31                   | Capacitor, electrolytic, 330 $\mu$ f, 1.5 vdc       | 98095                  | CE-77-.015         |
| C33                   | Capacitor, tantalum, 6.8 $\mu$ f, 35 vdc            | 98095                  | CE-6A8-.35         |
| C36, C37              | Capacitor, ceramic disc, 0.005 $\mu$ f, 1 kvdc      | 98095                  | CC-30-19           |
| C39                   | Capacitor, mylar, 0.033 $\mu$ f, 600 vdc            | 98095                  | CP-A033-6          |
| C40                   | Capacitor, ceramic, tubular, 330 pf, 500 vdc        | 98095                  | CC-26-5            |
| CR6, CR8              | Diode, silicon                                      | 98095                  | TS44R              |
| CR13, CR14            | Diode, silicon                                      | 98095                  | SI9420             |
| CR17 thru CR23        | Diode, silicon                                      | 98095                  | TS44               |
| CR24                  | Diode, silicon                                      | 98095                  | DI-587A-1          |
| CR25                  | Diode, silicon                                      | 98095                  | DI-587A-2          |
| CR26                  | Diode, silicon, zener                               | 98095                  | SV359 F, G         |
| CR27                  | Diode, silicon                                      | 98095                  | TS44               |
| CR28, CR29            | Diode, silicon                                      | 98095                  | SV359D, E, F       |
| CR30                  | Diode, silicon, zener                               | 98095                  | PD1948S            |
| CR33                  | Diode, silicon, zener                               | 98095                  | SV359C, A1         |
| DS1                   | Neon lamp   | 98095                  | GD-13              |
| DS2                   | Pilot lamp assembly                                 | 98095                  | PLA-14             |
| DS3                   | Neon lamp   | 98095                  | GD-13              |
| DS4                   | Incandescent lamp                                   | 98095                  | PLA-21             |
| DS5                   | Neon lamp   | 98095                  | PLA-19             |
| F1                    | Fuse, 1 ampere, Slo-Blo                             | 71400                  | MDL-1              |
| FB-03                 | Feedback resistor                                   | 98095                  | FB-03              |
| IV-120                | Inverter  | 98095                  | IV-120             |
| J1, J2                | Receptacle  | 09408                  | 7758A              |
| L4                    | Choke   | 98095                  | PS-1565-49/82(A)   |
| OVF-01                | Overvoltage protector and fault indicator           | 98095                  | OVF-01             |
| PE-320                | Current limit and DC amplifier                      | 98095                  | PE-320             |
| PR-02                 | Pre-regulator and driver stage                      | 98095                  | PR-02              |
| Q3, Q4                | Transistor, silicon, NPN                            | 98095                  | MS4230             |
| Q6                    | Transistor, silicon                                 | 98095                  | MS0421             |
| Q13                   | Transistor, silicon, PNP                            | 98095                  | MS1028A            |
| Q19                   | Transistor, silicon, PNP                            | 98095                  | MS1028A            |

| <u>Circuit Number</u> | <u>Description</u>   | <u>Mfr Code Number</u> | <u>Part Number</u> |
|-----------------------|--|------------------------|--------------------|
| R5, R6                | Resistor, composition, 22 $\Omega$ $\pm 10\%$ , 1/2 w              | 01121                  | EB2201             |
| R9                    | Resistor, wirewound, 1.5 k $\Omega$ $\pm 5\%$ , 3 w                | 98095                  | RW-152-3KA         |
| R11                   | Resistor, composition, 10 $\Omega$ $\pm 10\%$ , 1/2 w              | 01121                  | EB1001             |
| R14                   | Resistor, precision, metal film, 1 meg $\Omega$ $\pm 1\%$ , 1/4 w  | 98095                  | RD-105-1QA         |
| R20                   | Resistor, wirewound, trimmer, 2 $\Omega$ $\pm 10\%$ , 1-1/4 w      | 98095                  | RWT-020-C4         |
| R34                   | Resistor, precision, metal film, 249 $\Omega$ $\pm 1\%$ , 1/4 w    | 98095                  | RD-2490-1QA        |
| R36, R37              | Resistor, wirewound, 500 $\Omega$ $\pm 5\%$ , 3 w                  | 98095                  | RW-501-3KA         |
| R38                   | Resistor, composition, 470 $\Omega$ $\pm 10\%$ , 1 w               | 01121                  | CB4711             |
| R39                   | Resistor, precision, metal film, 649 $\Omega$ $\pm 1\%$ , 1/4 w    | 98095                  | RD-6490-1QA        |
| R40                   | Resistor, precision, metal film, 1.4 k $\Omega$ $\pm 1\%$ , 1/4 w  | 98095                  | RD-142-1QA         |
| R41                   | Resistor, wirewound, 61.2 k $\Omega$ $\pm 0.1\%$ , 1/3 w           | 98095                  | RW-6122-8SA        |
| R42                   | Resistor, wirewound, 30.6 k $\Omega$ , 0.1%, 1/3 w                 | 98095                  | RW-3062-8SA        |
| R43                   | Resistor, wirewound, 15.3 k $\Omega$ $\pm 0.1\%$ , 1/3 w           | 98095                  | RW-1532-8SA        |
| R44, R45              | Resistor, wirewound, 153 k $\Omega$ $\pm 0.25\%$ , 1/3 w           | 98095                  | RW-1533-11SA       |
| R46                   | Resistor, wirewound, 102 k $\Omega$ $\pm 0.1\%$ , 1/3 w            | 98095                  | RW-1023-8SA        |
| R48                   | Resistor, wirewound, 306 k $\Omega$ $\pm 0.25\%$ , 1/3 w           | 98095                  | RW-3063-11SA       |
| R49                   | Resistor, wirewound, variable, 5 k $\Omega$ $\pm 5\%$ , 2 w        | 98095                  | RWV-502-3C         |
| R50                   | Resistor, wirewound, trimmer, 200 $\Omega$ $\pm 5\%$ , 3/4 w       | 98095                  | RWT-201-3X         |
| R56                   | Resistor, composition, 1 k $\Omega$ $\pm 10\%$ , 1/2 w             | 01121                  | EB1021             |
| *R67                  | Resistor, precision, metal film                                    |                        |                    |
| R68                   | Resistor, composition, 10 k $\Omega$ $\pm 10\%$ , 1/2 w            | 01121                  | EB1031             |
| R69                   | Resistor, precision, metal film, 30.1 k $\Omega$ $\pm 1\%$ , 1/4 w | 98095                  | RD-3012-1QA        |
| R71                   | Resistor, precision, metal film, 100 $\Omega$ $\pm 1\%$ , 1/4 w    | 98095                  | RD-101-1QA         |
| R72                   | Resistor, composition, 8.2 meg $\Omega$ $\pm 10\%$ , 1/2 w         | 01121                  | EB8251             |
| R73                   | Resistor, composition, selected on test                            |                        |                    |
| S1                    | Switch, toggle, SPST   | 98095                  | ST-31              |
| S2                    | Switch, rotary   | 98095                  | PS-3K10-1(A)       |
| S3                    | Switch, rotary, 6-position   | 98095                  | PS-3K10-10(A)      |
| S4                    | Switch, rotary, 5-position   | 98095                  | PS-3K10-2(B)       |
| T1                    | Transformer, base drive  | 98095                  | 2001-H             |
| T2                    | Transformer, HV  | 98095                  | A3K02              |
| T3                    | Transformer, main  | 98095                  | 3003-B             |
| 3021-C                | Line filter  | 98095                  | 3021-C             |

Accessory

|    |                                  |       |       |
|----|----------------------------------|-------|-------|
| P1 | Connector (mates with J1 and J2) | 09408 | 5135A |
|----|----------------------------------|-------|-------|

## CODE LIST OF MANUFACTURERS

|       |                                |                           |
|-------|--------------------------------|---------------------------|
| 01121 | Allen-Bradley Company          | Milwaukee, Wisconsin      |
| 09408 | Star-tronics, Inc.             | Georgetown, Massachusetts |
| 71400 | Bussman Manufacturing Division | St. Louis, Missouri       |
| 98095 | Power Designs Inc.             | Westbury, New York        |

\*If SV359C is used, R67 is 845  $\Omega$   $\pm 1\%$ , 1/4 w (RD-8450-1QA). If SV359A1 is used, R67 is 806  $\Omega$   $\pm 1\%$ , 1/4 w (RD-8060-1QA).

A D D E N D A

POWER SUPPLY

MODELS AEC-315B and 3K10B

The Electrical Parts List and/or Schematic Diagram have been modified as follows:

| <u>Circuit Number</u> | <u>Description</u>   | <u>Mfr Code Number</u> | <u>Part Number</u> |
|-----------------------|--|------------------------|--------------------|
| C6                    | Capacitor, plastic film, .022 $\mu$ f, 200 vdc                   | 98095                  | CP-A022-2          |
| C7                    | Capacitor, plastic film, .001 $\mu$ f, 200 vdc                   | 98095                  | CP-24-2            |
| CR13, CR14            | Diode, silicon   | 98095                  | HV-25-12F/10F      |
| CR24, CR25            | Diode, silicon   | 98095                  | 1N4881             |
| CR34                  | Diode, silicon, zener (replaces DS1)                             | 98095                  | GD-13              |
| PR-02A                | Pre-regulator and driver stage                                   | 98095                  | PR-02A             |
| R9                    | Resistor, wirewound, 200 $\Omega$ , $\pm$ 5%, 3 w                | 98095                  | RW-201-3KA         |
| R12                   | Resistor, precision, metal film, 20 k $\Omega$ , $\pm$ 1%, 1/4 w | 98095                  | RD-203-1QA         |
| S3                    | Switch, rotary, 6 position                                       | 98095                  | PS-3K10-10(B)      |

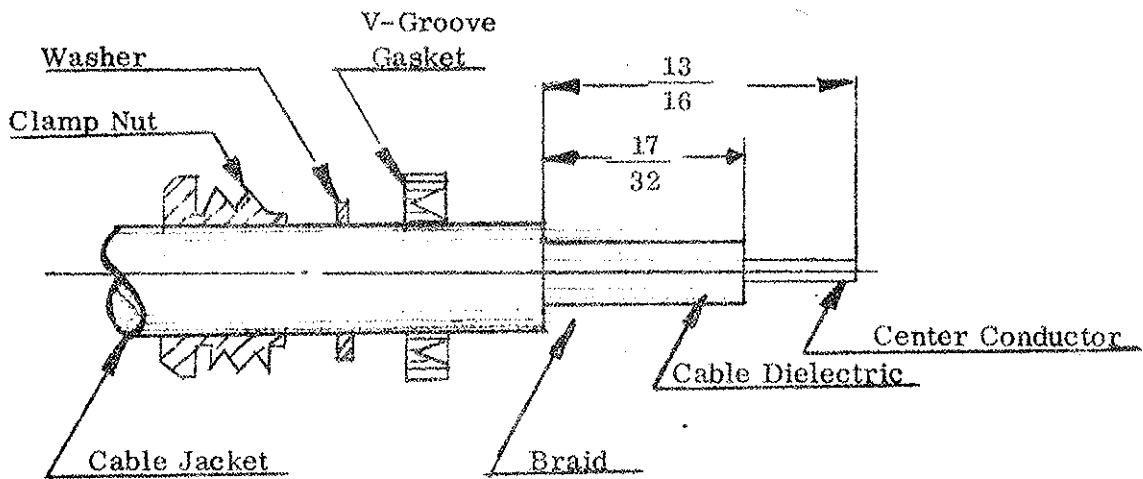


FIG. 1

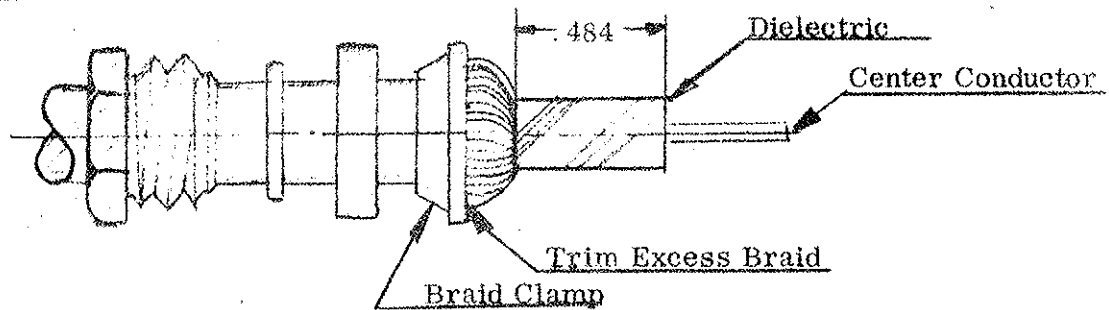


FIG. 2

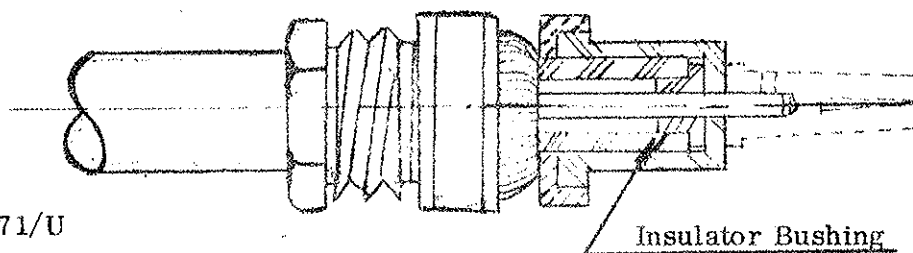


FIG. 3  
Special  
Assembly  
for RG-62 and 71/U  
Cables

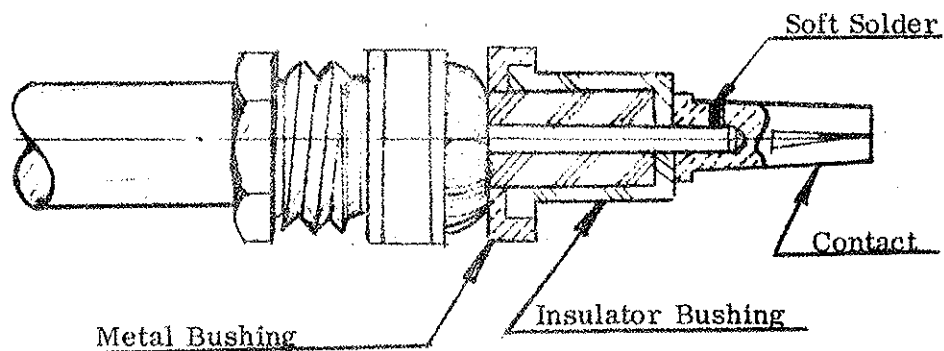


FIG. 4

### CABLE TRIM RECOMMENDATIONS

1. Use only proper razor-edged tools or special automatic trimming tools.
2. Keep all trims square, maintain 90° relationship between cable jacket O. D. on all cuts.


PROCEDURE:

(IMPORTANT: READ CABLE TRIM RECOMMENDATIONS BEFORE BEGINNING ASSEMBLY.)

1. Slide clamp nut, washer and V-groove gasket over cable as shown in Fig. 1.
2. Remove cable jacket to dimension shown: do not damage braid. Comb out braid wires, then fold back and make dielectric cut. Do not nick center conductor (Fig. 1).
3. Fold braid wires forward and taper toward center conductor. Place braid clamp over braid and set firmly against cable jacket. Fold braid wires back in even distribution and trim excess braid where indicated. Check for exposed dielectric dimension shown and retrim if necessary (Fig. 2).
4. For applications requiring use of RG-62 and 71/U cables, add the insulator bushing as shown in Fig. 3.
5. Place metal bushing and insulator bushing onto dielectric as shown in Fig. 4.
6. Place contact onto center conductor and bottom on insulator bushing. Soft solder as shown using 60/40 alloy multicore solder with rosin or ersin flux. Remove any surplus solder from outside of contact and thoroughly clean insulator bushing of chips, flux, etc. (Fig. 4).
7. Insert prepared cable into connector shell and tighten clamp nut securely using 20-40 inch-lbs. torque.

DO NOT SCALE THIS DRAWING

|                                      |                      |                                  |
|--------------------------------------|----------------------|----------------------------------|
| UNLESS OTHERWISE SPECIFIED           |                      |                                  |
| TOLERANCES                           | FRACTIONAL<br>± 1/64 | DECIMAL ANGLES<br>± .005 ± 0°30' |
| DIMENSIONS AND TOLERANCES TO BE HELD |                      |                                  |
| REMOVE ALL BURRS AND SHARP EDGES     |                      |                                  |

|   |               |               |        |
|---|---------------|---------------|--------|
| A RELEASED  |               | APPROVED      | DATE   |
| SYN.  | DESCRIPTION   | APPRO.        | DATE   |
| REVISIONS   |               |               |        |
| DRAWING NO. B70042  |               |               | REV. A |
| TITLE CONNECTOR & CABLE ASSY.<br>INSTRUCTIONS FOR 51.35A SHV  |               |               |        |
| DRAWN J.S.  | CHECKED       | APPROVED. KR  |        |
| DATE 10/21/70   | DATE 10/21/70 | DATE 10/21/70 |        |
|  <b>Power Designs Inc.</b><br>NEW YORK |               |               |        |

## WARRANTY

POWER DESIGNS INC., warrants to the original purchaser, each instrument sold by us, or our authorized agents, and all the parts thereof, to be free from defects in material or workmanship under normal use and service within the specified ratings and operating conditions.

Its obligation under this warranty is hereby limited to the repair or replacement of any instrument, or part thereof, which is returned to us within one year after delivery, and which shall prove, after our examination, to be thus defective.

This warranty does not include the cost of transportation charges to and from the factory and/or the cost of packaging or crating of instruments for return to the factory, unless such instrument is returned within thirty (30) days from the date of original shipment as shown on the packing list or shipping documents, and prior written authorization for such costs is obtained from the factory.

The repair or replacement of an instrument, or any part thereof, does not void or extend the original warranty.

POWER DESIGNS INC., reserves the right to discontinue any instrument without notice, or to make modifications in design at any time, without incurring any obligation to make these modifications in instruments previously sold.

**POWER DESIGNS INC.**

Westbury, L. I., New York

**POWER DESIGNS PACIFIC, INC.**

Palo Alto, California