


REVISIONS			
REV	DESCRIPTION	DATE	APPROVAL
B	RELEASE	07/11/01	PRL

# INSTRUCTION MANUAL

for

**2592 Series**

**High Voltage Power Supply**

CUSTOMER	CONTRACT NO.		 7313 SW TECH CENTER DRIVE PORTLAND, OR 97223 PH: (503) 598-9595 FAX: (503) 682-8164 WWW.CPSHV.COM			
	PREPARED P. R. Lubicki	DATE 07/11/01			TITLE <b>INSTRUCTION MANUAL - 2592</b>	
	CHECKED	DATE	SIZE <b>A</b>	FSCM NO. <b>31640</b>	SPECIFICATION NO. <b>2592-89-0001</b>	REV <b>B</b>
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WWW.CPSHV.COM

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1. Safety:

### OPERATIONAL SAFETY

THIS POWER SUPPLY GENERATES VOLTAGES THAT ARE DANGEROUS AND MAY BE FATAL. OBSERVE EXTREME CAUTION WHEN WORKING WITH THIS EQUIPMENT.

High voltage power supplies must always be grounded.

Do not touch connections unless equipment is off and the capacitances of both the load and power supply are discharged.

Do not ground yourself or work under wet or damp conditions.

### SERVICING SAFETY

Maintenance may require removing the instrument cover with the power on.

Servicing should only be done by qualified personnel aware of the electrical hazards.

“WARNING” notes in the text call attention to hazards in the operation of these units that could lead to possible injury or death.

“CAUTION” notes in the text indicate procedures to be followed to avoid possible damage to equipment.

Technical and safety assistance can be obtained from:

Viet Do  
7313 SW Tech Center Dr  
Portland, OR 97224, USA  
Phone: 503-598 9595  
Fax: 503-684-8164  
e-mail: [Viet@cpshev.com](mailto:Viet@cpshev.com)

### WARNING

IF THE EQUIPMENT IS USED IN ANY MANNER NOT SPECIFIED BY THE CPS, INC. (MANUFACTURER), THE PROTECTION PROVIDED IN THE POWER SUPPLY MAY BE IMPAIRED CAUSING EQUIPMENT DAMAGE.

## 2. Definitions of Symbols



Direct Current



Protective Conductor Terminal



Caution (refer to accompanying documents)



Caution, risk of electric shock

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### 3. Introduction:

CPS Model 2592 sets the standard for high performance in modular high voltage power supplies. Standard configuration is a 40 kV version of either positive or negative polarity factory selected. Maximum voltage output is 50kV. Model 2592 delivers exceptional performance in all critical power supply parameters such as ripple, stability, temperature coefficient and regulation. Low ripple is achieved with special ripple cancellation circuitry. The advantages of this design include low stored energy, compact packaging and improved reliability should arcing occur.

The exceptional stability and low temperature coefficient of the 2592 are the result of careful design practice and the selection of quality components throughout.

The CPS Model 2592 series of power supplies is designed for system component or stand-alone laboratory use in applications requiring a stable, regulated, low-noise source of high voltage power. The applications include, but are not limited to the following: Capacitor charging, Phototube systems, Laser systems, electron microscopes, focused ion and electron beam systems, such as lithography, etc.

The unit is designed to safely withstand continuous short circuits without damage.

### 4. Features:

- Wide output voltage range.
- Very low ripple.
- Excellent stability.
- Low stored energy.
- Low temperature coefficient.
- Local or remote programming.
- Precision voltage and current monitoring.
- Separate grounds for case, signal and power.

### 5. Electrical Specifications:

- Output Polarity:* Positive or negative.
- Output Voltage:* 10V – 40/50kVDC (programmable).
- Output Current:* 100 $\mu$ A rated (500 $\mu$ A maximum).
- Output Ripple:* < 200mV at 40kV and 100 $\mu$ A output.
- Load Regulation:* 0.001%.
- Line regulation:* 0.001%.
- Long term stability:* 0.005% in 1 hour, 0.01% in 8 hours.

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*Temperature Coefficient:* < 50ppm/°C.*Programming:* 0 – 5V continuous for full output range (an adjustable reference voltage output is supplied for local programming or a remote 0-5V supply may be used).*Output Protection:* Short circuit and arc protected. Output voltage is self-restoring after short removal.*Voltage monitor:* 0 – 5V for 0 to full output voltage.*Current monitor:* 0 – 5V for 0 to 100µA output current.*Operating temperature:* 0 to 50°C.*Input voltage:* 24 VDC.*Input current:* 300 mA max at no-load, 500 mA max at 100µA.*Internal Fuse:* 125V, 2.5A.**WARNING**

Replacement of internal fuse must be performed by qualified personnel. Contact manufacturer for instructions.

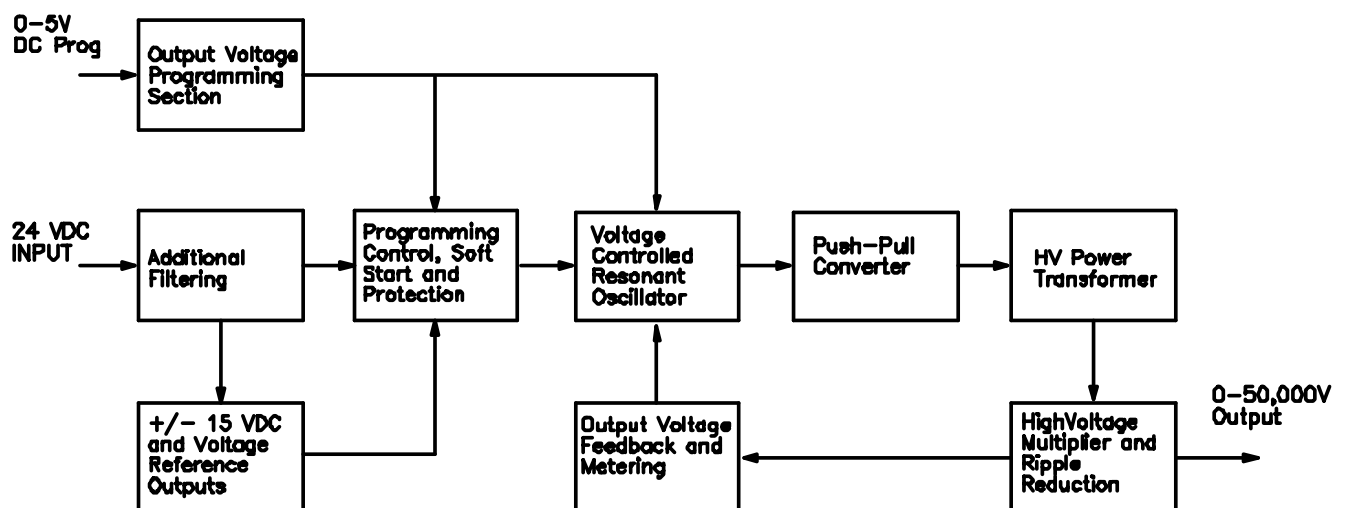
6. Block Diagram:**CPS Power Supply Model 2592 Block Diagram**

Fig. 1. Block diagram of 2592 high voltage power supply

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7. Environmental Conditions:

Model 2592 must operate under following conditions:

- the equipment is intended for indoor use only;
- operating temperature 0 to 50°C;
- altitude up to 2000 m;
- maximum relative humidity 80% at 31°C and 50% at 40°C
- installation Category - Intended for use in installation category (overvoltage category) II (IEC 1010-1 standard).
- Pollution Degree - Category 2 (IEC 1010-1 standard)

8. Mechanical Specifications:*Output Terminals:*

HV Connector – Caton model LGG-3I, P/N 17603.  
Case ground - #10 threaded stud with nut. Floating  
HV return - #8 threaded stud with nut. Input/Output  
signals – turret isolated pins

*Unit Package:*

2.5" H, 5.0" W, 8.0" D – see Figure 2. Four mounting  
holes at the bottom (UNC 10-32) see Figure 2

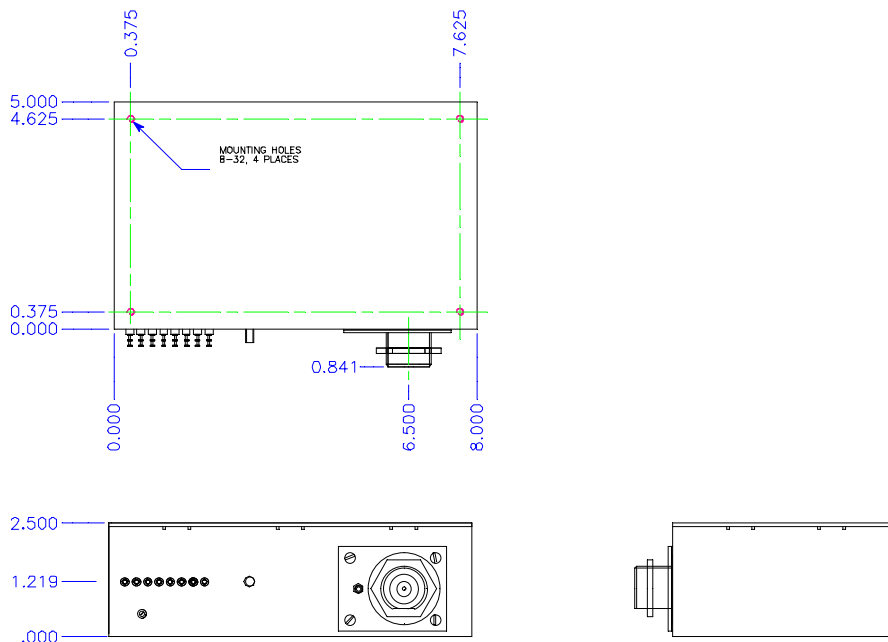


Fig. 2. Physical layout showing the placement of mounting holes on the bottom panel of 2592 power supply

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*Interface pin descriptions:*

- |               |  |
|---------------|--|
| 1. V PROG     | Programming voltage input.                                 |
| 2. I METER    | Output current monitor.                                    |
| 3. V METER    | Output voltage monitor.                                    |
| 4. V REF OUT  | Adjustable reference voltage output for local programming. |
| 5. SIGNAL RET | Signal return.   |
| 6. POWER IN   | 24VDC power input.   |
| 7. POWER RET  | 24VDC power return.  |
| 8. CASE       | Case safety ground.  |

The Case, Signal return and Power return are connected together in most circumstances. These returns may be separated in order to control noise in some setup environments. The separation of signal, power and case returns allows to differentially program the power supply in order to avoid any noise injected from the low voltage side.

The case return under any circumstances shall be connected to ground. Figure 3 shows the connections for remote and local programming of the power supply.

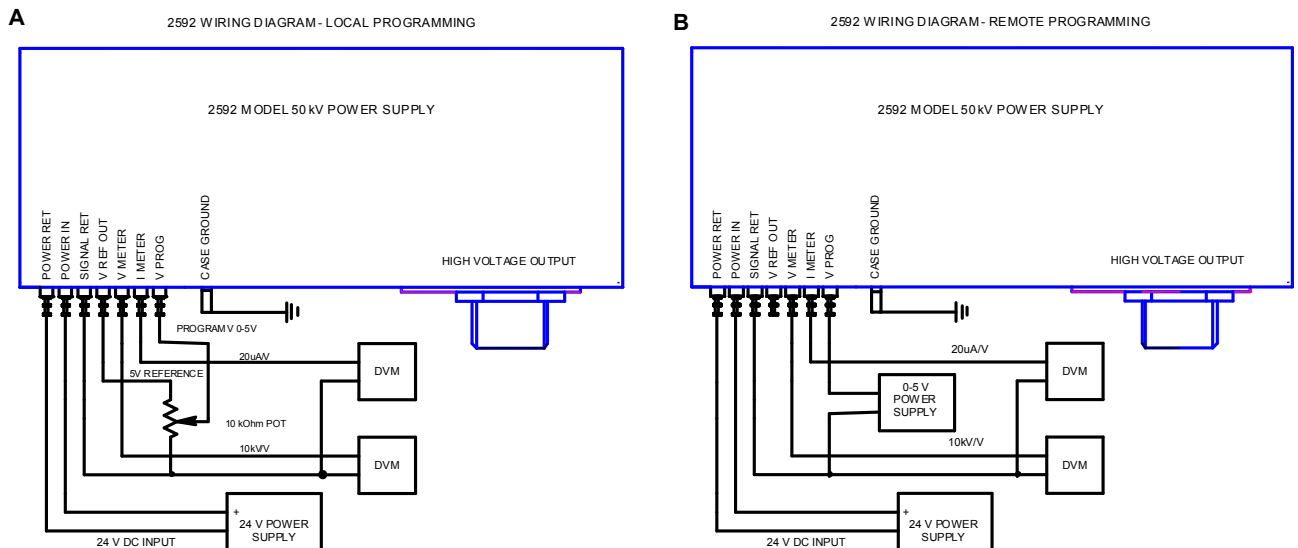


Fig. 3. Local (A) and remote (B) programming connections





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## 9. Operation:

### **WARNING**

THIS EQUIPMENT GENERATES DANGEROUS VOLTAGES THAT MAY BE FATAL. PROPER GROUNDING OF ALL HIGH VOLTAGE EQUIPMENT IS ESSENTIAL.

### **WARNING**

THIS EQUIPMENT IS PERMANENTLY CONNECTED THEREFORE IT SHALL OPERATE IN BUILDINGS WITH A SWITCH OR CIRCUIT BREAKER. THIS EQUIPMENT MUST BE INSTALLED IN CLOSE PROXIMITY OF THE SWITCH OR CIRCUIT BREAKER WITHIN EASY REACH OF OPERATOR. THIS SWITCH OR CIRCUIT BREAKER SHALL BE MARKED AS THE DISCONNECTING DEVICE FOR THE POWER SUPPLY.

### **CAUTION**

BEFORE CONNECTING THE POWER SUPPLY TO THE 24VDC SUPPLY, FOLLOW THIS STEP-BY-STEP PROCEDURE.

FAILURE TO FOLLOW THESE PROCEDURES MAY VOID THE WARRANTY AND WILL RESULT IN SAFETY VIOLATION.

#### *Step A*

The chassis of the high voltage power supply must be grounded. Use the Case Ground connection. Case Ground connections are for shielding and safety only.

#### *Step B*

Attach the high voltage output cable to the load. The cable used should be shielded with a wire braid that functions as the high voltage return.

#### *Step C*

Attach the mating plug on the high voltage cable to the HV output receptacle on the supply and hand tighten. Make absolutely sure that a good high voltage output and high voltage return connection is made between the supply and the load.

#### *Step D*

Connect the programming voltage supply to the pins on the side panel of the high voltage power supply. Make certain that the connections match the pin-out of the interface.

#### *Step E*

For initial turn-on, adjust the programming voltage to 0.0 V.

#### *Step G*

The 24VDC power supply may now be connected and switched on.



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### *Step H*

Adjust the programming voltage to obtain the required high voltage output.

To switch off the high voltage power supply, switch off the 24VDC power supply.

### **WARNING**

AFTER SWITCHING OFF, DO NOT HANDLE THE LOAD UNTIL THE POWER SUPPLY AND LOAD CAPACITANCES HAVE BEEN DISCHARGED.

### **WARNING**

The voltage monitor of the power supply does not read the output voltage when the 24VDC power supply is disconnected or switched off, even if a high voltage charge still exists across the load.

### **WARNING**

Always operate the unit with the cover on. Do not attempt to access or repair any internal circuits. Dangerous and potentially lethal voltages are generated inside the module.

### 10. Warranty:

COMPUTER POWER SUPPLY, Inc. (CPS) warrants equipment of its manufacture against defective materials or workmanship for a period of one year from the date of shipment.

CPS will repair or replace any defective product, which was not damaged by negligence, misuse, improper installation, accident, unauthorized repair or alteration by the Buyer.

This warranty is applicable to the original Buyer only and constitutes the sole and exclusive warranty of the Seller. No other warranty is made, expressed or implied.