

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

INSTRUCTION MANUAL

for

2591P 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 INSTRUCTION MANUAL-2591P	
	CHECKED	DATE	SIZE A	FSCM NO. 31640	SPECIFICATION NO. 2591P-89-0001	REV B
	APPROVED	DATE	SCALE 1:1		SHEET 1 OF 11	
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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:

Piotr Lubicki/Gary Bosman
7313 SW Tech Center Dr
Portland, OR 97224, USA

Phone: 503-598 9595

Fax: 503-684-8164

e-mail: Piotr@cshv.com
Gary@cshv.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.

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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 2591P sets the standard for high performance in modular high voltage power supplies. Standard configurations include 10, 20, and 30 kV versions of either positive or negative polarity factory selected. Model 2591P 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 2591P precision high voltage power supply is specifically designed for focused ion and electron beams. It is used in systems in which low noise, high stability and fast response are main requirements, such as electron and ion beam optics systems for integrated circuit fabrication and testing. The 2591P model provides very high quality output voltage parameters without sacrificing its reliability, since it can withstand severe short circuits, arcs and any other fast transients. Over-voltage and over-current limits provide safe and reliable power supply protection against long-term overloads and load malfunctions. Implementing differential programming input as well as separating control return from case ground and high voltage return makes it possible that no noise from control inputs is reflected on the output side. These design features assure that the output ripple and noise specifications are always met.

The exceptional stability and low temperature coefficient of the 2591P are the result of careful design practice and the selection of quality components throughout.

The CPS Model 2591P 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 unit is designed to safely withstand continuous short circuits without damage.

4. Features:

- Up to 30 kV positive or negative output
- 100 μ A of output current standard (up to 1 mA optional)
- Extremely low output noise and ripple <400 mV_{p-p} at 100 μ A
- Differential programming input
- Separate case ground, control common and high voltage return
- Outstanding output voltage stability (<10 ppm/hr after warming up period of 1 hour) and temperature coefficient (<25 ppm/^oC after warming up period of 1 hour)
- Very good load and line regulation (0.001%)
- Outstanding slew rate (over 35 V/ms) without voltage oscillations
- Compact enclosure (2"x4"x6")
- Convenient DB 9 connectors for low voltage signals



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- Shielded high voltage CATON connector
- Arc and short protected, and over-voltage and -current limited

5. Electrical Specifications:

Output Polarity: Positive or negative.

Output Voltage: 10V – 30 kVDC maximum (programmable).

Output Current: 500 μ A maximum.

Output Ripple: < 300 mV at 30 kV and 100 μ A.

Load Regulation: 0.001%.

Line regulation: 0.001%.

Long term stability: 10 ppm per 1 hour.

Temperature Coefficient: < 10 ppm/ $^{\circ}$ C.

Programming: 0 – 5 V 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 – 3 V for 0 to 30 kV output voltage.

Operating temperature: 0 to 50 $^{\circ}$ C.

Input voltage: 24 VDC.

Input current: 200 mA max at no-load. Less than 500mA at 100 μ A output.

Internal Fuse: 125V, 2.5A.

WARNING!

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

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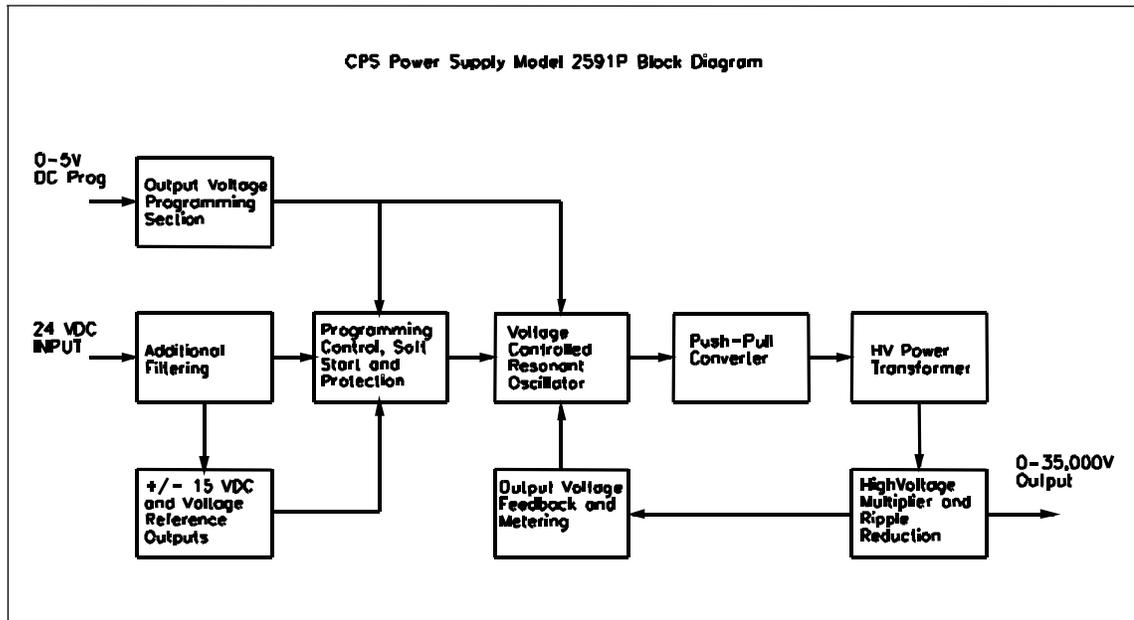
6. Block Diagram:

Fig. 1. Block diagram of 2591P high voltage power supply

7. Environmental Conditions:

Model 2591P must operate under following conditions:

- the equipment is intended for indoor use only;
- operating temperature 0 to 50⁰C;
- altitude up to 2000 m;
- maximum relative humidity 80% at 31⁰C and 50% at 40⁰C
- 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

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Unit Package:

HV return - #8 threaded stud with nut. Input/Output signals – male and female DB9 I/O connectors

2" H, 4.0" W, 6.0" D – see Figure 2. Four mounting holes at the bottom (UNC 10-32) see Figure 2

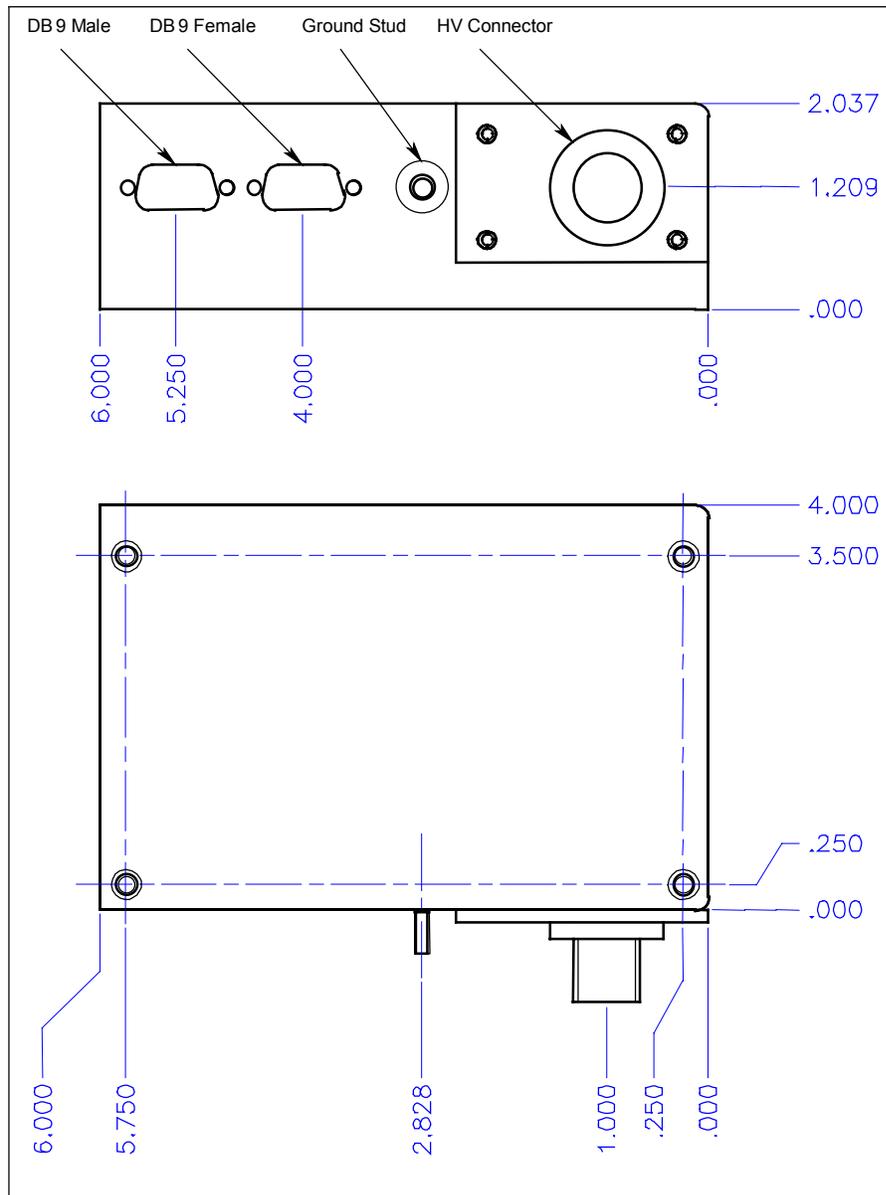


Fig. 2. Physical layout showing the placement of mounting holes on the bottom panel of 2591P power supply

Interface pin descriptions:

DB 9 Male



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- 1 Voltage Metering
- 2 NC
- 3 Power Input
- 4 Interlock
- 5 Voltage Programming+
- 6 Signal Return
- 7 Power Return
- 8 Power Return
- 9 Voltage Programming-
DB 9 Female
- 1 Interlock
- 2 Power Return
- 3 NC
- 4 Case Ground
- 5 - 8 NC
- 9 Signal ground

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.



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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 appropriate pins on the DB-9 male connector (voltage programming + and voltage programming -). 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 to the appropriate pins of the DB-9 male connector (power input and power return pins) and switched on.

Step H

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

To switch off the high voltage power supply, switch off the programming or 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.



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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.