REVISIONS			
REV	DESCRIPTION	DATE	APPROVAL
A	RELEASE	02/15/01	PRL
B	RELEASE	04/05/04	VQD

INSTRUCTION MANUAL

for

2591 Series

High Voltage Power Supply

CONTRACT NO.		CPS
PREPARED P. R. Lubicki	DATE 10/03/00	
CHECKED	DATE	
APPROVED	DATE	
APPROVED	DATE	

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CUSTOMER

TITLE
INSTRUCTION MANUAL - 2591

SIZE	FSCM NO.	SPECIFICATION NO.	REV
A	31640	2591-89-0001	A

SCALE 1:1

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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.

2. Introduction:

CPS Model 2591 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 2591 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 2591 are the result of careful design practice and the selection of quality components throughout.

The CPS Model 2591 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.

3. 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.

4. Electrical Specifications:

Output Polarity:	Negative.
Output Voltage:	10V – 15 kVDC (programmable).
Output Current:	1.5 mA.
Output Ripple:	< 200mV at 15kV and 1.5 mA.
Load Regulation:	0.001%.
Line regulation:	0.001%.

Long term stability:	0.005% in 1 hour, 0.01% in 8 hours.
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 15 kV output voltages.
Current monitor:	0 – 5V for 0 to 1.5 mA) output currents.
Operating temperature:	0 to 50 °C.
Input voltage:	24 VDC.
Input current:	1 A max at full-load.

5. Block Diagram:

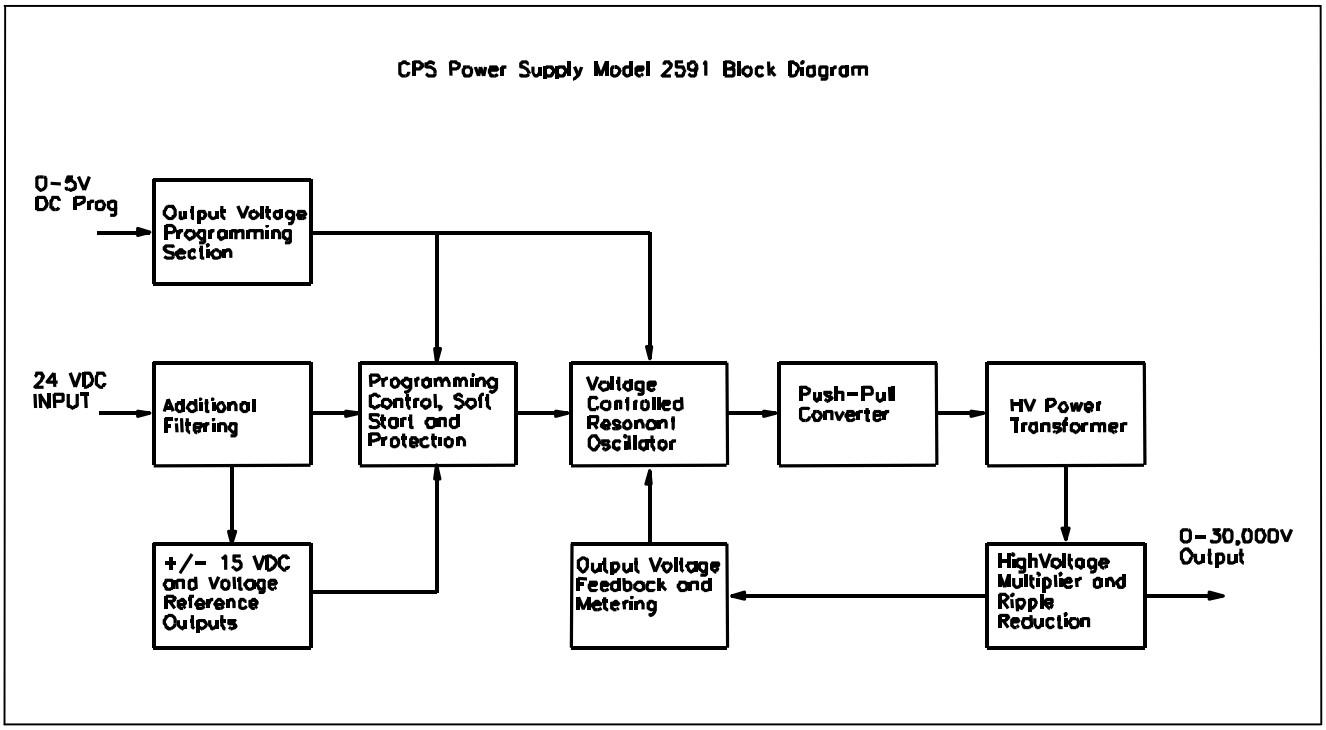


Fig. 1. Block diagram of 2591 high voltage power supply

4. Mechanical Specifications:

Output Terminals: HV Connector – CPS cable HVC130-01, Case ground - #10 threaded stud with nut. Floating HV return - #8 threaded stud with nut. Input/Output signals – DB9

Unit Package: 2” H, 4” W, 8” D – see Figure 2. Four mounting holes at the bottom (UNC 10-32) see Figure 2

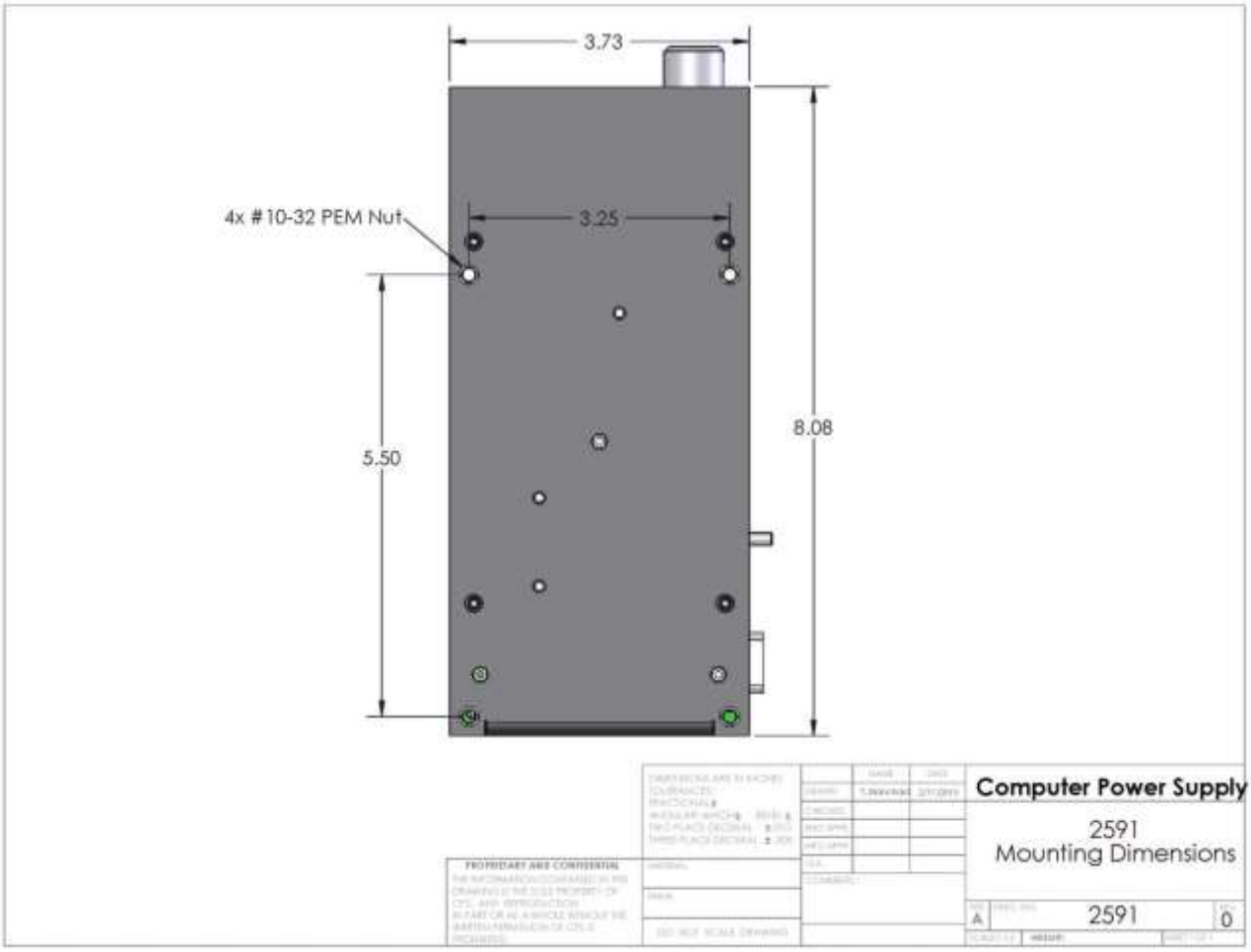
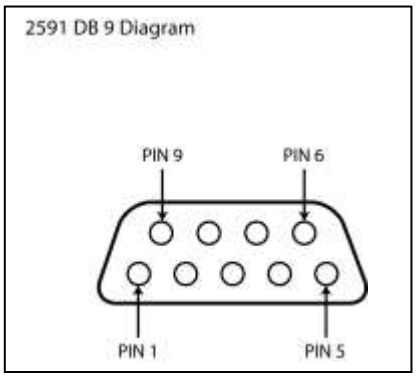


Fig. 2. Physical layout showing the placement of mounting holes on the bottom panel of 2591 power supply.

Interface pin descriptions:

1. OPEN
2. I METER — Output current monitor.
3. 5V REF — Reference voltage output for local programming.
4. POWER IN — 24VDC power input.
5. CASE GND — Case safety ground.
6. V. PROGRAM — Programming voltage input.
7. V. METER — Output voltage monitor.
8. SIGNAL RETURN — Signal return.
9. POWER RETURN — 24VDC power return.



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.

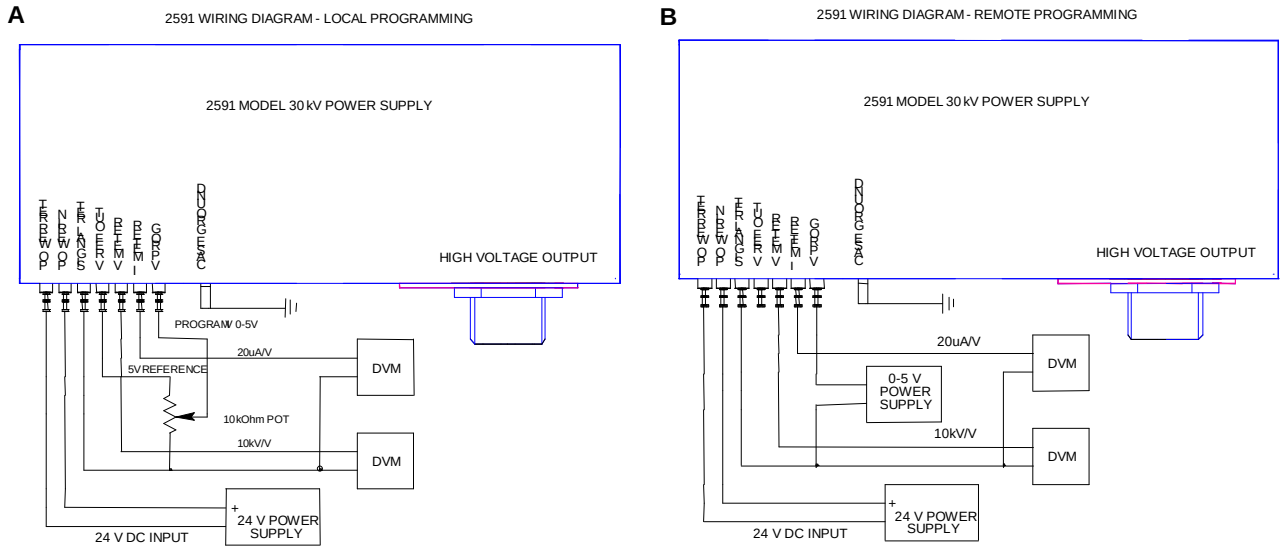


Fig. 3. Local (A) and remote (B) programming connections

5. Operation:

WARNING

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

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.

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.

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.

6. 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.

FINAL INSPECTION
TEST DATA SHEET

CPS
7313 SW TECH CENTER DR
PORTLAND, OR 97223
USA

MODEL No. 2591-00-0003 REV A
SERIAL No. 4204
DATE: 11 JUN, 2004

BURN-IN 48 HRS ☑
STABILITY ☑ %/8 hrs

INPUT VOLTAGE 24 V DC + -5%
INPUT CURRENT <1 .5 A

OUTPUT VOLTAGE SWING 0 kV to -15 kV

OUTPUT	-15	kV	
LINE REG	< .001	%	
DROP OUT	<21	V DC	
SHORT CKT	☑		
I LIMIT	☑	500uA	
ACCURACY	☑	%	

RIPPLE		< 200	mV_{p-p}
LOAD REGULATION		< .001	%
ARC TEST ☑			
V METER	3	V @ 30	kV
V PROGRAM	5	V @ 30	kV
I METER	1	V @ 100	uA
RESISTANCE (SIG RET-POWER RET)			1 Ω
RESISTANCE (CASE-SIG RET)			1 M Ω

OPTIONS
+30 KV 500 uA

CUSTOMER Future Technology Tabatories
SALES ORDER No. 3581-A

TESTED BY VQD
Q.C.