

REVISIONS			
REV	DESCRIPTION	DATE	APPROVAL
B	RELEASE	12/12/2023	MW

INSTRUCTION MANUAL

for

7201 Series

High Voltage Power Supply

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		
CUSTOMER	CHECKED	TITLE INSTRUCTION MANUAL-7201	
	APPROVED	SIZ E A	FSCM NO. 31640
	APPROVED	SPECIFICATION NO. 7201-89-0001	
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	DATE	SCALE 1:1	SHEET 1 OF 10



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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:

Marc Weissfloch
7313 SW Tech Center Dr
Portland, OR 97224, USA
503-598 9595
Marc@cpshev.com

Phone:
e-mail:

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. Introduction:

CPS Model 7201 is a dual output, constant current, +/- 8kV AC power supply.

Designed specifically for dissipation of static charge, the 7201 provides 400Hz square waveforms of balanced positive and negative current at a voltage of up to 8 kV per polarity, or 16 kV peak-to-peak.

The customer provided load is a single-ended corona wire whose function is to ionize surrounding air that will in turn dissipate static charge on a nearby moving carrier.

The 7201 is turned on by applying 24VDC to the power input. The buck converters that supply power to the HV multiplier transformers remain turned off until the enable pin is pulled down to ground. Opening the enable circuit will shut off the high voltage.

The 7201 has 4 separately controlled high voltage supplies, each with its own transformer and voltage multiplier: Each of 2 outputs is connected to a positive and a negative HV supply through a novel HV switching device. The switching device toggles between the 2 HV supply inputs and thus outputs a +/- HV square wave.

Output 1 will deliver a square wave of current that is balanced between positive and negative if the load impedance is equal in both directions. If the load is not equal, Output 1 is free to bias in either direction while the RMS current stays constant, as long as the maximum voltage of 8kV per polarity is not surpassed.

Output 2, however, remains balanced to a ground reference with an even or uneven load impedance.

Both outputs are current-controlled independently with separate program signals. A program voltage of 2.5VDC to 5.0VDC applied at a pin of the input connector provides linear proportional adjustment of the output current from 500µA up to 1mA RMS.

The 7201 provides Voltage monitor signals for each output. A monitor value of up to 8VDC is directly proportional to the average absolute peak voltage. For example a voltage monitor value of 6VDC indicates an output of 12kV peak-to-peak which may be +6kV and -6kV or +7kV and -5kV.

The 7201 has an Arc detect feature. An arc on either of the HV outputs will cause a sudden drop of voltage at one or both of the HV multipliers. If the amplitude of this voltage drop surpasses an established threshold, the voltage on the Arc_Status pin will drop from 12VDC to ground for a minimum duration of 200msec.



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Detecting multiple arcs will allow the customer to disable the 7201. Likewise, a voltage monitor signal surpassing 8kV will indicate an open circuit on the high voltage and allow the customer to disable the 7201. However, the unit is designed to safely withstand continuous short and open circuits for periods of up to 2 hours without damage.

Two 7201 units can be synchronized by connecting clock signals on the I/O connector. Both outputs on the second unit will be phase-shifted 180 degrees from the corresponding outputs on the first unit.

3. Features:

- 2 independent current-controlled HV outputs
- Up to 8 kV positive and negative output, switched at 400Hz
- Up to 1mA RMS of AC current per output
- Output 1 current biases if load impedance is unbalanced
- Output 2 current is balanced regardless of load impedance
- Indicator LEDs for Input voltage and HV enable
- Voltage monitors provide peak voltage feedback
- Arc status signal provides arc detection feedback
- Tolerant of open and short circuits on HV outputs
- 2 units can be wired for synchronous (180 degree shifted) operation



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4. Electrical Specifications:

<i>Output Waveform:</i>	Square wave, 400Hz (default, configurable 5Hz to 2000Hz).
<i>Waveform Risetime:</i>	10-90% in 120 +/- 50 μ sec (resistive load).
<i>Waveform Falltime:</i>	10-90% in 120 +/- 50 μ sec (resistive load).
<i>Output Current:</i>	500-1000 μ A RMS (programmable).
<i>Output Voltage:</i>	0 - 8 kVDC.
<i>Programming:</i>	2.5 – 5 VDC continuous for full output range
<i>Output Protection:</i>	Short circuit and arc protected. Output voltage is self-restoring after short removal.
<i>Voltage monitor:</i>	0 – 8 V for 0 to 16 kV peak-to-peak output voltage.
<i>Operating temperature:</i>	0 to 40 °C.
<i>Input voltage:</i>	24 VDC.
<i>Input current:</i>	200 mA max at no-load. Less than 2A, both outputs at full.
<i>Internal Fuse:</i>	250V, 3.15A.

WARNING!

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

5. Environmental Conditions:

Model 7201 must operate under following conditions:

- the equipment is intended for indoor use only;
- operating temperature 15 to 43°C;
- altitude from -30m to 2300 m;
- relative humidity from 5% to 90%.

6. Block Diagram:

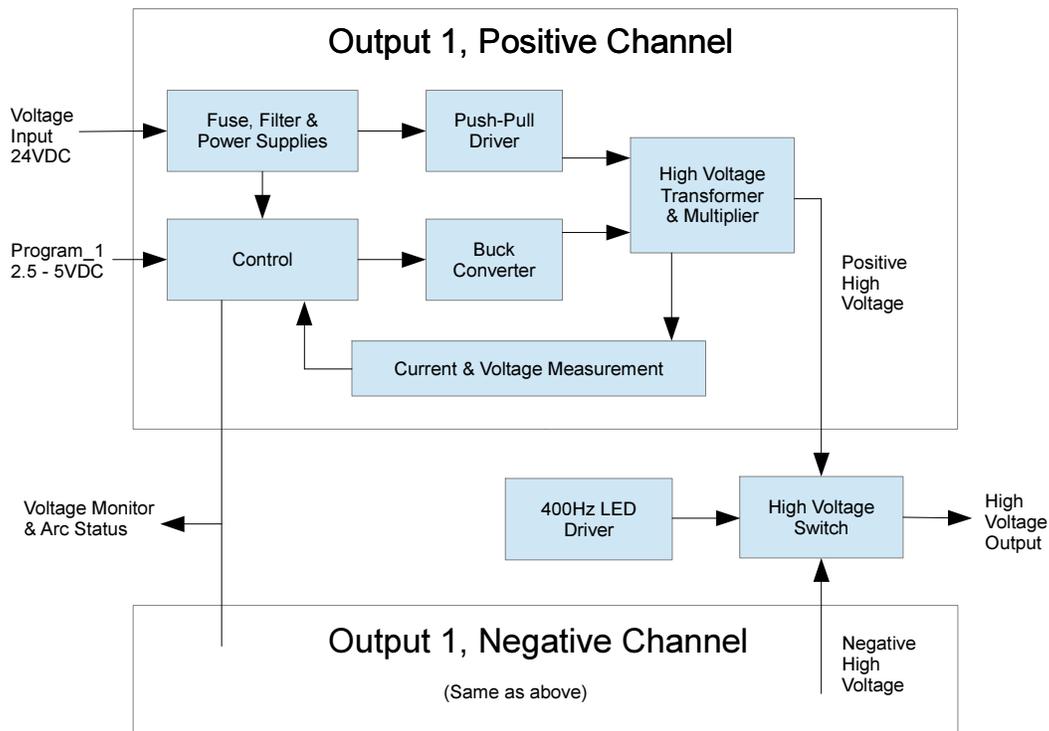


Fig. 1. Block diagram of 7201 (Output 1 shown, Output 2 is identical).

7. Mechanical Specifications:

Electrical Connections:

I/O Connector: 20 pin 3.96mm friction lock, AMP MTA-156 series.

HV Connectors: Amphenol Alden A400QX

Ground connector: #8-32 threaded stud with nut.

Unit Package:

7.0" H, 10.0" W, 3.6" D. Two mounting slots at the bottom for #10 bolts, plus one mounting tab, see Figure 2

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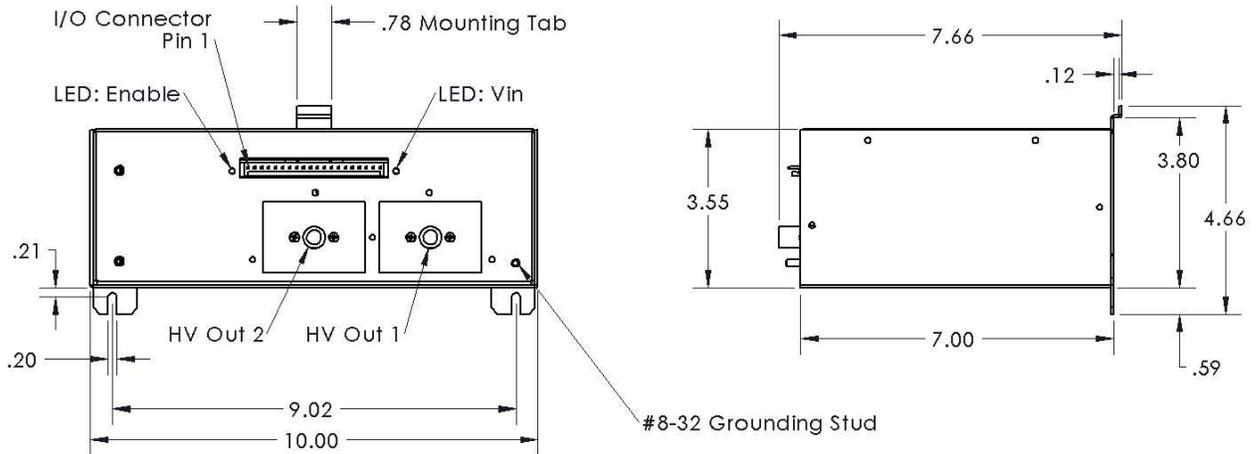


Fig. 2. Physical layout of 7201 power supply

Table 1. I/O connector pin descriptions:

Pin #	Description	Pin #	Description
1	Input Voltage (+24VDC)	11	Shield
2	Input Return	12	V_Monitor_1 (0 – 10 VDC)
3	Enable (0v = enable output)	13	V_Monitor_1 Return
4	Program_1 Return	14	Shield
5	Program_1 (2.5 – 5 VDC)	15	V_Monitor_2 (0 – 10 VDC)
6	Shield	16	V_Monitor_2 Return
7	Program_2 Return	17	CLK_OUT_A (0 – 5 VDC)
8	Program_2 (2.5 – 5 VDC)	18	CLK_OUT_B (0 – 5 VDC)
9	Shield	19	CLK_IN (0 – 5 VDC)
10	Arc_Status (0, 12VDC)	20	CLK_IN (0 – 5 VDC)



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8. Operation:

WARNING

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

CAUTION

BEFORE APPLYING POWER TO THE 24VDC INPUT PIN, 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 Grounding Stud for connection.

Step B

Attach both high voltage output cables to their respective loads, using Amphenol Alden A-series cables.

Attach I/O cable to I/O connector using AMP MTA-156 series 20 pin crimp housing

Step C

For only one 7201 unit: Pin 17 and 19 must be externally shorted .

For 2 synchronized units: Short as above and connect pin 18 on Unit 1 to pin 20 on Unit 2.

Step D

For initial turn-on, apply programming voltage of 2.5 V.

Step E

The 24VDC power supply may now be switched on.

Step G

The Enable pin may now be shorted to ground. This will turn on the HV outputs.

Step H

Adjust the programming voltage to obtain the required output.

To switch off the high voltage, disconnect the Enable pin or the 24VDC power supply.



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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

9. 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.