CPS 2600 POWER SUPPLY

INSTRUCTION MANUAL

FSCM NO. 31640
SPEC NO. 2600-89-0001
REV C

CPS MODEL 2600 GENERATES VOLTAGES THAT ARE DANGEROUS AND POTENTIALLY LETHAL. OBSERVE EXTREME CAUTION WHEN WORKING WITH THIS EQUIPMENT AND FOLLOW ALL DIRECTIONS AND GUIDELINES IN THIS DOCUMENT.

Safety

READ this document in its entirety before making any electrical connections to a model 2600 power supply.

STOP and consult CPS if you are unsure or have questions about safety or operation of model 2600. Technical and safety assistance can be obtained from:

CPS Technical Support
7313 SW Tech Center Dr
Portland, OR 97223, USA
503-684-8026

Important Notes

Important safety notes appear throughout this document:

- **WARNING** notes call attention to hazards that could lead to injury or death.
- **CAUTION** notes indicate procedures to be followed to avoid damage to equipment.

Operational Safety

- All equipment must be properly grounded and all cables must be properly connected before applying power.
- Note that high voltage may remain on internal capacitors during long periods of time, even if the unit has not been recently powered.
- Do not disconnect any cables from operating equipment as this could interrupt the return ground and cause dangerous high voltage on unprotected conductors.
- Do not ground yourself or work under wet or damp conditions.

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 PRESENT INSIDE THE UNIT.

Servicing Safety

- Servicing (installation or replacement) should only be performed by qualified personnel who are aware of the electrical hazards.
- Before servicing a 2600 power supply, disconnect the input power and discharge the HV output.

WARNING

IF THE EQUIPMENT IS USED IN ANY MANNER NOT SPECIFIED BY CPS, THE PROTECTION PROVIDED BY THE POWER SUPPLY MAY BE IMPAIRED AND MAY RESULT IN INJURY OR EQUIPMENT DAMAGE.

Symbol Definitions

Direct Current

Protective Conductor Terminal

Caution (refer to accompanying documents)

Caution, risk of electric shock

Introduction

CPS Model 2600 sets the standard for high performance in modular high voltage power supplies. It generates up to 60kV, positive or negative output (factory configured). A serial RS-232 interface is provided to allow computer control and monitoring of the power supply.

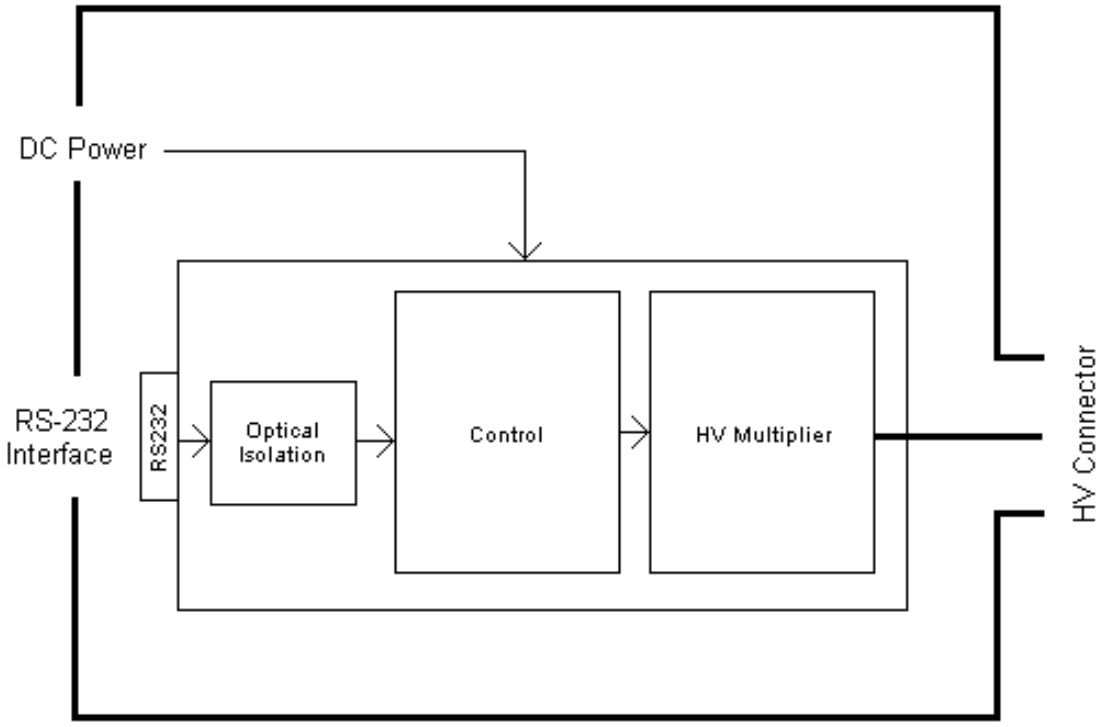
Model 2600 delivers exceptional performance in all critical power supply parameters such as ripple, stability, temperature coefficient and regulation. Low ripple is achieved with special ripple cancellation circuitry. The advantages of this design include low stored energy, compact packaging and improved reliability should arcing occur. The exceptional stability and low temperature coefficient of the 2600 are the result of careful design practice and the selection of quality components throughout.

The CPS Model 2600 series of power supplies is designed for system component or standalone laboratory use in applications requiring a stable, regulated, low-noise source of high voltage power. Suitable applications include capacitor charging, phototube systems, laser systems, electron microscopes, and focused ion and electron beam systems for lithography, etc.

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

Block Diagram

The CPS 2600 circuitry includes a HV multiplier, control unit, and optically isolated interface circuit. The multiplier converts low voltage to high output voltage. The control unit manages all internal power supply operations and communications (via RS-232) with an external computer.



Electrical Specifications

Input voltage	*+28 V, ±10%*
Input current	*3 A maximum*
Input power	*100 W maximum*
Output voltage	*up to 60 kV (negative or positive)*
Output current	*1 mA maximum*
Set ability	*1 V steps*
Stability	*10 ppm/hour*
Ripple/Noise	*less than 100 mV p-p*
Input I/O	*RS-232, 500V AC/DC ground-isolated*

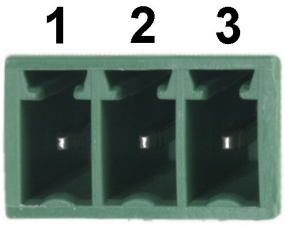
Environmental Requirements

Model 2600 must operate under following conditions:

- The equipment is intended for indoor use only
- Operating temperature 0 to 40^0C
- Altitude up to 2000 m
- Maximum relative humidity 80% at 31^0C and 50% at 40^0C
- Installation category - Intended for use in installation category (over voltage category) II (IEC 1010-1 standard)
- Pollution degree - Category 2 (IEC 1010-1 standard)

Connector Pinouts

Power connector: 3 pin, type1803280, Phoenix Contact: see Figure 2.



1 - positive

2 - negative (ground)

3 – HV return

RS-232 interface connector:

1 - DCD

2 - RxD

3 - TxD

4 - DTR

5 - GND

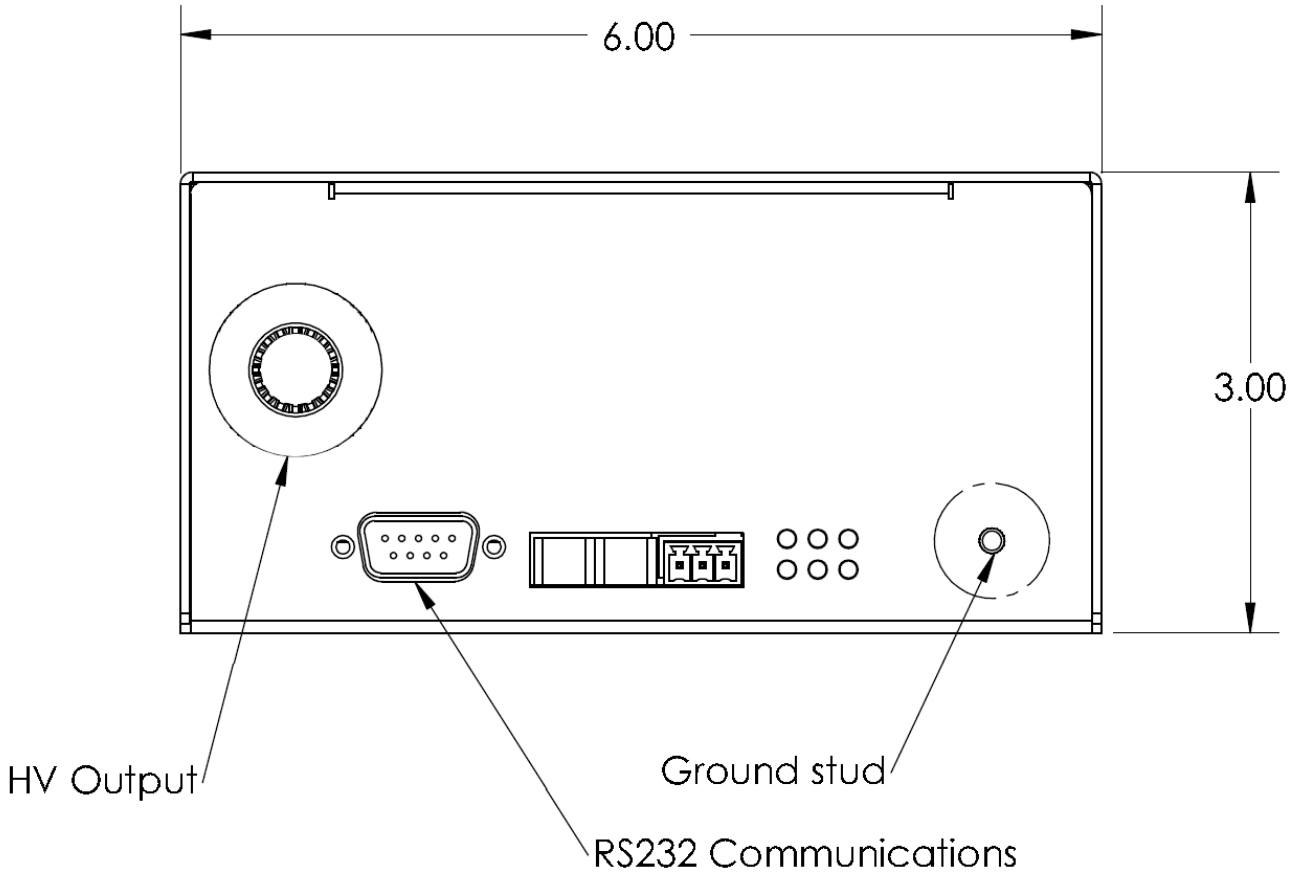
6 - DSR

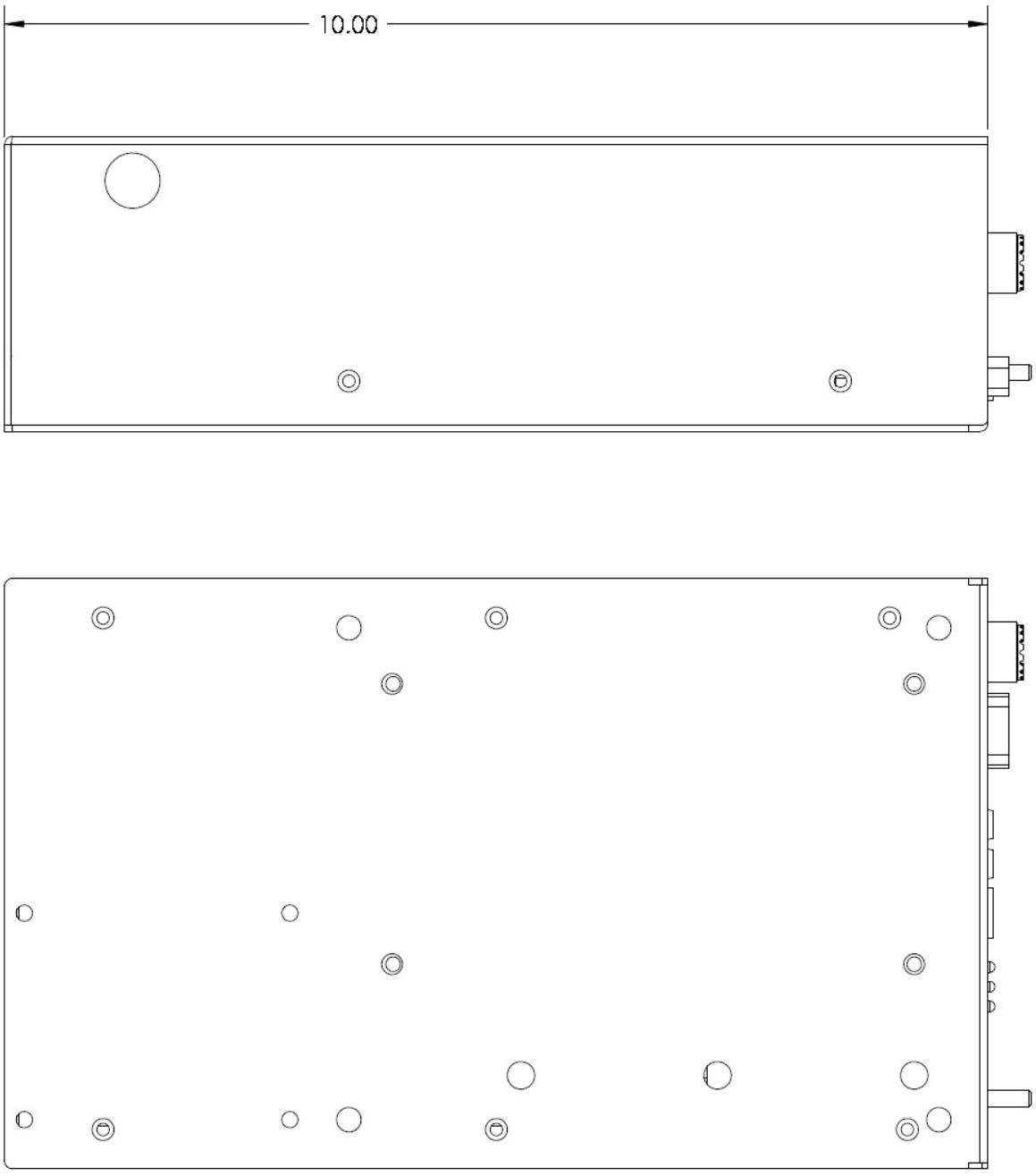
7 - RTS

8 - CTS

9 – RING

Mechanical Specifications





WARNING

THE SHIELD OF THE HIGH VOLTAGE CABLE MUST BE GROUNDED. FAILURE TO FOLLOW THIS WARNING MAY RESULT IN SEVERE HEALTH HAZARD.

Installation

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 THE OPERATOR. THIS SWITCH OR CIRCUIT BREAKER SHALL BE MARKED AS THE DISCONNECTING DEVICE FOR THE POWER SUPPLY.

CAUTION

DO NOT CONNECT THE POWER SUPPLY TO A POWER SOURCE UNTIL DIRECTED TO DO SO. FAILURE TO FOLLOW THESE INSTRUCTIONS MAY VOID THE WARRANTY AND RESULT IN AN UNSAFE CONDITION.

1. Create a directory on your computer for model 2600 software. Download the 2600 software developer's kit (SDK) from CPS' web site and unzip it into the newly created directory. The resulting directory will include two essential files: c2600.dll and 2600demo.exe, a Windows demo program that allows a computer to control and monitor a 2600. The demo can control and monitor one power supply. If you are using more than one power supply, each power supply must be connected to a different COM port and controlled by a dedicated instance of the demo.
2. The chassis of the power supply must be grounded. Connect ground to both the chassis ground stud and the ground pin of the power input connector.
3. Attach the HV cable to the load. The HV cable must be shielded with a wire braid that functions as a high voltage return.
4. Insert the mating plug at the other end of the HV cable into the power supply's HV output receptacle and hand tighten it in place. If desired, dielectric silicon grease may be added to improve the connector's performance (contact the connector manufacturer for instructions). Make absolutely sure that good, reliable high voltage output and high voltage return connections are made between the supply and the load.
5. Using a null-modem cable, connect the power supply's RS-232 connector to the computer's COM port or – if the computer has no COM port – to a USB COM port adapter which has been plugged into one of the computer's USB ports. USB COM port adapters are available from CPS; contact CPS sales for details.

6. Connect a de-energized, external 28 VDC power source to the 2600 power input connector.

Operation

WARNING

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

WARNING

THE VOLTAGE METER DOES NOT ACCURATELY INDICATE OUTPUT VOLTAGE WHEN INPUT POWER HAS BEEN DISCONNECTED OR SWITCHED OFF – HIGH VOLTAGE MAY STILL EXIST AT THE LOAD.

1. Turn on the 28 VDC power source.
2. Run the demo program (2600demo.exe) on the control computer. When the program starts it will display a window as shown in Figure 4.

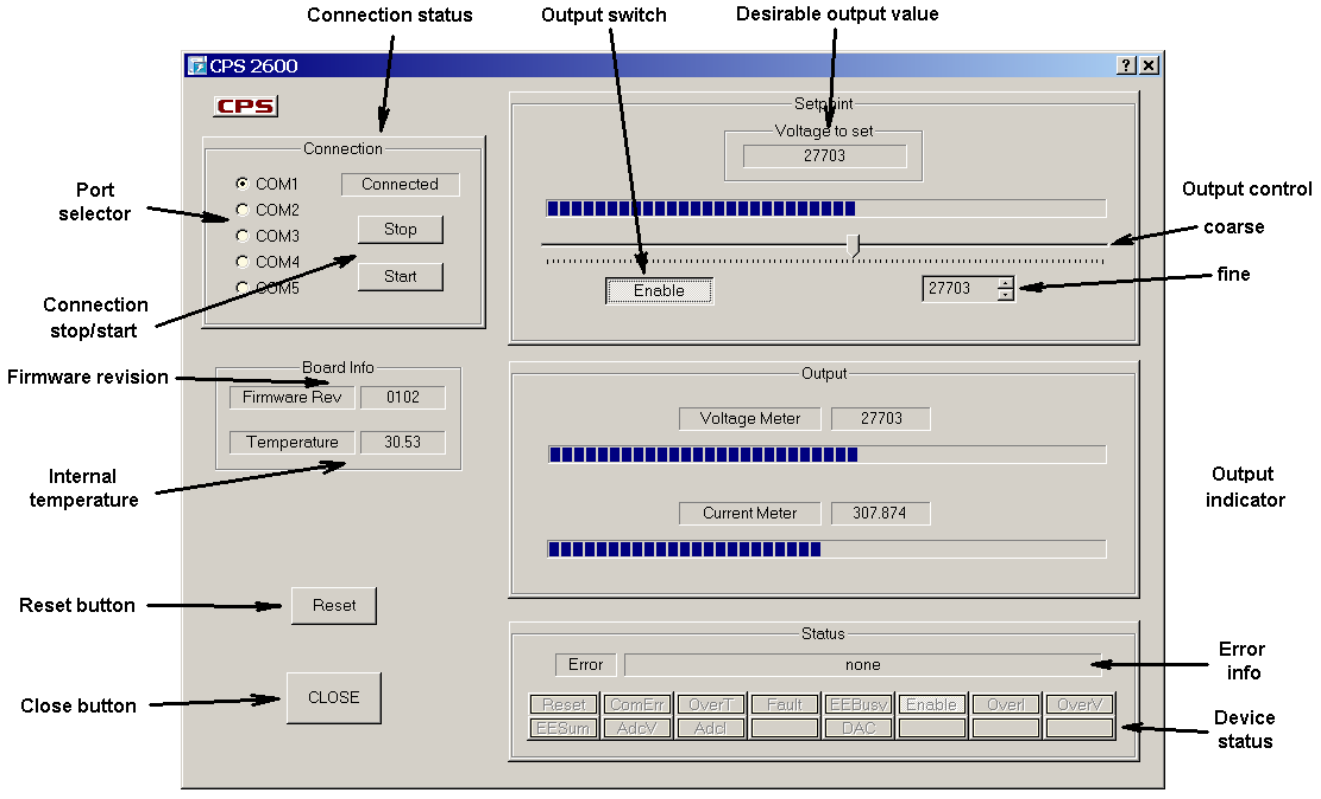


Figure 4. Demo program

3. Output power may be now be applied to the load. Set the desired output voltage with the setpoint output controls (coarse slider, fine up/down control), and enable or disable the HV output using the Enable button.

   Note that the output slew rate is limited to ensure even and safe charging of the power supply's output capacitors. When the HV output is disabled or the setpoint voltage is reduced, the discharge rate is determined by output capacitance and resistance. You can read the actual output levels on the displayed voltage and current meters.

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.