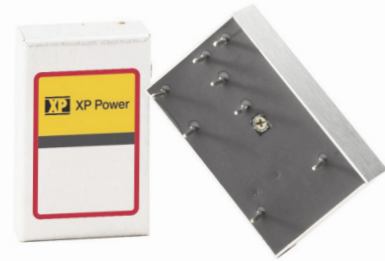


1 Watt

- Operating Temperature -55°C to +70°C
- Precision Voltage Regulated
- Output Voltages from 100V to 2000V
- 5V and 12V Input Models
- 0 to 100% Programmable Output
- On-board Voltage Reference
- Temperature Coefficient <25ppm/°C
- Shielded Case with Isolated Case Ground
- Ultra Low Ripple, down to 5ppm
- 3 Year Warranty

The CA-T Series are precision regulated high voltage power supplies that are designed to perform over a wide operating temperature range of -55°C to +70°C without derating. They are fully programmable (0 to 100%) via a DAC compatible high impedance programming input and include a voltage monitor output for easy system integration. The on-board precision reference output can be used to drive the programming input to further simplify the solution.

A quasi-sinewave oscillator design with additional output filtering results in very low ripple and noise and excellent stability. All models include protection against arcs and short circuits. The internal transformer shielding and isolated case reduce EMI/RFI radiation to extremely low levels making these ideal for sensitive equipment containing photomultiplier tubes or avalanche photodiodes.



Dimensions:

CA-T Series:

1.8 x 1.12 x 0.51" (45.7 x 28.5 x 12.9mm)

Key Applications:

- Photo Multiplier Tube
- Solid State Detectors
- Avalanche Photodiodes
- Electrophoresis
- Piezo Devices
- Capacitor Charging
- EO Lenses

Input

12Vin Models

| Characteristic | Minimum | Typical | Maximum | Units | Notes & Conditions |
|---------------------------|---------|---------|---------|-------|---------------------|
| Input Voltage, Vin | 11.5 | 12.0 | 15.5 | VDC | For 12Vin models |
| Input Current, No Load | | | 80 | mA | 200V-1200V |
| Input Current, No Load | | | 100 | mA | 2kV |
| Input Current, Full Load | | | 220 | mA | All Output Voltages |
| Programming Voltage, Vpgm | 0 | | 5 | VDC | <150μA |

5Vin Models

| Characteristic | Minimum | Typical | Maximum | Units | Notes & Conditions |
|---------------------------|---------|---------|---------|-------|--------------------|
| Input Voltage, Vin | 4.75 | 5 | 5.25 | VDC | For 5Vin models |
| Input Current, No Load | | | 65 | mA | 200V-1200V |
| Input Current, No Load | | | 155 | mA | 2kV |
| Input Current, Full Load | | | 420 | mA | 200V-1200V |
| Input Current, Full Load | | | 550 | mA | 2kV |
| Programming Voltage, Vpgm | 0 | | 2.048 | VDC | <150μA |

Output

| Characteristic | Minimum | Typical | Maximum | Units | Notes & Conditions |
|----------------------------------|--------------------------|----------|----------|--------|---|
| Output Voltage | | | 2000 | VDC | See Models and Ratings Table |
| Output Current | | | 5 | mA | See Models and Ratings Table |
| Output Programming | 0 | | 100 | % | |
| Setpoint Accuracy ⁽⁴⁾ | | ±1 | | % | |
| Gain Adjust ⁽⁵⁾ | | ±1 | | % | Potentiometer |
| Linearity ⁽⁶⁾ | | | ±0.5 | % | From 15% to 100% Vout |
| Minimum Load | No minimum load required | | | | |
| Line Regulation | 0.001 | | 0.01 | % | Conditions: 100% Vpgm, Full Load |
| Load Regulation | 0.001 | | 0.05 | % | No Load to Full Load at 100% Vpgm, Nominal Vin. |
| Short Circuit Protection | 1 | | | min | |
| Ripple and Noise | 0.0005 | | 0.01 | % | 1MHz bandwidth |
| Temperature Coefficient | | 25 | | ppm/°C | |
| Stability | | | 50 | ppm/hr | |
| Voltage Monitor Output | 0 | | Max Vpgm | VDC | Range corresponds to 0 to 100% Vout |
| Voltage Reference Output | | Max Vpgm | | | Vref is a fixed output equal to Max Vpgm |

General

| Characteristic | Minimum | Typical | Maximum | Units | Notes & Conditions |
|---------------------------|--|---------|---------|-------|------------------------------|
| Isolation | N/A – Input ground is connected to output ground | | | | |
| Construction | Case materials is aluminum. UL 94 V-0 rated solid vacuum encapsulation | | | | |
| Switching Frequency | 80 | | 400 | kHz | |
| Mean Time Between Failure | 2.1 | | | MHrs | Per Bellcore TR 332 GB +25°C |

Environmental

| Characteristic | Minimum | Typical | Maximum | Units | Notes & Conditions |
|-----------------------|---------|---------|---------|-----------|--------------------|
| Operating Temperature | -55 | | +70 | °C | Case temperature |
| Storage Temperature | -55 | | +95 | °C | |
| Humidity | | | 95 | %RH | Non-condensing |
| Cooling | | | | | Natural convection |
| Thermal Shock Limit | | | 1 | °C/10secc | |

Safety Approvals

| Safety Agency | Safety Standard | Notes & Conditions |
|---------------|-------------------------------------|--------------------|
| RoHS | RoHS 2 and 3 Directive (2011/65/EU) | Where applicable |

Notes

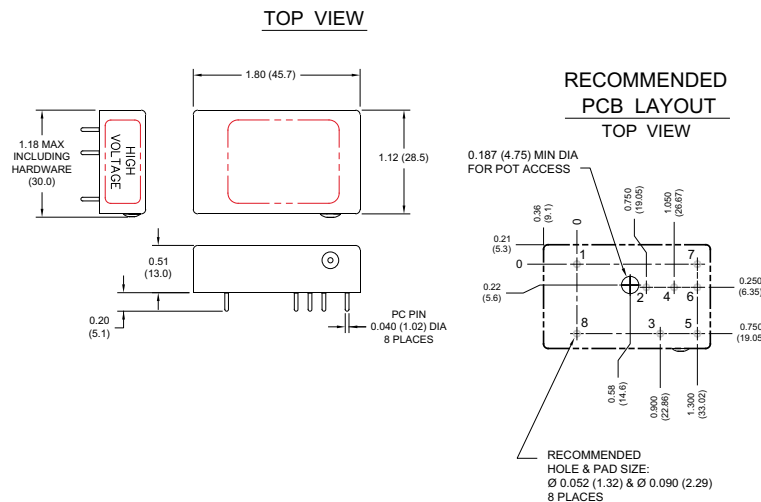
- Maximum rated output current is available from 100% Max Vout down to 50% Max Vout, then derates linearly from 50% Max Vout down to zero.
- Specifications after 1 hour warm-up, full load, 25°C unless otherwise indicated.
- Proper thermal management techniques are required to maintain safe case temperature.
- SET POINT ACCURACY refers to the ability of the unit to accurately deliver the programmed voltage.
- GAIN ADJUST refers to the ability to alter the gain of the circuit to allow for set-point accuracy error.
- LINEARITY refers to how much the transfer function can deviate from a straight line in the absence of any set-point error.

Models & Ratings

| Output Voltage | Output Current ⁽¹⁾ | Regulation | | Ripple | Frequency | Input Voltage | Model Number |
|----------------|-------------------------------|------------|------------|----------|------------|---------------|--------------|
| | | Load | Line | | | | |
| 0 to -200V | 5mA | <0.05% | <0.01% | <0.01% | 80-230kHz | 12V | CA02N-T |
| 0 to +200V | 5mA | <0.01% | <0.01% | <0.01% | 100-250kHz | 5V | CA02P-5TR |
| 0 to +200V | 5mA | <0.05% | ----<0.01% | <0.01% | 80-180kHz | 12V | CA02P-T |
| 0 to -500V | 2mA | <0.01% | <0.01% | <0.01% | 100-250kHz | 12V | CA05N-T |
| 0 to +500V | 2mA | <0.003% | <0.002% | <0.005% | 100-250kHz | 5V | CA05P-5T |
| 0 to +500V | 2mA | <0.01% | <0.01% | <0.01% | 200-400kHz | 12V | CA05P-T |
| 0 to -1000V | 1mA | <0.005% | <0.001% | <0.001% | 100-250kHz | 5V | CA10N-5T |
| 0 to -1000V | 1mA | <0.005% | <0.001% | <0.001% | 100-250kHz | 12V | CA10N-T |
| 0 to -1250V | 0.8mA | <0.005% | <0.001% | <0.001% | 150-300kHz | 5V | CA12N-5TR |
| 0 to -1250V | 0.8mA | <0.005% | <0.001% | <0.0005% | 80-250kHz | 12V | CA12N-T |
| 0 to +1250V | 0.8mA | <0.005% | <0.001% | <0.001% | 150-300kHz | 5V | CA12P-5T |
| 0 to +1250V | 0.8mA | <0.005% | <0.001% | <0.0005% | 80-250kHz | 12V | CA12P-T |
| 0 to -2000V | 0.5mA | <0.001% | <0.001% | <0.001% | 100-250kHz | 5V | CA20N-5T |
| 0 to -2000V | 0.5mA | <0.01% | <0.01% | <0.001% | 100-250kHz | 12V | CA20N-T |
| 0 to +2000V | 0.5mA | <0.01% | <0.01% | <0.001% | 80-250kHz | 12V | CA20P-T |

R suffix is used as a RoHS designator for legacy part numbers.

Mechanical Details



| Pin | Function | Description | 5Vin | 12Vin |
|-----|----------|---|--------------------|------------------|
| 1 | VOUT | High Voltage Output | Ground to Pin 8 | |
| 2 | VPGM | Voltage Programming Input, <150uA | 0 to +2.048V | 0 to +5V |
| 3 | SGND | Signal Ground [For VPGM, VIN, VMON] | Low Voltage Ground | |
| 4 | VREF | Voltage Reference Output, +/- 1%, 1 mA | +2.048V | +5V |
| 5 | CGND | Case Ground | Case Ground | |
| 6 | VIN | Input Voltage | +4.75 to +5.25V | +11.5V to +15.5V |
| 7 | VMON | Voltage Monitor Output, 1mA, scales to 0 to 100% Vout | 0 to +2.048V | 0 to +5V |
| 8 | HV RTN | HV Output Return | Ground for Pin 1 | |

Notes

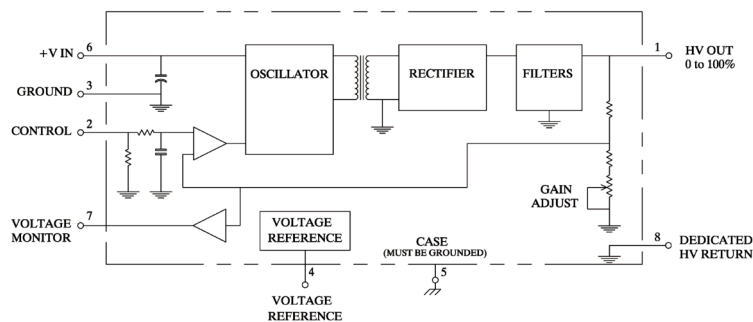
- All dimensions are in inches (mm)
- Weight: 1.4oz (39.6g)
- Tolerance: X.XX±0.02 (0.51)
- Pin Tolerance: ±0.005 (0.127)
- All grounds internally connected except case. Case Ground (Pin5) must be connected to ground, with no more than 50V between case ground (Pin 5) and circuit ground (Pin 3).
- On negative output models, voltage monitor is buffered representation of programming voltage.

Distribution:

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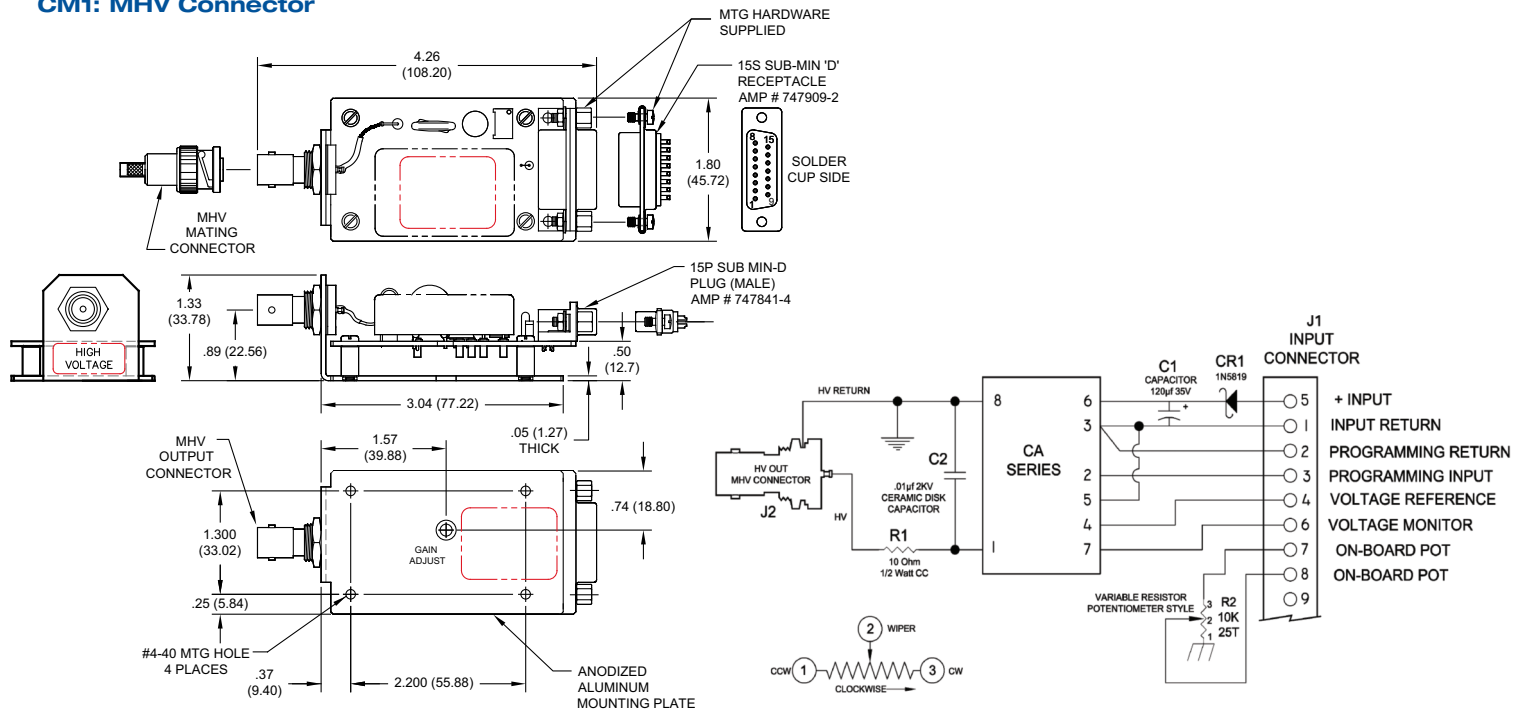
hivolt.de GmbH & Co. KG
 Oehleckerring 40 • D-22419 Hamburg • Germany
 +49 40 537122-0
 info@hivolt.de • www.hivolt.de

Block Diagram



Mounting Kit

CM1: MHV Connector



Product Description

These adapters provide convenient prototyping and evaluation during system development and integration. They allow the high voltage modules to be mounted to a chassis instead of designed into a PC board. Extra filtering on the input and output improves performance. A schottky diode on the input provides reverse polarity protection. Input connector is via a 15P SUB MIN-D plug (mate supplied) and output is via an MHV style coaxial connector (mate supplied). Please note when ordering, the high voltage module is not included and must be ordered separately.

Programming Instructions

Onboard Potentiometer: connect pins 7 to 4 and 8 to 3, turn potentiometer to adjust high voltage. Or Remote Potentiometer: connect wiper arm to pin 3, other sides to pins 4 and 2. Or Remote Analog Signal: apply programming voltage to pin 3, return to pin 2.

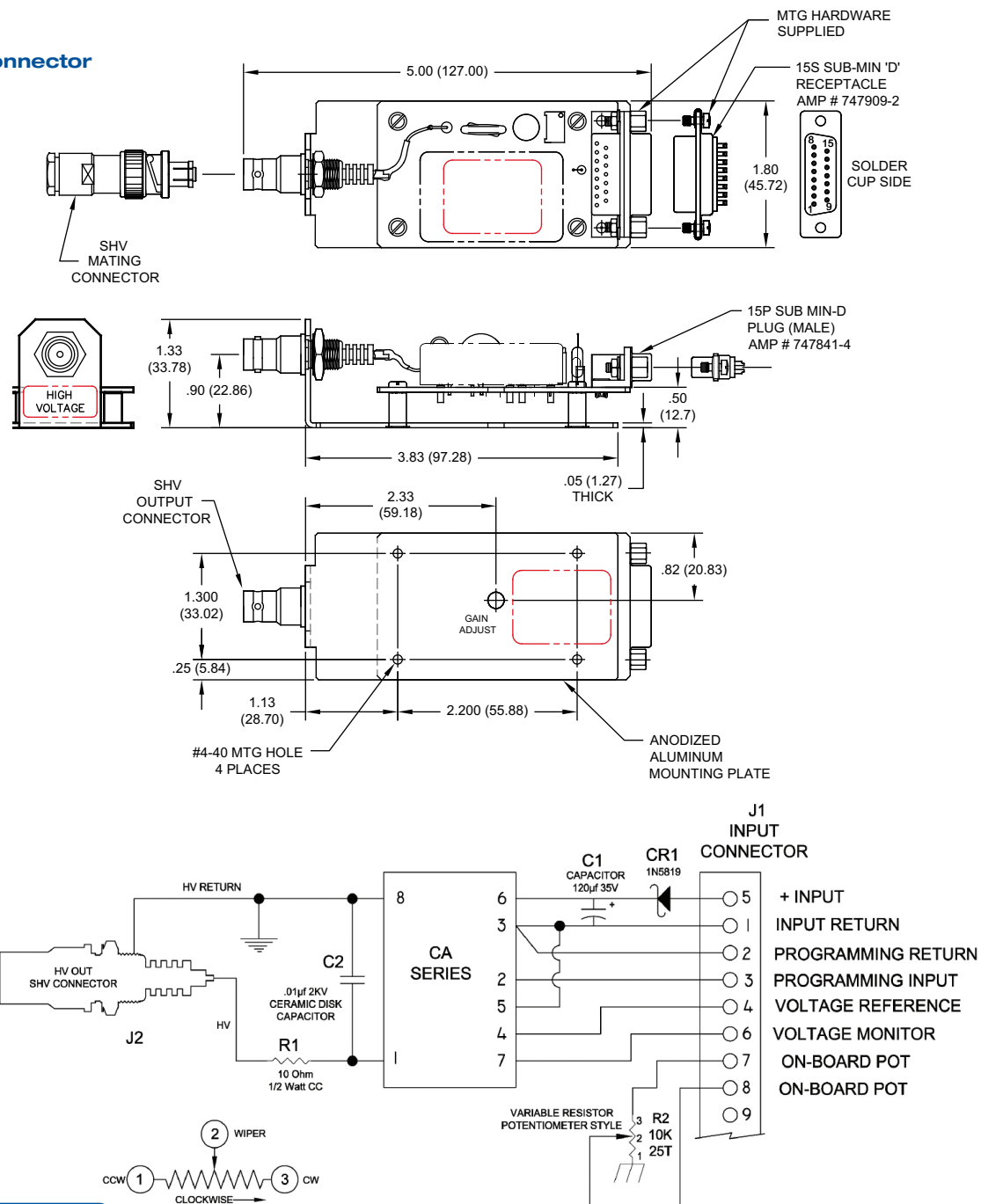
Distribution:

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+49 40 537122-0
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Mounting Kit

CM2: SHV Connector



Product Description

These adapters provide convenient prototyping and evaluation during system development and integration. They allow the high voltage modules to be mounted to a chassis instead of designed into a PC board. Extra filtering on the input and output improves performance. A schottky diode on the input provides reverse polarity protection. Input connector is via a 15P SUB MIN-D plug (mate supplied) and output is via an SHV style coaxial connector (mate supplied). Please note when ordering, the high voltage module is not included and must be ordered separately.

Programming Instructions

Onboard Potentiometer: connect pins 7 to 4 and 8 to 3, turn potentiometer to adjust high voltage. Or Remote Potentiometer: connect wiper arm to pin 3, other sides to pins 4 and 2. Or Remote Analog Signal: apply programming voltage to pin 3, return to pin 2.

Distribution:

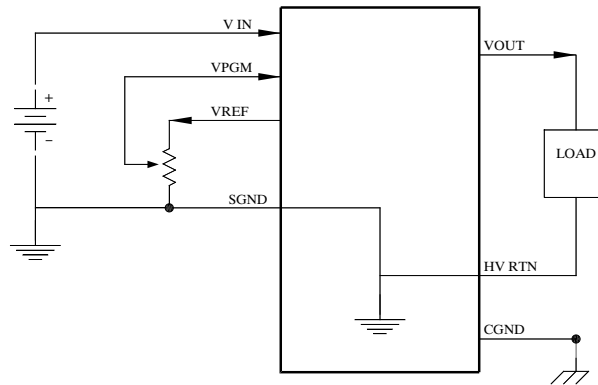
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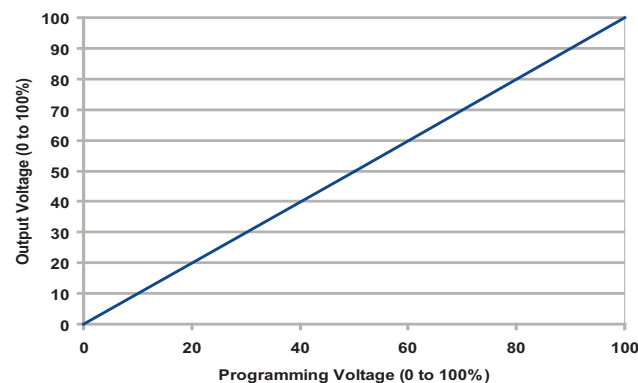
Application Notes

Connection Diagram for VREF programming

For best performance a separate voltage source should be used for the voltage programming input. If this is not available, the user can utilize the voltage reference output (VREF), along with a user provided potentiometer, for the voltage programming input (VPGM).



Programming Voltage vs Output Voltage



Sequencing

For the CA-T Series, it is recommended to wait at least 100msec after input power is applied before sending a voltage programming command.

Dynamic Response

In cases where the output voltage rises above the voltage programming command then settles. To mitigate this effect, ramp the voltage programming input at a slower rate until satisfactory results are achieved.