



PVX-4000-2kV Pulsed Voltage Source — Datasheet



Precision Pulse Control

The PVX-4000-2kV is an air-cooled, high voltage pulse generator. Optimized for high impedance capacitive loads, the PVX-4000-2kV is well-suited for driving extraction grids and deflection plates for electrostatic modulation of particle beams in time-of-flight mass spectrometers and accelerators.

System Operation

The output voltage can be set from 0 V to ± 2000 V. Duty cycles from 2% to 98% and repetition rates from 40 Hz to 30,000 Hz are supported by the internal trigger source.

With a built-in trigger source and the internal positive and negative high-voltage DC power supplies, the PVX-4000-2kV can be used as a standalone test system. Programming is done through a front panel as well as RS-232 and USB computer interfaces.

If using the internal trigger source, when changing the frequency, the duty cycle is maintained and the new pulse width is displayed. It is recommended that the frequency be changed before the pulse width is changed.

Pulse widths from 500 ns to 100% duty cycle and repetition rates from single-shot to 100 kHz are supported when an external trigger source is used.

Computer Interfaces

For automated applications, complete control of the instrument is provided through RS-232 and USB computer interfaces. Up to five system configurations may be stored in internal non-volatile memory, providing instant recall of frequently-used configurations.

Control Signals

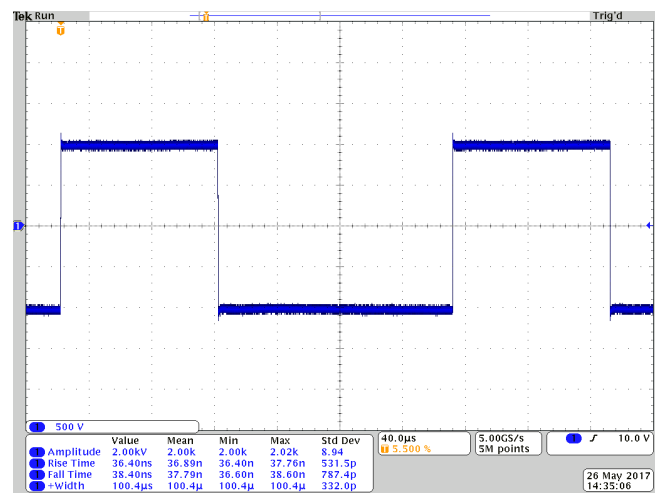
Conveniently-located front panel BNC connectors allow the PVX-4000-2kV to be externally triggered. The impedance of the gate input is 50 Ω .

The system has a Sync output for interconnection to other equipment. The pulse from the Sync output is synchronized to the leading edge of the output voltage pulse. The impedance of the sync output is 50 Ω .

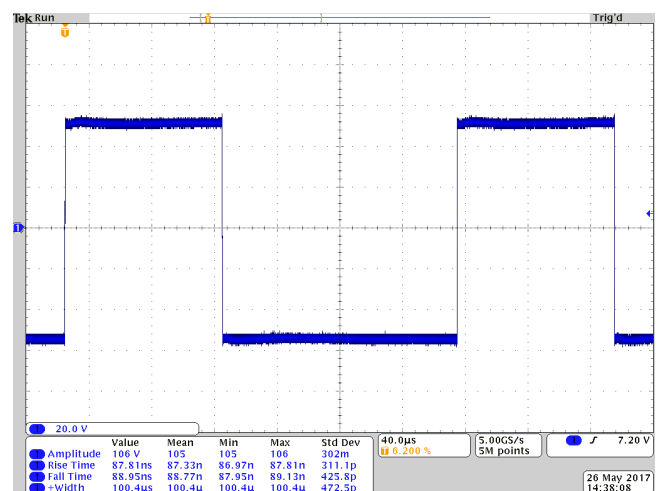
The system can easily be monitored through the Voltage Monitor BNC connection using an oscilloscope set to 1 M Ω termination.

Ordering Information

| | |
|--------------|------------------------|
| PVX-4000-2kV | System |
| PCA-9400 | Output Cable |
| PCA-9410 | BNC Shorting Connector |



+1000 V & -1000 V, 4 kHz, 100.4 μ s, 344 pF Load



+50 V & -50 V, 4 kHz, 100.4 μ s, 344 pF Load

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Pulse Characteristics

| | |
|------------------------|--|
| Output Voltage Range | 0 V to ± 2000 V *** |
| Voltage Overshoot | < 2% |
| Voltage Rise/Fall Time | ≤ 50 ns from 500 V to 2000 V ≤ 100 ns from 200 V to 500 V |
| Voltage Rise/Fall Time | ≤ 50 ns from -500 V to -2000 V ≤ 100 ns from -200 V to -500 V |

Output Power

Refer to SOA Graphs

*** The positive and negative high voltage output levels must not exceed 2000 V total.

$$V_{\text{positive}} + |V_{\text{negative}}| \leq 2000 \text{ V}$$

Internal Trigger

| | |
|----------------------|--|
| Frequency Range | 40 Hz to 30 kHz |
| Frequency Resolution | 40 Hz to 1000 Hz @ 10 Hz 1100 Hz to 30 kHz @ 100 Hz |

| | |
|------------------------|---|
| Pulse Width | 2% to 98% Duty Cycle |
| Pulse Width Resolution | 6.4 μ s from 40 Hz to 1000 Hz 0.4 μ s from 1100 Hz to 5000 Hz 0.05 μ s from 5100 Hz to 30000 Hz |

External Gate

| | |
|-----------------------|--|
| Frequency Range | Single-shot to 100 kHz |
| Trigger Pulse Width | 500 ns to 100% duty cycle |
| Termination Impedance | 50 Ω |
| Connector | BNC |
| Input Voltage Levels | 0 V input = output pulse off +5 V input = output pulse on |

Monitors

| | |
|-----------------------------|---|
| Voltage Monitor | 1000 V / 10 V (typical), see note 3. |
| Voltage Monitor Termination | 1 M Ω |
| Voltage Monitor Connector | BNC |
| Sync Termination | 50 Ω |
| Sync Connector | BNC |
| Sync Output Voltage Levels | 0 V output = - HV output pulse < +3.3 V output = + HV output pulse |

Enable Input BNC connector

External dry-contact closure or factory supplied shorting BNC plug.

Output Connector

| | |
|-------------------------|--|
| Pulsed Output Connector | Winchester Kings 10 kV, Rear Panel 1065-2 plug |
|-------------------------|--|

Power Specifications

| | |
|----------------------|--|
| Voltage Requirements | 100 VAC to 120 VAC \pm 10% 220 VAC to 240 VAC \pm 10% 50 Hz to 60 Hz |
| Line Frequency | 50 Hz to 60 Hz |
| Power Requirements | 600 W |
| AC Connector Type | NEMA C-14 |

General

| | |
|------------------------|--|
| Size (HxWxD) | 15 cm x 49 cm x 52 cm |
| Weight | 8 kg |
| Operating Temperature | 15 $^{\circ}$ C to 35 $^{\circ}$ C |
| Computer Communication | RS-232 and USB, @ 115200 baud, 8 data bits, no parity, 1 stop bit, and no flow control |

Notes

Warranty: One year parts and labor on defects in materials and workmanship.

1. The PVX-4000-2kV voltage source meets or exceeds these specifications. The unit was tested driving a **344 pF** load at 2000 V output.
2. The factory supplied output cable has 1.57 pF / 1.0 cm of cable. This needs to be calculated in the load value.
3. V_{MON} is designed to be used with RG 58/U 2ft long coax cable connected between the V_{MON} BNC output and an oscilloscope terminated in to a 1 M ohm input impedance.

Specifications subject to change without notice.





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Safe operating area graphs; stay below the line for proper operation.

