



## Precision Pulse Control

The PVX-4000-2kV-EX is an air-cooled, high voltage pulse generator. Optimized for high impedance capacitive loads, the PVX-4000-2kV-EX 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 PVX-4000-2kV-EX system requires external high voltage power supplies. Using external HVPSs, the output voltage can be set from 0 V to  $\pm 2000$  V. Duty cycles from 2% to 98% and repetition rates from 40 Hz to 30,000 Hz are supported by the internal trigger source.

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 600 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

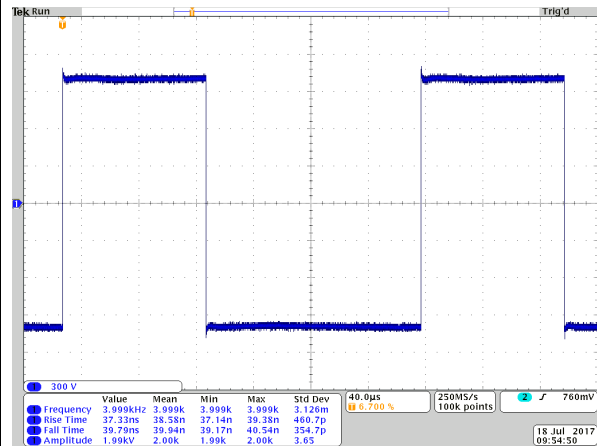
Conveniently-located front panel BNC connectors allow the PVX-4000-2kV-EX to be externally triggered. The impedance of the gate input is 50  $\Omega$ .

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  $\Omega$ .

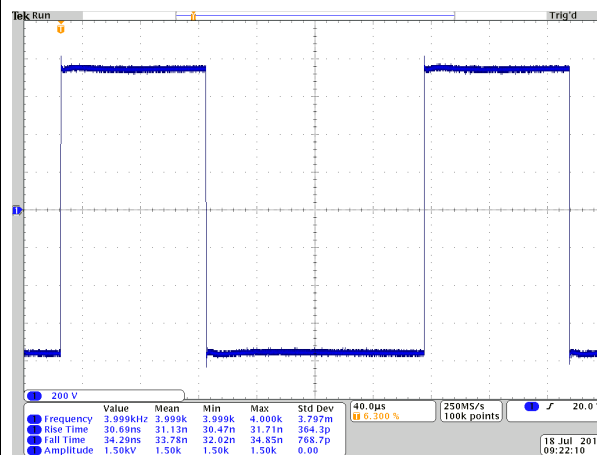
The system can easily be monitored through the Voltage Monitor BNC connection using an oscilloscope set to 1 M $\Omega$  termination.

## Ordering Information

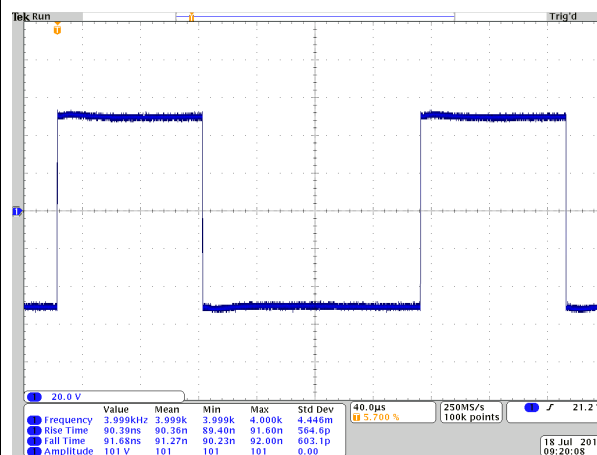
PVX-4000-2kV-EX	System
PCA-9400	3x Input/Output Cables
PCA-9410	1x BNC Shorting Connector



+1000 V & -1000 V, 4 kHz, 100.0  $\mu$ s, 344 pF Load



+750 V & -750 V, 4 kHz, 100.0  $\mu$ s, 344 pF Load



+50 V & -50 V, 4 kHz, 100.0  $\mu$ s, 344 pF Load

## 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	<b>Refer to SOA Graphs</b>

\*\*\* The positive and negative high voltage input levels must not exceed 2000 V total. Reduce the high voltage input on either channel to achieve ≤ 2000 V. Use the below formula:

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

## Internal Trigger

Frequency Range	40 Hz to 30000 Hz
Frequency Resolution	40 Hz to 1000 Hz @ 10 Hz 1100 Hz to 30000 Hz @ 100 Hz
Pulse Width	2% to 98% Duty Cycle
Pulse Width Resolution	6.4 μs from 40 Hz to 1000 Hz 0.4 μs from 1100 Hz to 5000 Hz 0.05 μs from 5100 Hz to 30000 Hz

## External Gate

Frequency Range	Single-shot to 600 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 MΩ
Voltage Monitor Connector	BNC
Sync Termination	50 Ω
Sync Connector	BNC
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.

## High Voltage Connectors

Pulsed Output Connector	Winchester Kings 10 kV, Rear Panel 1065-2 plug
DC HV Input Connectors	Winchester Kings 10 kV, Rear Panel 1065-2 plug

## Power Specifications

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

## General

Size (HxWxD)	15 cm x 49 cm x 52 cm
Weight	7 kg
Operating Temperature	15 °C to 35 °C
Computer Communication	RS-232 and USB, @ 115200 baud, 8 data bits, no parity, 1 stop bit, and no flow control

## Notes

1. The PVX-4000-2kV-EX voltage source meets or exceeds these specifications. The system 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<sub>MON</sub> is designed to be used with RG 58/U 2ft long coax cable connected between the V<sub>MON</sub> BNC output and an oscilloscope terminated in to a 1 M ohm input impedance.

Specifications subject to change without notice.



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

