PCX-7401 Pulsed Precision Current Source — Datasheet

Precision Pulse Control

The PCX-7401 offers the capability of providing both pulsed and bias outputs. A modern internal trigger source is capable of two modes of operation: duty cycle and single shot. External trigger is available for additional flexibility.

Low Inductance Output Cable

Connection to the laser diode is made through an innovative low-inductance stripline cable, designed to preserve the fidelity of high-speed current pulses. The output connector is interlocked so that the PCX-7401 is disabled when the cable is removed.

Output Protection

The PCX-7401 features advanced circuitry to protect both the laser diode and instrument. At turn on, and at any time the output is not enabled, the PCX-7401's output is electronically shorted to ground, ensuring that no current flows through the laser diode. Safety features of the instrument include a separate output enable key switch, an output cable safety interlock, and an external enable control signal.

Ease of Setup and Operation

The PCX-7401 may be operated through the intuitive front panel controls. The color LCD provides immediate visual confirmation of all operating parameters.

Store and Recall User Settings

All system configurations may be stored and recalled in the internal non-volatile memory.

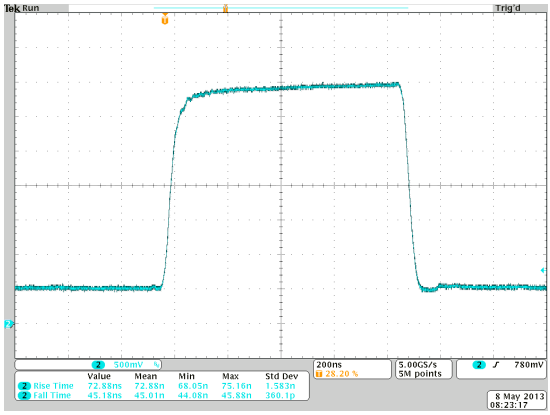
Complete System Integration

Automated applications can utilize RS-232, USB, or Ethernet computer interfaces.

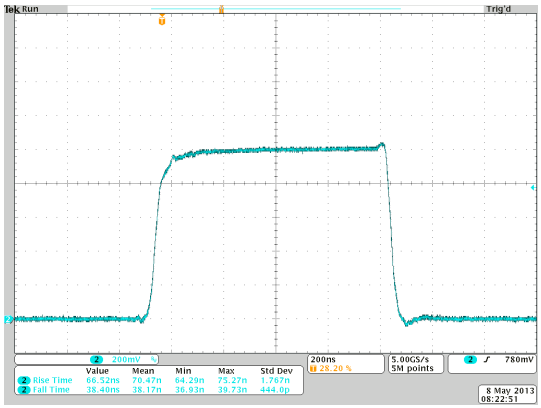
Ordering Information

PCX-7401	Precision Pulsed Current Source
6045-0003	Output Stripline Cable
6045-0097	Laser Output PCBA
PCA-9550	Current/Voltage Monitor Cable
PCA-9410	BNC Shorting Connector

Each PCX-7401 is delivered with a Output Stripline Cable, Laser Output PCBA, Current/Voltage Monitor Cable and BNC shorting connector.

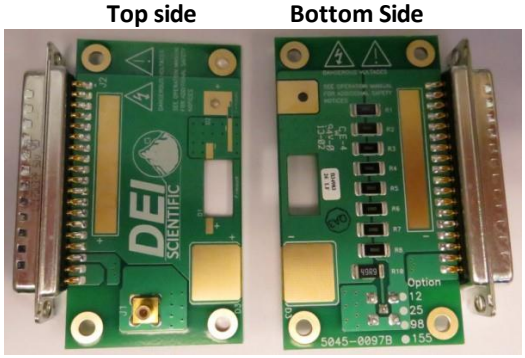


3.000 A output with 0.500 A bias



1.000 A output with 0.000 A bias

Top side **Bottom Side**



Laser Output PCBA

On the laser output PCBA above, the current monitor (J1) has a ratio of 125 mV/A, with a 50 Ω termination.

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Pulse Amplitude

Output Current Range	0.000 A to 3.000 A
Setpoint Resolution	0.001 A
Setpoint Accuracy*	± 0.001 A
Compliance Voltage	≤ 15 V
Overshoot	< 2 %
Maximum Output Power	54 W

Bias Amplitude

Bias Current Amplitude	0.000 A to 0.550 A
Bias Current Resolution	0.001 A
Bias Current Accuracy	± 0.001 A

Output Parameters

Pulse Width Range	100 ns to DC
Rise/Fall Time	≤ 100 ns
Polarity	Positive

Internal Trigger

Frequency Range	5 Hz to 1.000 MHz	
Frequency Resolution	5 Hz to 995 Hz:	5 Hz
	1 kHz to 49.9 kHz:	100 Hz
	50 kHz to 1 MHz:	1000 Hz
Frequency Accuracy	± (0.01 x setpoint +2) Hz	
$T_{jit(cc)}$ (cycle to cycle jitter)	≤ 25 ns	
Duty Cycle Range	1 % to 99 %	
Duty Cycle Resolution	0.01 %	
Duty Cycle Accuracy	± (0.01 x setpoint + 2.5) %	

Internal Single Shot Trigger

Pulse Width Range	200 ns to 1.0000 s	
Pulse Width Resolution	200 ns to 5,000 ns	100 ns
	6 µs to 1,000 ms	1 µs
Pulse Width Accuracy	200 ns to 5,000 ns	± 5 ns
	6 µs to 50 µs	± 100 ns
	51 µs to 250 µs	± 250 ns
	251 µs to 500 µs	± 2 µs
	501 µs to 2,000 µs	± 5 µs
	2001 µs to 10,000 µs	± 50 µs
	10,000 µs to 65,535 µs	± 250 µs
	65.536 ms to 100 ms	± 500 µs
	100.001 ms to 1,000 ms	± 2,000 µs
Pulsed Bias Output**	Main Pulsewidth	Fixed Bias
	200 ns to 100 µs	2 µs
	100.1 µs to 350 µs	10 µs
	350.1 µs to 1,000 ms	25 µs

Trigger Sync Output

Termination	Requires 50 Ω
Connector	BNC
Output Voltage Levels	0 V to 4.5 V
Delay (sync to output)	~ 100 ns

External Trigger

Frequency Range	≤ 2,000,000 Hz
Minimum Pulsewidth	100 ns
Delay (external to output)	~ 130 ns
Termination Impedance	50 Ω or 10 kΩ
Connector	BNC
Input Voltage Levels	0 V to 5 V 5 V = Output to load 0 V = No output to load

Computer Interface

RS232, Ethernet, USB

USB Driver Support	Windows 8, Windows 7, Windows XP, Linux, and MAC OS X

General

Power Requirements	47 Hz to 63 Hz 100 VAC to 120 VAC ± 10% 220 VAC to 240 VAC ± 10%
AC Inrush Current (typical)	35 A/115 VAC 70A/230 VAC
AC Connector Type	NEMA C-14
Size (H x W x D)	10.66 cm x 29.21 cm x 51.06 cm
Weight	7.8 kg
Operating Temperature	15° C to 40° C
Cooling	Air cooled
User interface	Color LCD with touch screen

Notes

* Current accuracy +/- 1 mA for output currents with pulse frequency below 100 kHz. Current accuracy between 100 kHz and 1 MHz is:

+0 mA / –X mA Where X =

((Output frequency in Hz) * (current setpoint in A) / 31,000)

** In single shot mode bias is a fixed pulsewidth before and after the main pulsewidth, as shown above.

The PCX-7401 current source meets or exceeds these specifications.

All specifications are measured with a low inductance stripline interconnect cable to the laser diode, with less than 4 nH total inductance.

Specifications information subject to change without notice.