PCX-7421 Laser Diode Driver Datasheet

Precision Pulse Control

The PCX-7421 is an air-cooled, high-powered CW/QCW current source designed to drive diode lasers, bars, and arrays. The pulsed output current is adjustable from 50 mA to 21.5 A. The pulse width is adjustable from 50 ns to 500 ms, and the rise time is under 25 ns. The pulse repetition rate is selectable from 40 Hz to 100,000 Hz when using the internal pulse source, and from single-shot to 1 MHz when using an external source.

The PCX-7421 provides both QCW (pulsed) and CW (DC) outputs. It can serve as a CW driver at currents from 3.0 A to 5.8 A, and as a pulsed/QCW driver at currents from 50 mA to 21.5 A. Furthermore, the output may be biased to any CW current from 0.050 A to 5.8 A, then pulsed above this bias current up to 15.7 A maximum. A new feature allows the bias current to be pulsed and triggered independently from the main current.

Ease of Setup and Operation

The PCX-7421 may be operated through its intuitive front panel controls. The OLED display provides immediate visual confirmation of all operating parameters, including bias and pulsed current set points, internal trigger pulse width, internal trigger frequency, and error/fault messages.

Complete System Integration

For automated applications, complete control of the driver 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.

Low Inductance Output Cable

Connection to the laser diode is made through an innovative rear panel, low-impedance twisted pair cable designed to preserve the fidelity of high-speed, large-amplitude current pulses. The front panel of the PCX-7421 has an interlock key. When the key is off, the output is disabled. To enable, the key must be on and the system enable must be made, either manually or through computer interface.

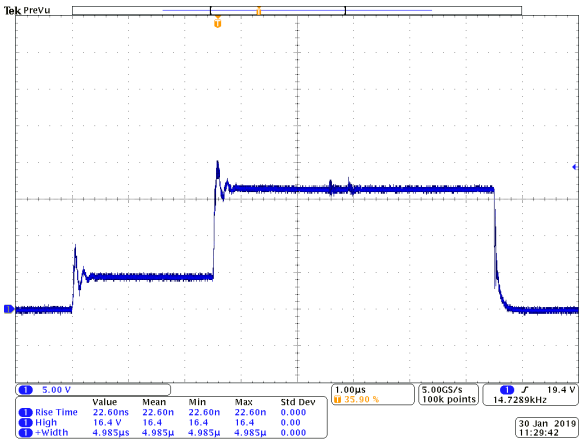
Output Protection

The PCX-7421 features advanced circuitry to protect both the diode and driver. At turn-on, and at any time the output is not enabled, the PCX-7421's output is electronically shorted to ground, ensuring that no current flows through the diode. Safety features include a separate enable key-switch and a remote interlock.

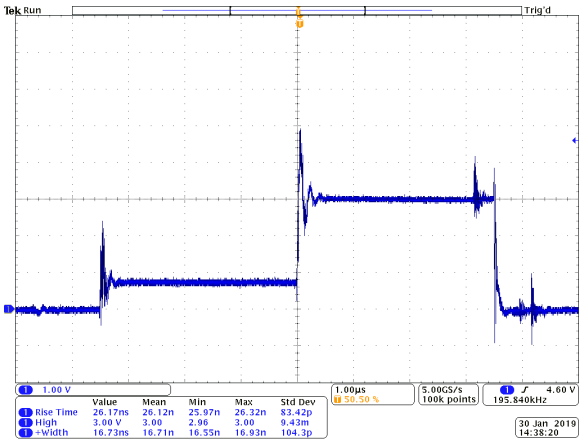
Ordering Information

PCX-7421	Precision Pulsed Current Source
6100-0119	Output Cable, requires 2
6045-0134	Laser Output PCBA
PCA-9410	BNC Shorting Connector

Each PCX-7421 is delivered with 2 output twisted pair cables, 1 Laser Output PCBA, and a BNC shorting connector.



Internal trigger: 100 kHz, 2.5 µs bias and 5.0 µs main pulse width, 6 A bias current, 16 A main current.



Internal trigger: 100 kHz, 3.5 µs bias and 3.5 µs main pulse width, 1 A bias current, 3 A main current.

Pulse Amplitude

Main current output	3.0 A to 15.7 A
rangeSetpoint resolution	1 mA
Compliance voltage	24 V[1]

Bias Amplitude

Bias current output range	50 mA to 5.8 A
Setpoint bias resolution	1 mA

Internal Trigger

Frequency range	40 Hz to 100 kHz	
Frequency resolution	40 Hz to 300 Hz:	1 Hz
	300 Hz to 5000 Hz:	100 Hz
	5 kHz to 100 kHz:	1000 Hz
Pulse width range	100 ns to 500 ms	
Pulse width resolution	40 Hz to 300 Hz:	6400 ns
	300 Hz to 5000 Hz:	1600 ns
	5 kHz to 100 kHz:	100 ns
Rise time	< 25 ns	
Polarity	Positive	

Trigger Sync Output

Termination	50 Ω
Connector	BNC
Output voltage levels	0 V to 2.7 V

External Trigger

Frequency range	≤ 1 MHz
Minimum pulse width	50 ns
Maximum pulse width	100% duty cycle, up to 250 W
Termination	50 Ω or 10000 Ω
Connector	BNC
Input voltage levels	0 V to 5.0 V

High = output to load, Low = no output to load

Computer Interface

RS232, USB

USB driver support	Windows 7—10, Windows XP, Linux, and MAC OS X

General

Power requirements	47 Hz to 63 Hz
	100 V AC to 120 V AC ± 10%
	220 V AC to 240 V AC ± 10%
AC connector type	NEMA C-14
Size (H x W x D)	8.9 cm x 28.5 cm x 53.4 cm
Standard with rack mount ears	33.6 cm wide at ears
Requires 2U spacer	
Weight	8.4 kg
Operating temperature	15° C to 40° C

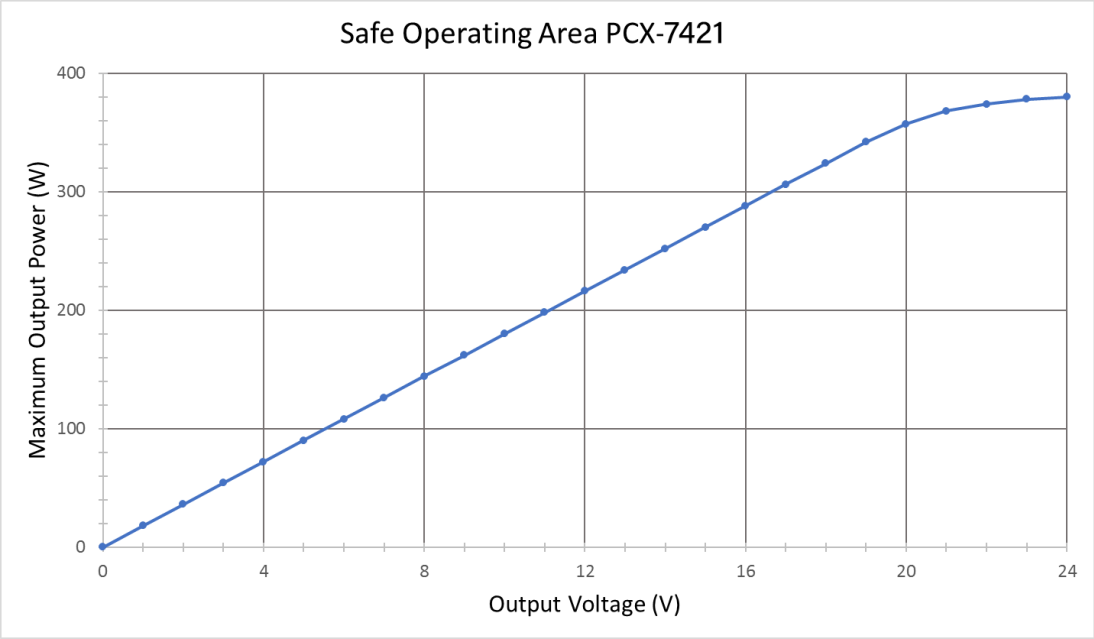
Air cooled, flow from front to the rear of unit

Notes

The PCX-7421 current source meets or exceeds these specifications. All specifications are measured with a low inductance twisted pair interconnect cable to a load. Specifications information subject to change without notice.

[1] Laser diode drivers are current sources. The compliance voltage is the maximum voltage available to maintain the programmed current.

Laser Output PCBA



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