

PCX-150

150A QUASI-CW LASER DIODE DRIVER/PULSED CURRENT SOURCE



- Output Current Up To 150A
- Output Voltage Up To 100V
- Rise Time < 10ms
- Pulse Width < 50ms to 5ms
- 5KHz Maximum Frequency
- 5V to 100V compliance, drives up to 50 diodes simultaneously
- IEEE-488 (GPIB) Computer Interface

The PCX-150 is an air-cooled, high power pulsed current source designed to drive diode lasers, bars and arrays. It delivers current pulses variable from 15A to 150A, pulse widths variable from $50\mu\text{s}$ to 5ms, with rise times <math><5\mu\text{s}</math>, and pulse repetition frequencies variable from single shot to 5KHz at duty cycles up to 20%.

A microprocessor-controlled front-panel interface provide individual control of each electronic function, while the backlit display provides immediate visual confirmation of all operating parameters, including output current setpoint and amplitude, pulse width, repetition frequency, duty cycle, and error and fault messages. The front panel controls allow the user to set either pulse width and frequency independently, or to set frequency and duty cycle, which then sets the pulse width accordingly. The front panel display monitors both the setpoints, and the actual current delivered to the diode. Analog current and voltage monitors and a synchronization output are also provided for monitoring of the current and voltage to the laser diode. In addition to stand-alone operation, the PCX-150 can be externally triggered.

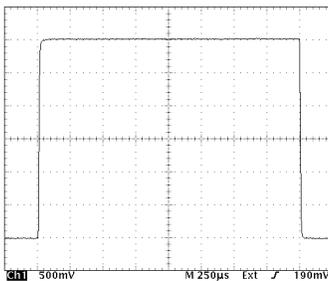
Connection to the laser diode is made through an innovative front panel, low impedance ribbon cable, designed to preserve the fidelity of high-speed, large-amplitude current pulses. The

output connector is interlocked, so that the PCX-150 is disabled when the connector is removed.

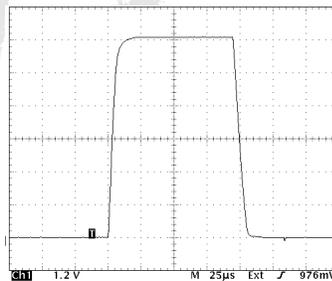
The PCX-150 features advanced circuitry to protect both the diode and driver. A relay closure shorts the output to ground when power to the driver is turned off. At turn on, and at any time the driver is not pulsing, the PCX-150's output is electronically shorted to ground, ensuring that no current flows through the diode except during the on period of the pulse. In addition, the actual current through the diode is monitored in real-time. If the actual current ever exceeds the user-adjustable current setpoint, the driver truncates the output current pulse, electronically shorts the output to ground, and displays an error message on the front-panel display. In addition, the PCX-150 has a factory-set hardware-controlled current-limit and an independent, user-adjustable current limit. This provides a fail-safe mechanism to prohibit the user from setting the current amplitude setpoint above the user-controlled current limit.

A user-selectable slow-start option allows the user to configure a slow-start current ramp, as shown in the waveform below.

Safety features of the PCX-150 include a laser enable keyswitch, an output cable safety interlock, remote interlock, and delayed output enable.

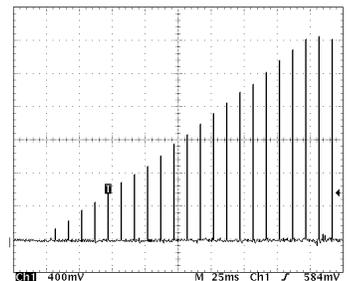


2ms Pulse, 150A, 100V Output
250µs/Div horizontal scale,
25A/Div vertical scale



6.5ms Rise, 9ms Fall
150A, 100V Output
25µs/Div horizontal scale,
25A/Div vertical scale

Slow-start Ramp
Function, 0-120A
Output, 6A Step
Increments
25ms/Div
horizontal scale,
20A/Div vertical
scale



**DIRECTED
ENERGY
INCORPORATED**

SPECIFICATIONS

PARAMETER	MODEL PCX150-25 Compliance voltage 5V to 25V Drives up to 12 diodes in series	MODEL PCX150-50 Compliance voltage 5V to 50V Drives up to 25 diodes in series	MODEL PCX150-100 Compliance voltage 5V to 100V Drives up to 25 diodes in series
PULSE OUTPUT CURRENT			
Output Pulse Amplitude Range ⁽¹⁾	15A to 125A	15A to 150A	15A to 150A
Output Current Resolution	0.1A		
Accuracy At $\geq 25A$ Setpoint	1%		
Slow-start Ramp Resolution	0.1A		
Pulse Rise Time	<10 μ s (10%-90%)		
Pulse Fall Time	<10 μ s (10%-90%)		
Pulse Width	50 μ s to 5ms		
Pulse Recurrence Frequency Range	Single Shot to 5KHz		
Maximum Duty Cycle and Average Current	4% at 125A, 6% at 100A, 40% at 15A. The max. average output power is 160W, and the average current cannot exceed 6A.	2% at 150A, 3.5% at 100A, 23% at 15A. The max. average output power is 175W, and the average current cannot exceed 3.5A.	2% at 150A, 3% at 100A, 20% at 15A. The max. average output power is 300W, and the average current cannot exceed 3A.
Output Pulse Width Stability	$\leq \pm 0.5\%$ at 1ms pulse width, 125A at maximum output voltage		
Output Pulse Amplitude Stability	$\leq \pm 0.5\%$ at 1ms pulse width, 125A at maximum output voltage		
Output Pulse Flatness	$\leq \pm 0.1\%$ at 1ms pulse width, 125A at maximum output voltage		
Over/undershoot	<5%		
Jitter	<10ns shot-to-shot		
Output Connector	Ribbon Cable, Front Panel		
COMPLIANCE VOLTAGE			
Range	5V to 25V	5V to 50V	5V to 100V
Resolution	1V		
CURRENT LIMIT			
Range	15A to 150A		
Resolution	1A		
TRIGGER IN			
Trigger Input	TTL or +5V $\pm 1V$, into 50 Ω		
Minimum Trigger Pulse Width	100ns		
Input Trigger Connector	BNC, Front Panel		
SYNC MONITOR OUTPUT			
Sync Monitor	TTL output into high impedance		
Sync Monitor Connector	BNC, Front Panel		
CURRENT MONITOR OUTPUT			
CVR Monitor	50A/1V into 50 Ω , typically within 1% of the displayed actual current		
CVR Monitor Connector	BNC, Front Panel		
VOLTAGE MONITOR OUTPUT			
Voltage Monitor	50V/1V into 50 Ω , typically within 1% of the actual voltage		
Voltage Monitor Connector	BNC, Front Panel		
GENERAL			
Input AC Power	90-240VAC Nominal, 50/60Hz		
Dimensions (H X W X D)	3 1/4" x 17" x 21"		
Weight	Approx. 22 lbs		
Safety	Complies with CDRH US21 CFR 1040.10		

SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE

(1) Output during the pulse "ON" period. During the pulse "OFF" period, the output is shunted to ground, ensuring that no current flows through the laser diode.

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