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Safety

WARNING
Risk of lethal electric shock. Do not open the cabinet of this device. Do not touch the output or laser diode while it is operating. This device produces LETHAL levels of electric current, both inside its cabinet and at its output.

DO NOT OPERATE THIS DEVICE UNLESS ANOTHER PERSON CAPABLE OF RENDERING FIRST AID OR RESUSCITATION IS PRESENT.

SAFE AND PROPER OPERATION OF THIS DEVICE IS THE RESPONSIBILITY OF THE USER.

Directed Energy, Inc. (DEI) provides information on its products and associated hazards, but it assumes no responsibility for the after-sale operation and safety practices.

• Do not open the cover of PCX-7420. There are no user-serviceable parts inside. Opening the cover exposes you to lethal shock and voids the factory warranty.

• Do not install, handle, or remove the output cable or laser diode while the PCX-7420 is operating.

• The PCX-7420 can be triggered randomly by spurious transients. Always assume it is possible to get an unexpected pulse at the output.

• Allow at least 10 minutes after power-down before handling the output cable or laser diode.

• Do not use this device in a manner not specified by the manufacturer.

• Allow sufficient space around this device for air circulation. Cooling air enters the front of the chassis and exits the back of the chassis.

• Take normal precautions to protect this device against liquid entry or corrosive environments.

• Clean this device by wiping with a dry or damp cloth.
Quick Start Guide

• **Safety**
  
  Follow the safety guidelines on Page 3. DO NOT PROCEED WITHOUT UNDERSTANDING AND OBSERVING THESE GUIDELINES.

• **Requirements**
  
  Make sure the PCX-7420:
  - Is connected with the proper cables and termination impedance
  - Is powered up
  - Has all faults cleared
  - Has the rear enable and keyswitch enabled. Their icons should be green.

• **Controlling the PCX-7420 From the Front Panel**

  1. **Disable the PCX-7420.**
     - If the ENABLE button on the front panel is illuminated, press the button to disable the unit. The button goes dark.

  2. **Set the output current.**
     - Press the Output button on the touch screen.
     - Press the encoder knob to set the resolution.
     - Turn the encoder knob to set the output current from 0 mA to 15700 mA.
     - Press the Done button.

  3. **Set the bias current.**
     - Press the Bias button on the touch screen.
     - Press the encoder knob to set the resolution.
     - Turn the encoder knob to set the bias current from 0 mA to 5800 mA.
     - Press the Done button.

  4. **Set the trigger to internal or external as needed.**
     - Press the Trigger button on the touch screen.
     - Press the Internal or External button to select the trigger.

  5. **Set the frequency.**
     - Press the Frequency button on the touch screen.
     - Press the encoder knob to set the resolution.
     - Turn the encoder knob to set the frequency from 40 Hz to 6000 Hz.
     - Press the Done button.
6. Set the pulse width.
   - Press the Pulse Width button on the touch screen.
   - Press the encoder knob to set the resolution.
   - Turn the encoder knob to set the pulse width from 0.05 µs to 5000 µs.
   - Press the Done button.

7. Set the bias pulse width.
   - Press the Bias Width button on the touch screen.
   - Press the encoder knob to set the resolution.
   - Turn the encoder knob to set the bias pulse width from 0 µs to 25000 µs.
   - Press the Done button.

8. Enable the PCX-7420.
   - Press the ENABLE button on the front panel. The button illuminates.

- Controlling the PCX-7420 From a Computer

1. Disable the PCX-7420.
   - Send the command “OUTPUT:DISABLE”.

2. Set the main output current.
   - Send the command “MAIN:CURRENT:SETPOINT n”. n = [0 to 15700]. Units are milliamperes.

3. Set the bias output current.
   - Send the command “BIAS:CURRENT:SETPOINT n”. n = [0 to 5800]. Units are milliamperes.

4. Set the trigger to internal or external as needed.
   - Send the command “TRIG:INTERNAL” or “TRIG:EXTERNAL”.

5. Set the internal trigger frequency.
   - Send the command “TRIG:INT:FREQ n”. n = [40 to 6000]. Units are hertz.

6. Set the main pulse width.
   - Send the command “TRIG:INT:MAIN:PULSEWIDTH n” n = [50 to 5000000]. Units are nanoseconds.

7. Set the bias pulse width.
   - Send the command “TRIG:INT:BIAS:PULSEWIDTH n” n = [0 to 25000000]. Units are nanoseconds.

8. Enable the PCX-7420.
   - Send the command “OUTPUT:ENABLE”.
Introduction

• Description

The PCX-7420 is a pulsed current source designed to drive laser diodes, bars, and arrays. It delivers current pulses from 0 A to 21.5 A with up to 375 W of total output power. An internal trigger source provides pulse repetition frequencies from 40 Hz to 100 kHz. The external trigger function allows operation at frequencies from single-shot to 1 MHz.

The bias current amplitude, the main output current amplitude, the bias pulse width, the main pulse width, the trigger source, and the trigger frequency are adjustable from the front panel touch screen or by computer control via RS232, USB, or Ethernet interface.

The bias feature allows the PCX-7420 to deliver the current pulse in two steps. The first step—the bias pulse—starts before the intended trigger time and is adjusted to supply enough current to set the diode just below the lasing point. This minimizes the diode’s response time to the main pulse. The bias pulse amplitude is adjustable from 0 A to 5.8 A and its width is adjustable from 0 ms to 25 ms.

The main pulse current adds to the bias current and energizes the diode at the intended time. The main pulse current is adjustable from 0 A to 15.7 A and its width is adjustable from 50 ns to 5 ms.

Note: The total current output pulse is always the sum of the bias pulse current and the main pulse current, even if the bias pulse width is set to zero. Consider both the bias output current and the main output current when planning the total output current.

The PCX-7420 can be triggered internally or externally, and it can be readily synchronized with other devices via the Sync output signal on the front panel. The input termination impedance for both the external trigger and the external bias trigger is selectable for either 50 Ω or 10000 Ω. The Sync signal logic amplitude is 0 V and +5 V. The rising edge corresponds to the rising edge of the main output current pulse. The delay between the sync output signal and the main output current pulse is 5 ns to 15 ns.
• **Panel Layout**

All features of the front and rear panel are labeled. Their functions are covered in the next section.
• Front Panel Features

LOCAL Button
Returns the PCX-7420 to front-panel control during computer control. Illuminates red during power-up initialization. Flashes red during a fault.

ENABLE Button
Toggles the PCX-7420 between enabled and disabled. Illuminates green when the unit is enabled. Illuminates solid green, then flashes green during power-up initialization.

Touch Screen
Provides a graphic user interface and front-panel touch control for most of the functions of the PCX-7420.

Encoder Knob
Turn to change a value. Push to cycle through the resolutions (increments of value change).

Keyswitch
ON enables the PCX-7420. OFF disables the PCX-7420.

Sync Output
A BNC connector that provides synchronization pulses to external devices. The sync pulse is triggered by the leading edge of the output current pulse.

External Trigger Input
A BNC connector that accepts trigger pulses from an external source. Its input impedance can be set to either 50 Ω or 10 kΩ.

External Bias Input
A BNC connector that accepts bias trigger pulses from an external source. Its input impedance can be set to either 50 Ω or 10 kΩ.
• Rear Panel Features

Output
A socket that accepts the factory-supplied output cable and provides the generated current pulses. DO NOT TOUCH any part of this cable while the PCX-7420 is powered up. Please review the Safety section on Page 3.
Note: Absence of a properly-installed output cable disables the output and creates a rear enable fault.

Rear Enable
A BNC connector that accepts either an external dry-contact closure or the factory-supplied shorting BNC plug. Closed contacts, or use of the shorting plug, enables the output. Open contacts, or removal of the shorting plug, disables the output and creates a rear enable fault.

IMON Output
A BNC connector that provides a connection to an oscilloscope. The signal is a voltage that represents the current output. Scaling is 36 mV / 1 A into 50 Ω.

Ethernet Cable Connector
Communicates with an external computer through an Ethernet cable.

USB Cable Connector
Communicates with an external computer through a USB cable.

RS232 Cable Connector
Communicates with an external computer through an RS232 null cable.

Power Cable Connector
Accepts a standard grounding equipment power cable.

Fuse Holder
Houses two AC power fuses.

On-Off Switch
Powers the PCX-7420 ON and OFF.
• **Accessories Included**

![AC Power Cable](image1.png)

**AC Power Cable**
A factory-supplied standard computer-style power cord, with NEMA C14 and NEMA 5-15R connectors.

![Shorting BNC Plug](image2.png)

**Shorting BNC Plug**
Attaches to the Rear Enable BNC connector on the rear panel. It takes the place of closed contacts and enables the output.

![Keyswitch Keys](image3.png)

**Keyswitch Keys**
For the front-panel On-Off keyswitch. On enables the output.

![Output Cable](image4.png)

**Output Cable**
A factory-supplied cable that provides high current pulses to external devices. A DB-37 male connector fits the socket on the rear panel of the PCX-7420; a DB-37 female connector is on the user end.

**Output Cable Connector Pinouts**
The male DB-37 connector interfaces with the instrument and has the following pinout:
- Pins 1 through 16: positive (+) output
- Pins 20 through 35: negative (−) output
- Pins 17, 36, 37: no connection
- Pins 18 and 19: connected together to satisfy interlock requirement

The female DB-37 connector interfaces with the customer’s laser diode PC board and
has the following pinout:

- Pins 1 through 16: positive (+) connection (to laser diode anode)
- Pins 20 through 35: negative (‒) connection (to laser diode cathode)
- Pins 17, 18, 19, 36, 37: no connection

**Interlock**
The DEI instrument requires that **pins 18 and 19** of the **male DB-37** be connected to satisfy an interlock that determines whether the output cable is present. If this connection is not detected the instrument will not be enabled.

**Output Cable Diagram**
The diagram below depicts the male and female connectors and their pinouts.
Operation

- Setup

1. Make sure the PCX-7420 has been OFF for at least ten minutes.
2. Make sure the polarity of the diode connection is correct. If necessary, review the output cable pinout in the Specifications section.
3. Make the other connections as necessary: External Trigger, External Bias, Sync, IMON, Rear Enable, and the connection to the computer.
4. Connect the power cable.

- Power Up

1. Turn the power switch ON (I).
   - The unit plays a tune and the ENABLE button flashes green as the unit initializes.
   - The PCX-7420 powers up in Internal Trigger mode and the Home screen appears. The main features of the Home screen are shown below.

   ![Home Screen Diagram]

   **Status Icons:** Green = OK or enabled. Red = Fault or disabled. Numerical displays show the current settings for all parameters.

2. Turn the keyswitch ON.
• **Set the Output Current**

  MAIN:CURRENT:SETPOINT?
  MAIN:CURRENT:SETPOINT n

  1. On the Home screen, press the Output button.

  2. The Set Output Current screen appears. Press the encoder knob to select a resolution: x0.001, x0.010, x0.100, or x1.000.
  3. Turn the encoder knob to adjust the output current. The range is 0 A to 15.7 A.
  4. On the screen, press the Done button.

• **Set the Bias Current**

  BIAS:CURRENT:SETPOINT?
  BIAS:CURRENT:SETPOINT n

  1. On the Home screen, press the Bias button.

  2. The Set Bias Current screen appears. Press the encoder knob to select a resolution: x0.001, x0.010, x0.100, or x1.000.
  3. Turn the encoder knob to adjust the bias current. The range is 0 A to 5.8 A.
  4. On the screen, press the Done button.
• Set the Pulse Width

TRIG:INT:MAIN:PULSEWIDTH?
TRIG:INT:MAIN:PULSEWIDTH n

1. On the Home screen, press the Pulse Width button.

2. The Set Pulse Width screen appears. Press the encoder knob to select a resolution: x0.025, x0.100, x1, x100, or x1000.

3. Turn the encoder knob to adjust the pulse width. The range is 0.05 µs to 5000 µs.

4. On the screen, press the Done button.

• Set the Bias Width

TRIG:INT:BIAS:PULSEWIDTH?
TRIG:INT:BIAS:PULSEWIDTH n

1. On the Home screen, press the Bias Width button.

2. The Set Bias Width screen appears. Press the encoder knob to select a resolution: x0.025, x0.100, x1, x100, or x1000.

3. Turn the encoder knob to adjust the bias width. The range is 0 µs to 25000 µs.

4. On the screen, press the Done button.
• Set the Trigger

Set the Source

TRIG:INTERNAL
TRIG:EXTERNAL

NOTE:
If you have just powered up the PCX-7420, the unit is in Internal Trigger mode.

1. On the Home screen, press the gray Trigger button.
2. The Select Trigger screen appears. Press the button for the desired trigger mode.
   
   ➢ If you select Internal Trigger, the Home screen reappears. Set the Frequency.

   ➢ If you select External Trigger, the Set Termination screen appears. Set the Termination if necessary.

OR

Set the Termination

TRIG:EXT:TERM?
TRIG:EXT:TERM n

➢ If you selected External Trigger, the External Trigger Home screen appears. Press a Termination button to set the termination of the external trigger input to 50 Ω or 10 kΩ.
• Set the Frequency

\[ \text{TRIG:INT:FREQ?} \]
\[ \text{TRIG:INT:FREQ } n \]

1. From the Home screen, press the Frequency button.

2. The Set Frequency screen appears. Press the encoder knob to change the resolution: x100, x1000, or x10000.

3. Turn the encoder knob to adjust the trigger frequency. The range is 40 Hz to 100000 Hz.


• View Information About the PCX-7420

\[ *\text{IDN}? \]

1. On the Home screen, press the tools button.

2. The Settings screen appears. Press the About button.

3. The About screen appears. View the model number, serial number, manufacture date, and firmware revision level.

4. Press the upper left icon button to return to the Home screen.
• **Save Settings**

*SAVE n*

1. On the Home screen, press the tools button.

2. The Settings screen appears. Press the Save Settings button.

3. The Save screen appears. Press the button for one of the four locations to which you want to save the settings.

   **NOTE:**
   Saving to a location overwrites any data previously stored at that location.

4. A progress indicator appears. When it is finished, press the upper left icon button to return to the Home screen.
• Recall Settings

*RECALL n
1. On the Home screen, press the tools button.

2. The Settings screen appears. Press the Recall Settings button.

3. The Recall screen appears. Press the button for one of the four locations from which you want to recall the settings.

4. A progress indicator appears. When it is finished, press the upper left icon button to return to the Home screen.
• **Warnings and Faults**

All faults disable the PCX-7420. To continue after clearing a fault, you must send an “OUTPUT:ENABLE” command from the computer or press the ENABLE button on the front panel.

**Red Keyswitch Status Icon**

```
STATUS:KEYSWITCH?
```

- The keyswitch was OFF at power-up, or it was turned OFF during disabled operation.
- This is also the display after clearing a keyswitch hardware warning or a keyswitch fault.
- Turn the keyswitch ON to continue.

**Keyswitch Hardware Warning**

```
FAULT:CLEAR:ALL
```

- The user attempted to enable the PCX-7420 while the keyswitch was OFF.
- On the screen, press the Clear Warning button.
- The Home screen appears with a red keyswitch status icon.
- Turn the keyswitch ON to continue.

**Keyswitch Fault**

```
FAULT:CLEAR:ALL
```

- The keyswitch was turned OFF during enabled operation.
- On the screen, press the Clear Fault button.
- The Home screen appears with a red keyswitch status icon.
- Turn the keyswitch ON to continue.
Red Rear Enable Status Icon

STATUS:REAR:ENABLE?

- The rear enable was disabled at power-up, or it was disabled during operation.
- Open dry contacts in the rear enable circuit, removal of the shorting BNC plug, or absence of a properly-installed output cable causes this fault.
- This is also the display after clearing a rear enable hardware warning or rear enable fault.

Rear Enable Hardware Warning

FAULT:CLEAR:ALL

- The user attempted to enable the PCX-7420 while the rear enable was disabled.
- On the screen, press the Clear Warning button.
- The Home screen appears with a red rear-enable status icon.
- Enable the rear enable to continue.

Rear Enable Fault

FAULT:CLEAR:ALL

- The rear enable was disabled during enabled operation.
- On the screen, press the Clear Fault button.
- The Home screen appears with a red rear-enable status icon.
- Enable the rear enable to continue.
Over Temperature Fault

FAULT: CLEAR: ALL

- Allow cool, free air flow from front to rear.
- Either the ambient temperature or the exhaust air temperature exceeded the safe temperature operating range.

**View the Communication Settings**

1. On the Home screen, press the tools button.

2. The Settings screen appears. Press the Comm Settings button.

3. The PCX-7420 Comm screen appears. Press the button for the desired port.
   - **If you select RS232**
     The screen reports the Baud rate, the number of data bits and stop bits, and the parity.

   - **If you select USB**
     The screen reports the Baud rate, the number of data bits and stop bits, and the parity.
If you select Ethernet
The screen supports entry of the IP address and socket, choice of DHCP or STATIC, and updating of the settings.
If desired, press the Settings button.

The Ethernet Configuration screen appears. Make desired entries in the appropriate fields.
Pressing any of the three buttons returns the Home screen.

• Power Down

WARNING
Risk of fatal electric shock. Wait at least 10 minutes after powering down the PCX-7420 before handling the output cable or laser diode.

1. Disable the unit by pressing the front panel BUTTON or by sending a computer command “OUTPUT:DISABLE”.
2. Turn the keyswitch OFF.
3. Turn the unit OFF at the power switch.
Command Set

These are all of the commands and queries that the PCX-7420 supports via remote RS232, USB, and Ethernet control. Commands and queries must be in all capital letters. Commands and queries that require data, denoted as n, must have a space between the command and the data.

The PCX-7420 expects “\n” to be the end line character of commands and queries. The responses to the user’s computer are also terminated with “\n”. For every command sent to the PCX-7420, the PCX-7420 sends a response. The user’s software must wait for a response before sending another command to avoid an overflow of the PCX-7420 receive buffer.

The commands are in alphabetical order except *LIST?. In the examples, the command or query is in black; the response is in blue italics.

*LIST?
Lists all commands and queries supported by the PCX-7420. Example:

*LIST?
*IDN?
*SAVE
*RECALL
OUTPUT?
OUTPUT:ENABLE
OUTPUT:DISABLE
TRIG?
TRIG:INTERNAL
TRIG:EXTERNAL
TRIG:EXT:TERM?
TRIG:EXT:TERM
TRIG:INT:FREQ?
TRIG:INT:FREQ
TRIG:INT:MAIN:PULSEWIDTH?
TRIG:INT:MAIN:PULSEWIDTH
TRIG:INT:BIAS:PULSEWIDTH?
TRIG:INT:BIAS:PULSEWIDTH
MAIN:CURRENT:SETPOINT?
MAIN:CURRENT:SETPOINT
BIAS:CURRENT:SETPOINT?
BIAS:CURRENT:SETPOINT
STATUS:KEYSWITCH?
STATUS:REAR:ENABLE?
TEMP:IN?
TEMP:EXHAUST?
FAULT?
FAULT:CLEAR:ALL
BIAS:CURRENT:SETPOINT?
Returns the amount of bias current in mA. Example:

BIAS:CURRENT:SETPOINT?
1500 mAmps

BIAS:CURRENT:SETPOINT n
Sets the amount of bias current in mA. The value of n must be between 0 and 5800. Example:

BIAS:CURRENT:SETPOINT 1500

BIAS:CURRENT:SETPOINT 1500

FAULT?
Returns the last 10 faults that have occurred since power-up. The codes for the faults are:

0 = No Fault
1 = Keyswitch was turned off while the instrument was enabled
2 = Rear Enable was disabled while the instrument was enabled
4 = Ambient or exhaust temperature was out of range while the instrument was enabled
8 = AC-DC supply was out of range
16 = An open load was detected

The first listed fault is the most recent. The example below shows there have been no faults since power-up:

FAULT?
0, 0, 0, 0, 0, 0

FAULT:CLEAR:ALL
Erases all previous faults. Example:

FAULT:CLEAR:ALL
All Faults Cleared

*IDN?
Short for Identity; returns the manufacturer’s name, unit model number, serial number, firmware revisions, and manufacture date. Example:

*IDN?
DEI Scientific, PCX-7420, 00081, Q03 M04 C05, 00
MAIN:CURRENT:SETPOINT?
Returns the amount of bias current in mA. Example:

MAIN:CURRENT:SETPOINT?
15000 mAmps

MAIN:CURRENT:SETPOINT n
Sets the amount of bias current in mA. The value of n must be between 0 and 15700. Example:

MAIN:CURRENT:SETPOINT 15000
MAIN:CURRENT:SETPOINT 15000

OUTPUT?
Returns whether the output is enabled or disabled. Example:

OUTPUT?
Disabled

OUTPUT:DISABLE
Disables the output; the same as pressing the front-panel ENABLE button so it is unlit. Example:

OUTPUT:DISABLE
Disabled

OUTPUT:ENABLE
Enables the output; the same as pressing the front-panel ENABLE button so it lights green. Example:

OUTPUT:ENABLE
Enabled
(if successful)
Command Failed. Keyswitch or rear enable error.
(if a fault is preventing the PCX-7420 from enabling)

*RECALL n
Recalls saved configurations and sets the PCX-7420 to them. The value of n must be between 1 and 4. Example:

*RECALL 2
Recalled Memory Location 2
*SAVE n
Saves the current configuration to non-volatile memory. The value of n must be between 1 and 4. Example:

*SAVE 3
 Saved Memory Location 3

STATUS:KEYSWITCH?
Returns whether the keyswitch is enabled or disabled. Example:

STATUS:KEYSWITCH?
 Disabled

STATUS:REAR:ENABLE?
Returns whether the rear enable is enabled or disabled. Example:

STATUS:REAR:ENABLE?
 Disabled

TEMP:IN?
Returns the temperature of the intake air in degrees Celsius. Example:

TEMP:IN?
 27

TEMP:EXHAUST?
Returns the temperature of the exhaust air in degrees Celsius. Example:

TEMP:EXHAUST?
 38 C

TRIG?
Returns the whether the trigger is internal or external. Example:

TRIG?
 Internal

TRIG:EXTERNAL
Sets the trigger to External. Example:

TRIG:EXTERNAL
 External
TRIG:EXT:TERM?
Returns the termination impedance of the external trigger input in ohms. Example:

TRIG:EXT:TERM?
50 Ohms

TRIG:EXT:TERM n
Sets the termination impedance of the external trigger input in ohms. The value of n must be 50 or 10000. Example:

TRIG:EXT:TERM 50
TRIG:EXT:TERM 50

TRIG:INTERNAL
Sets the trigger to internal. Example:

TRIG:INTERNAL
Internal

TRIG:INT:FREQ?
Returns the internal trigger frequency in hertz. Example:

TRIG:INT:FREQ?
2400 Hz

TRIG:INT:FREQ n
Sets the internal trigger frequency in hertz. The value of n must be from 40 to 100000. Example:

TRIG:INT:FREQ 2400
2400 Hz

TRIG:INT:MAIN:PULSEWIDTH?
Returns the pulse width of the main current pulse, in nanoseconds. Example:

TRIG:INT:MAIN:PULSEWIDTH?
280000 nsec

TRIG:INT:MAIN:PULSEWIDTH n
Sets the pulse width of the main current pulse in nanoseconds. The value of n must be from 50 to 500000. Example:

TRIG:INT:MAIN:PULSEWIDTH 280000
**TRIG:INT:MAIN:PULSEWIDTH 280000**

**TRIG:INT:BIAS:PULSEWIDTH?**
Returns the pulse width of the bias current pulse, in nanoseconds.
Example:
TRIG:INT:BIAS:PULSEWIDTH?
12000 nsec

**TRIG:INT:BIAS:PULSEWIDTH n**
Sets the pulse width of the main current pulse. The value of n must be in nanoseconds from 0 to 25000000. Example:
TRIG:INT:BIAS:PULSEWIDTH 12000
TRIG:INT:BIAS:PULSEWIDTH 1
Warranty and Service

• Warranty
Directed Energy, Inc. (DEI) warrants equipment it manufactures to be free from defects in materials and factory workmanship under conditions of normal use, and agrees to repair or replace any standard product that fails to perform as specified within one year after date of shipment to the original owner. OEM, modified, and custom products are warranted, as stated above, for ninety (90) days from date of shipment to original owner. This Warranty shall not apply to any product that has been:

I. Repaired, worked on, or altered by persons unauthorized by DEI in such a manner as to injure, in DEI’s sole judgment, the performance, stability, or reliability of the product;
II. Subjected the product to misuse, neglect, or accident; or
III. Connected, installed, adjusted, or used otherwise than in accordance with instructions furnished by DEI.

DEI reserves the right to make any changes in the design or construction of its products at any time, without incurring any obligation to make any change whatever in units previously delivered.

DEI’s sole obligation, and buyer’s sole remedies, under this agreement shall be limited to a refund of the purchase price, or at DEI’s sole discretion, to the repair or replacement of products in kind that prove, to DEI’s satisfaction, to be defective, when returned to the DEI factory, transportation prepaid by the buyer, within the warranty period. DEI shall in no way be liable for damages consequential or incidental to defects in its products, for failure of delivery in whole or in part, for injuries resulting from its use, or for any other cause.

Returns must be preauthorized and accompanied by a DEI return authorization number.

The foregoing states the entire warranty extended by DEI, and is given and accepted in lieu of 1) any and all other warranties, expressed or implied, including but not limited to the implied warranties of merchantability and fitness for any particular purpose and 2) any obligation, liability, right, claim or remedy in contract or tort.

• Factory Service and Support
For more information about your instrument or for an operation problem, please contact the factory:

Directed Energy, Inc. (DEI)
1609 Oakridge Drive, Suite 100
Fort Collins, Colorado 80525

Telephone: (970) 493-1901

sales@directedenergy.com
support@directedenergy.com
https://directedenergy.com
CE Declaration

CE DECLARATION OF CONFORMITY

DECLARATION OF CONFORMITY

Manufacturer's Name: Directed Energy Inc.
Manufacturer's Address: 2401 Research Blvd Suite 108; Fort Collins, CO 80525; USA
Equipment Description: 20 Amp Current Source
Equipment Model Designation: PCX-7420


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<thead>
<tr>
<th>Referenced Safety Standards</th>
<th>Referenced EMC Standards</th>
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<tr>
<td>EN 60335-2-82</td>
<td>EN61326-1</td>
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<td>EN 55011 Class A</td>
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<td>EN 61000-3-2</td>
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<td>EN 61000-4-11</td>
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I, the undersigned, hereby declare that the equipment specified above conforms to the above Directive(s) and Standard(s).

Signature: ____________________________

Printed Name: Stephen Krausse
Title: DEI General Manager