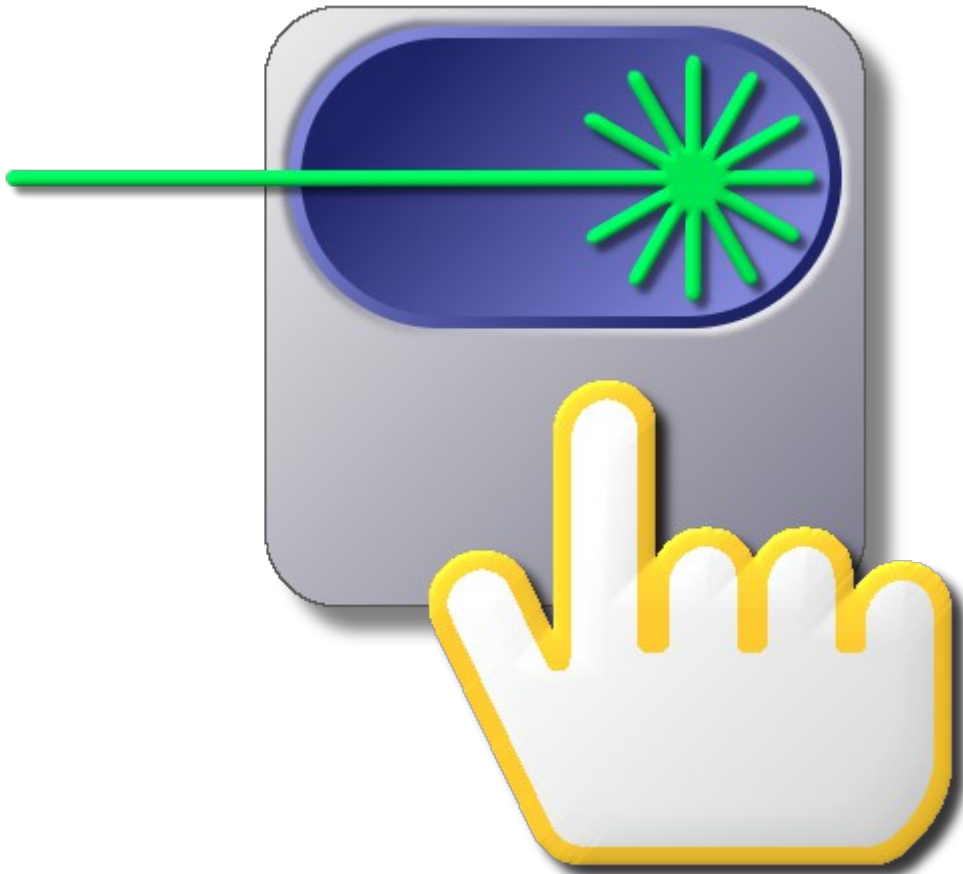


Laser Control Software

User Manual



EdgeWave GmbH
Innovative Laser Solutions

EdgeWave Laser Control Software

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This manual is based on EdgeWave Laser Control version 3.0.3.65. The version of the software can be found in the [about dialog](#).

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1 Safety

The EdgeWave Laser Control Software is intended to control a EdgeWave INNOSLAB laser through a RS232 port of the computer. Laser radiation may effect a person's health or may otherwise cause damage. Prior to installation and operation compliance with all relevant laser safety regulation has to be secured. The client shall solely be responsible to strictly comply with all applicable and relevant safety regulations regarding installation and operation of the system at any time.

2 Installation

2.1 File list

The EdgeWave Laser Control Software is delivered with the following file(s):

- EWLaserControl.exe
EdgeWave Laser Control which provides the full control to the EdgeWave Laser via RS232 (serial) port.
- EWLaserControl.ini (*optional*)
The file used to save all settings for the EdgeWave Laser Control Software.

2.2 Requirement

2.2.1 Hardware requirement

- The EdgeWave Laser Control Software is designed to control EdgeWave INNOSLAB Laser. A EdgeWave Laser with essential peripheral equipment, e.g. EdgeWave Power Supply, chiller, trigger generator, etc. is required.



Please read the manual of EdgeWave Laser carefully and connect all cables properly prior to use EdgeWave Laser Control Software.

- A computer to control the Laser.
 - A RS232 (serial) port is required to control a EdgeWave Laser with EdgeWave Laser Control Software. Both on-board com port and USB to RS232 adapter works.
 - 2MB free hard drive space.
 - The software itself will use less than 10MB memory when running, which can be provided by any modern computer.

2.2.2 Software requirement

- EdgeWave Laser Control Software works only in windows platform, including both 32 and 64 bits version of Windows 2000, Windows XP, Windows Vista, Windows 7 or above .
- Windows user privilege
 - The EdgeWave Laser Control Software writes all settings into *EWLaserControl.ini* in the same directory when it is closed. The setting file will be created automatically in case of missing. The Modify, Create and Read privilege to file *EWLaserControl.ini* must be granted to current user to avoid some warning message.
 - The software controls EdgeWave Laser via the RS232 port. The Read and Write privilege to the using COM port has to be granted.

2.3 Software installation and uninstalling

The EdgeWave Laser Control Software is a green software which means NOTHING will be written into the registry or system folder by itself.

2.3.1 Installation

1. Copy all files delivered into the destination directory.
2. Create a shortcut to the preferred location. For instance, a shortcut will be created on the desktop of Windows by right clicking on *EWLaserControl.exe* with the mouse and then select “Send To” → “Desktop (create shortcut)”, as shown below:

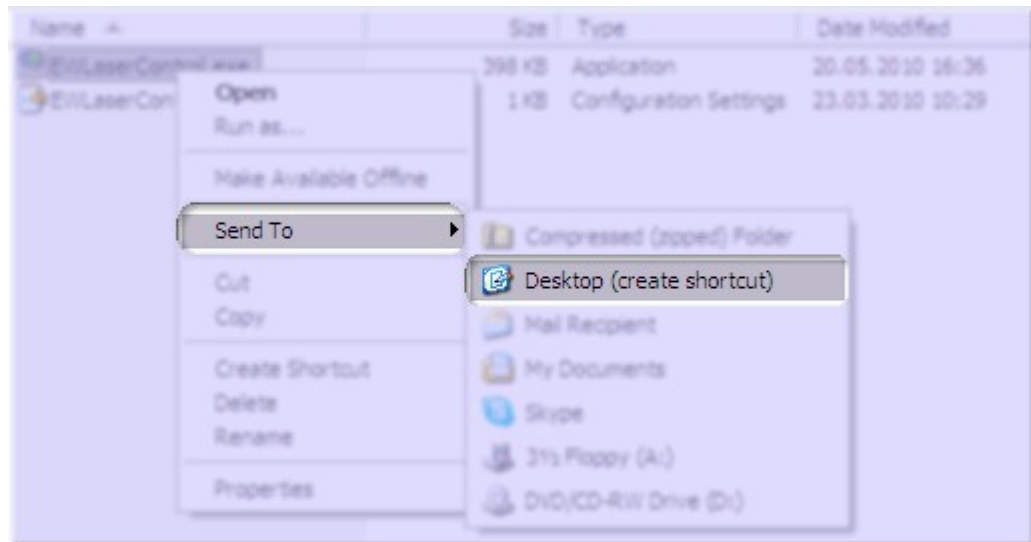


Figure 1: Create a shortcut on desktop

2.3.2 Uninstalling

1. Delete the shortcut pointed to *EWLaserControl.exe*.
2. Delete *EWLaserControl.exe*, *EWLaserControl.ini* and any other files copied with this software (if present) under the directory of EdgeWave Laser Control Software.

3 Operation

3.1 Main window

When launch the Laser Control Software for the first time, it will try to connect EdgeWave Laser via COM1. If no EdgeWave Laser is connected to this port (Figure 2), it will try to reconnect automatically for every 1 second by default. Both COM port and the auto-connect feature are adjustable in the [settings](#).



Figure 2: Main window – Laser disconnected

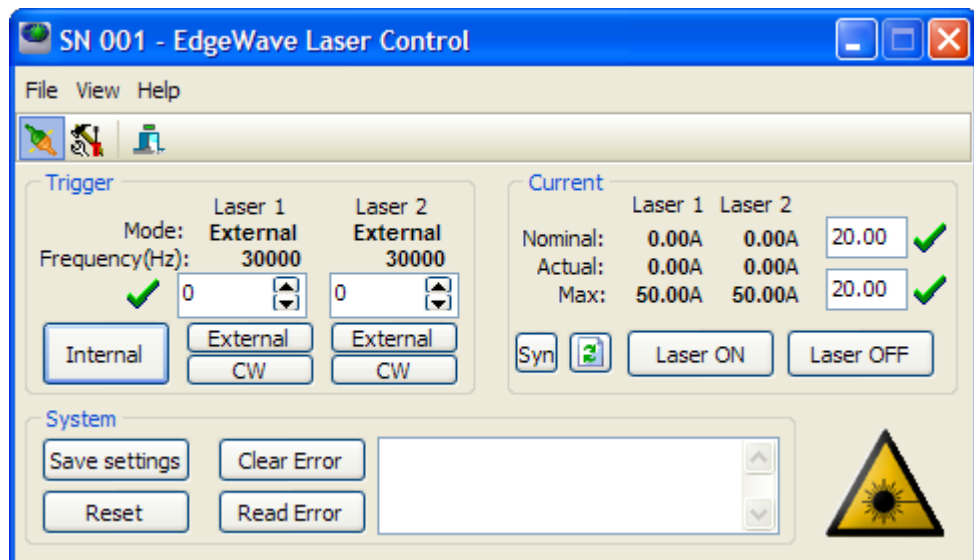


Figure 3: Main window - Laser connected

To establish a connection to the Laser, the following requirement must be fulfilled:

- A EdgeWave Laser is connected to a working COM port of the computer.
- The RS232 cable used to connect the Laser and the computer must be a 1-to-1 cable.

- COM Port number has to be specified in the EdgeWave Laser Control Software correctly.
- Emergency stop button has to be released.
- Safety loops on the rear panel of Laser power supply is connected properly and the corresponding switches are closed. Please find more details about safety loops in the user manual of EdgeWave Laser.
- The Laser power supply is connected to the mains and switched on.

Once the laser is found and connected, the serial number of the Laser will be shown in the title bar and a Laser operation panel appears. This panel provide a easy way to set most of Laser parameters and display current status. But only most frequently used commands are implemented in this panel. An advanced panel (Figure 4) is also provided, with which all control commands of EdgeWave Laser can be executed.

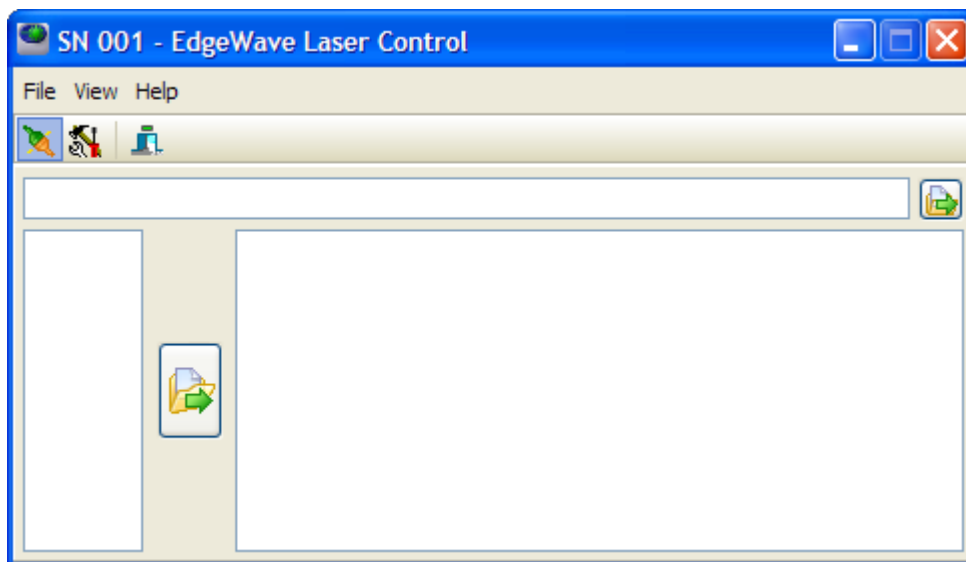


Figure 4: Main window - Advanced panel

3.2 Terms

The terms below are subject to the use of EdgeWave Laser. Their definition is important in understanding the operation procedure, trouble shooting and so on. Some of the definition are valid only inside this manual and during operating EdgeWave Laser.

Laser output

Laser output means required Laser beam emitting from the output aperture of the Laser head. To have Laser output, the following must be fulfilled if the other necessary parts (e.g. cooling water) are configured properly and working well:

1. **Laser ON**
2. The current is higher than the threshold
3. Proper TTL trigger signal is provided if working in External trigger mode
4. Proper TTL signal for external modulator is provided if required.



Laser ON	<p>The status of Laser hardware. When Laser On is set, the control board has to prepare some initializing procedures for Laser output, e.g. set the current of Laser diodes to nominal value and turn the shutter to output position if present.</p> <p>Laser ON should be considered more like “Laser is ready for ON”. To have Laser beam output, all conditions for Laser output described above must be fulfilled.</p>
Laser OFF	<p>The status of Laser hardware. When Laser Off is set, current of Laser diodes is set to 0A despite of the nominal current and the shutter is turned to off position (if present).</p>
Q-Switching	<p>Most of EdgeWave Lasers are working at Q-switching mode, which is a technique to produce pulsed output beam with high peak power and short pulse width. It is achieved by putting an optical switch inside the laser's optical resonator. Normally there is not pulse output when the switch is off, while a giant pulse is produced once it switch to on.</p>
Trigger	<p>The TTL signal used to control the on/off state of the Q-switch. It controls the repetition rate and the timing of laser pulses. It also regulates the pulse energy in some kinds of EdgeWave Laser.</p>
Trigger mode	<p>Control mode of the Q-switch in EdgeWave Laser. There are 3 kinds of mode: CW (continuous wave), External trigger and Internal trigger.</p>
CW	<p>The Q-switch does not work under CW power. The laser resonator will have constant output if there is enough pump power</p>
External trigger	<p>The trigger signal is generated outside of EdgeWave Laser and coupled into the Laser through the Trigger port of the Laser. This is the most favorable mode for most applications because the user can control the timing and the other features.</p>
Internal trigger	<p>The trigger signal is generated by the control board of EdgeWave Laser. It is not controllable by user. For some model the internal trigger signal might becomes unstable at >5kHz.</p>
Branch	<p>Some models of EdgeWave Laser have 2 sets of pump unit. And some also have 2 sets of Q-switching control. It is called 1 branch for each set of such unit. Each branch</p>

can be marked as branch 1 and branch 2, or Laser 1 and Laser 2. The output aperture is not relevant to the amount of branches.

Hyper Terminal A windows application of terminal emulation which supports communications over TCP/IP networks, Dial-Up Modems, and serial COM ports (RS232). It was bundled with Windows from version Windows 95 to Windows XP. This tool is useful for troubleshooting. There are also some other software provides similar functions.

3.3 Main menu and tool bar




Main menu	Toolbar button	Shortcut	Usage
<i>File → Connect Laser</i>		Ctrl + L	Connect or disconnect Laser
<i>File → Exit</i>		Alt + X	Close the software
<i>View → Minimize to system tray</i>			Hide main window and show a small icon in the Windows tray area on the taskbar when this item is checked. Click on this icon will bring the main window back.
<i>View → Show tray icon</i>			Always display the icon in Windows tray when checked.
<i>View → Show advanced panel</i>		Ctrl + D	Display a HyperTerminal like interface (Figure 4) for extra controls over the Laser. More details are described in chapter 3.5.
<i>View → Options</i>		Ctrl + O	Display the options dialog to configure the software.
<i>Help → About</i>		F1	Display the copyright and version information (Figure 5).



Figure 5: About dialog

3.4 Regular operation

The regular operation panel provides a GUI (graphical user interface) to interact with a EdgeWave Laser. Only a few value inputting and mouse

clicking are required with such panel to control the Laser, instead of the user-unfriendly commands. Most of Laser operation can be done here.

Based on their functions, the regular operation panel is divided into 4 blocks: Trigger control, Current control, System functions and Laser status indicator.

3.4.1 Laser On/Off status

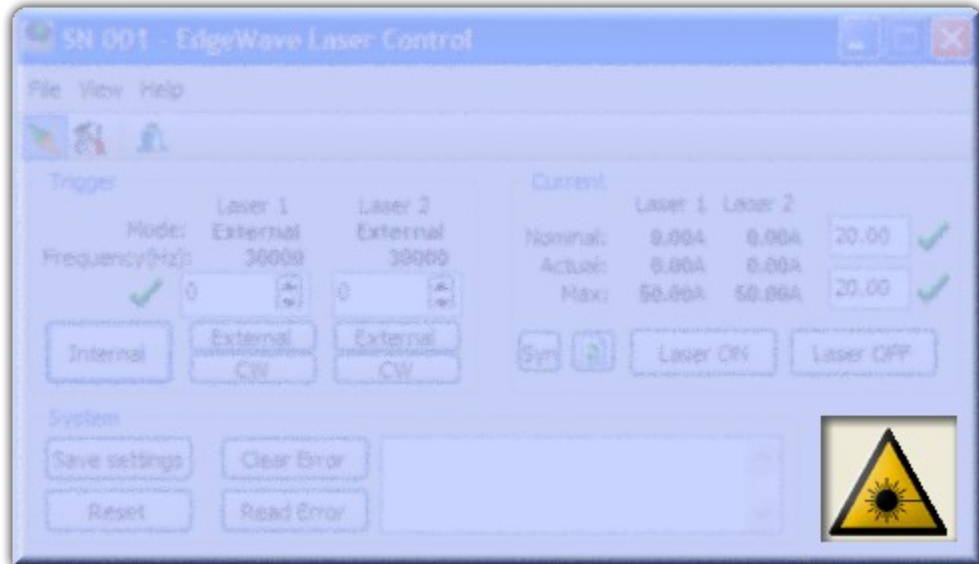


Figure 6: Warning symbol

The Laser status indicator is located at the bottom-right corner of the interface. It shows the On/Off status of the Laser through the color of the warning symbol. The On/Off here is not the same as the output of Laser beam. Please refer to section ?? for the definition of Laser On/Off.



A colorful (yellow and black) symbol indicates Laser is in On state.



A gray scale symbol indicates Laser is in Off state.



The indicator might not be updated in time if the auto-update feature is deactivated or the updating interval is too long (section 3.6 below)

3.4.2 Trigger control

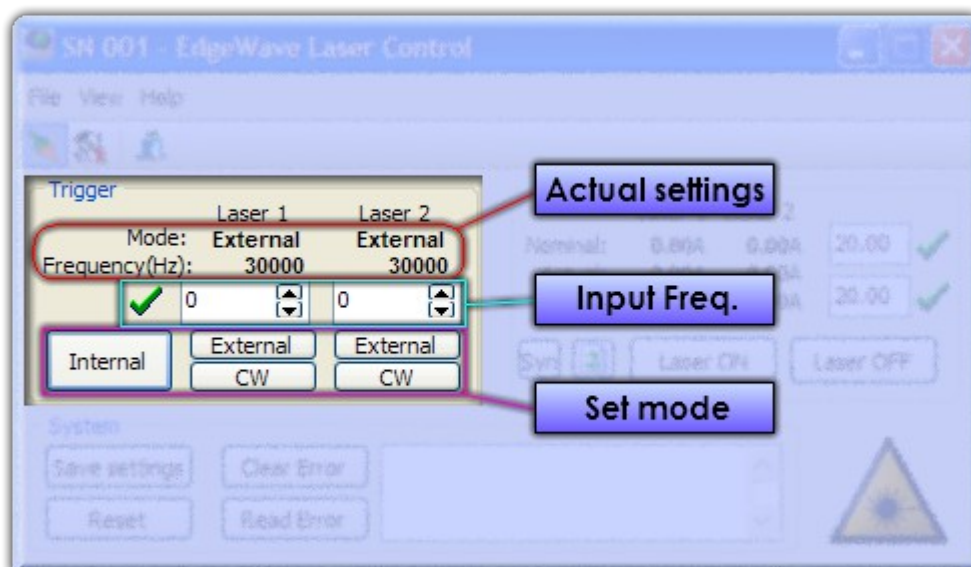


Figure 7: Trigger mode

Trigger control panel is located at the top-left corner of the interface. it consists the display of actual settings, input fields for frequency values and buttons for changing trigger mode.

- **Input frequency**

The internal trigger frequency in Hz can be input in the edit box(es). Only integer value is allowed. Press Enter key (if the input focus is inside the edit box) or click on the green check symbol to send it to laser control board when correct value is set. New value will be displayed above in the actual settings area if the sent one is accepted.

- **Actual settings**

The actual trigger mode and frequency are displayed here. The values inside the input boxes do not represent the values in the Laser controller.

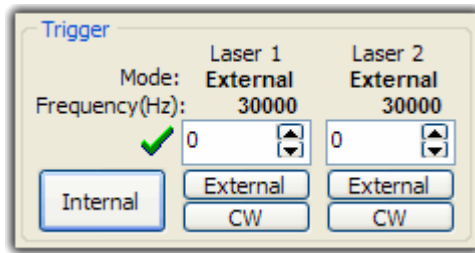
- **Change trigger mode**

The trigger mode can be changed easily by clicking the corresponding buttons. When internal trigger is set, both Laser 1 and Laser 2 (if there are 2 branches present) will be set to internal mode simultaneously.

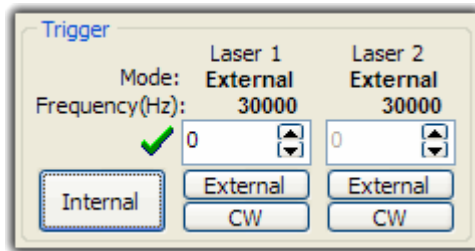


In some Lasers equipped with certain first pulse killer, the frequency set here also tells the controller to perform the pulse optimizing according to this frequency. For such Laser, the maximum working frequency must be set here. Otherwise the Laser might be locked down at lower power level, or pulse energy is unstable.

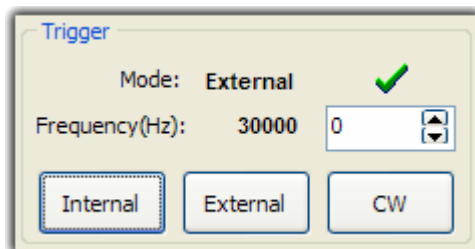
The appearance of trigger control panel varies with the Laser hardware configuration.



Both branches have independent control on trigger mode and frequency. When press Enter key inside one of the edit box, the frequency will be send to the relevant Laser branch only. By clicking the green check symbol, values of both branches will be transmitted.



Both branches have independent control on trigger mode and share the same frequency setting.



There is only one branch installed inside the Laser.

3.4.3 Current control

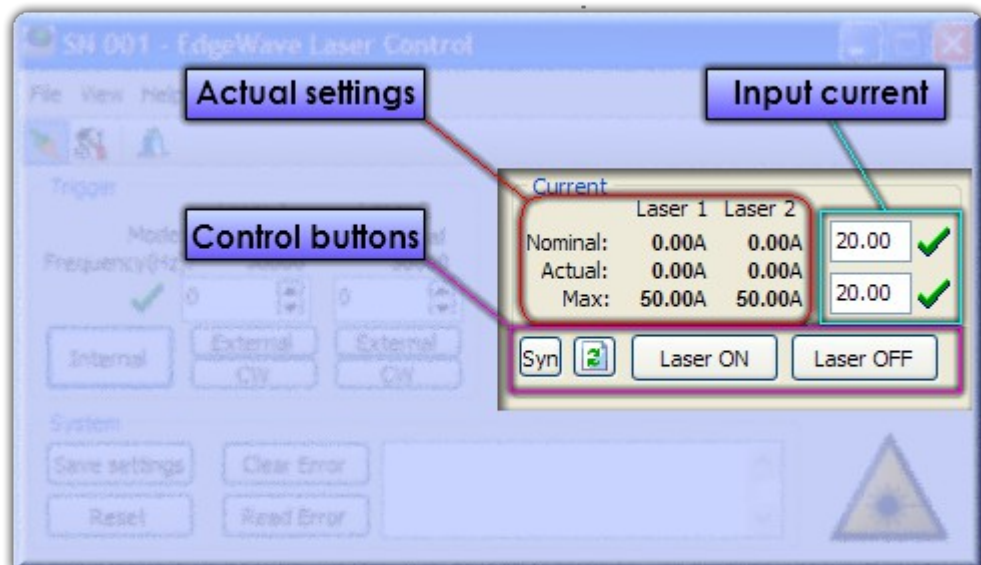


Figure 8: Current control

The current applied on the Laser diodes regulates the output power of the optical resonator in a diode pumped Laser. For most applications with EdgeWave Laser, the power level or pulse energy achieved from Laser head has to be controlled through the diode current. Current control panel is located at the top-right corner of the interface. it consists the display of actual

settings, input fields for current values and some control buttons. The appearance varies with the configuration of the connected Laser hardware as well.

• **Input currents**

Currents in ampere for Laser diodes can be set here. Nominal values is sent to the controller only after press Enter key in the edit box or click on the green check symbol next to it. New value will be shown in the display area if it is accepted. The decimal separator (dot) cannot be erased and always stays inside the edit box.

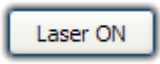
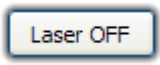




If the given value is larger than the maximum current of the corresponding Laser branch, the maximum value will be used instead.

• **Actual settings**

Current settings are always displayed in this area. Displayed items are selected automatically by the software itself according to the type of Laser.

• **Control buttons**

	Turn Laser ON. Please refer to section ?? in page 6 for the definition of Laser ON .
	Turn Laser OFF. Please refer to section ?? in page 6 for the definition of Laser OFF .
	Synchronized control over current. Appears only when 2 Laser branches available. Click it once, the button will keep down. Click again it will be released. When this button is down, currents for both branches will be changed simultaneously with the same value. Some models of EdgeWave Laser have such function implemented inside the Laser controller. It should be ignored in such case.
	This button is not functional any more.



The edit box is always in overwrite mode. It is unnecessary to delete the old value and then type in new one. Recommended operation is to place the cursor at the right position with cursor key or mouse, and then type in the new digits. By using delete or backspace key, it is easier to input a number like "0_00" with a space between the first digit and the decimal point by mistake, which will bring a warning dialog when trying to send such value. Leading and/or trailing space is acceptable.



Always find out the current in the "Actual Settings" area instead of the edit box!

3.4.4 System functions

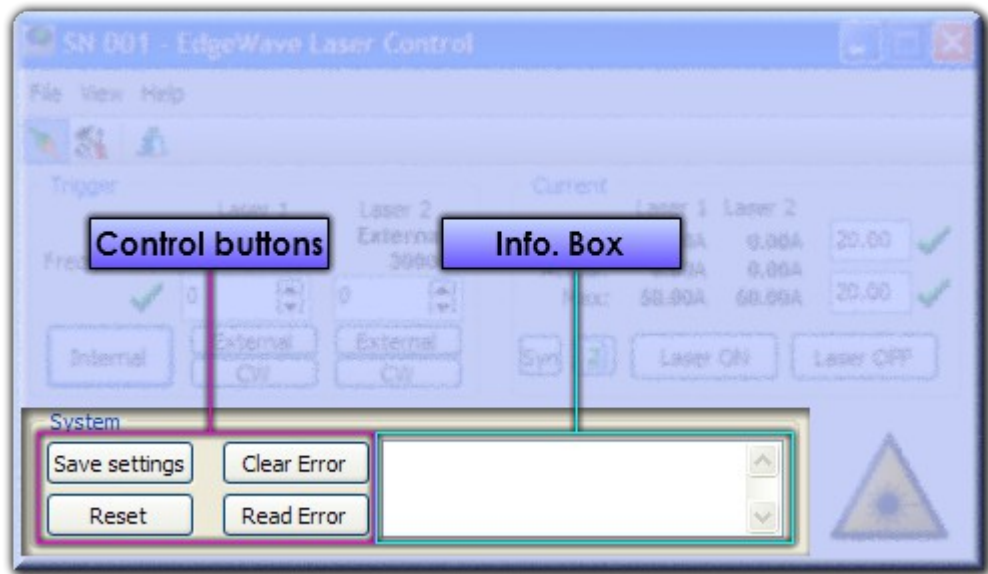


Figure 9: System functions

- **Information box**

The information box is a small window to show the error messages from the Laser head. Right click within this window will bring a popup menu with which the contents can be copied or cleared.

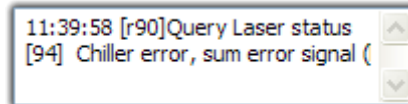


Figure 10: Error code and description

Error code shown inside the information box is a 2-digit-number enclosed with square brackets and located at the beginning of a line. For instance, the picture below shows that error **94** was found, which means chiller error happened. More details about error codes can be found in the Laser manual. The [r90] in the first line of Figure 10 meant the command **r90** was executed to query the laser status.

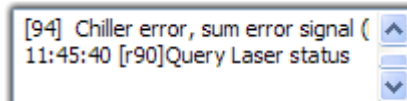
- **Control buttons**

Save settings

Save all current settings (including trigger frequency and mode, nominal current, etc.) into Laser controller as default values. Once saved, those settings will be restored after next reset or starting up the power supply.

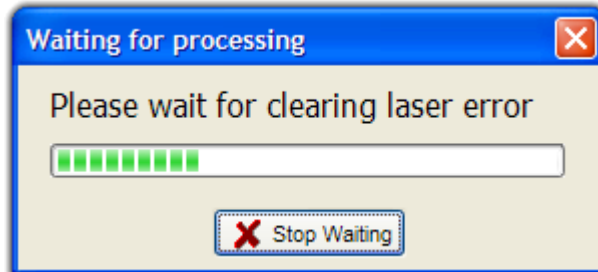
Read Error

Click this button to check the Laser status if it cannot be started or the laser stops suddenly during operation. Error codes and description will be shown inside the information box in case of error happened. Only a line with time and "[r90]Query Laser status" will be shown if there is no error presently.



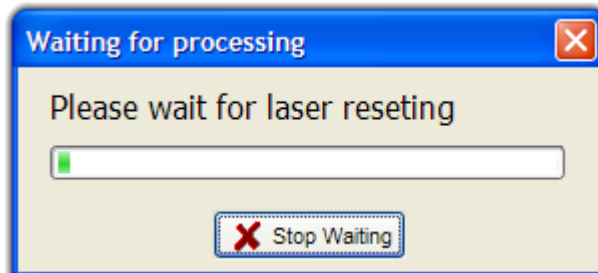
Clear Error

If laser error happened and solved, click this button to try to clear the errors and release the laser from a lock down state. A dialog with a processing bar like below might appear during the clearing procedure. Normally it will disappear automatically after the procedure is accomplished. Anyhow, it can also be closed by clicking the “Stop Waiting” button at anytime, or when it stays for too long.



Reset

Click the reset button to perform a cold start. By doing this the Laser will be turned off (if it is on) and all settings will be restored to the default value saved before (using “Save settings” button of command “w98 101”). A dialog with a processing bar like below will appear during the reset procedure. Normally it will disappear automatically after the reset is accomplished. Anyhow, it can also be closed by clicking the “Stop Waiting” button at anytime.



3.5 Advanced panel

The advanced panel is a terminal-like window for all commands that EdgeWave Laser supports. Since the GUI provides basic controls only, the unimplemented commands must be carried out here or use a terminal emulation software (e.g. [HyperTerminal](#)) instead.



When the software is showing the advanced panel, the [automation functions](#) introduced in section will be deactivated automatically. In this case, the software will not detect if a EdgeWave Laser is connected or not. If a Laser is disconnected and another Laser is connected during this, nothing will be updated including the SN in the title bar and the layout of the controls. It has to be done by disconnect and connect again manually. Automation functions will be activated when back to the simple panel if the feature is enabled in the settings.

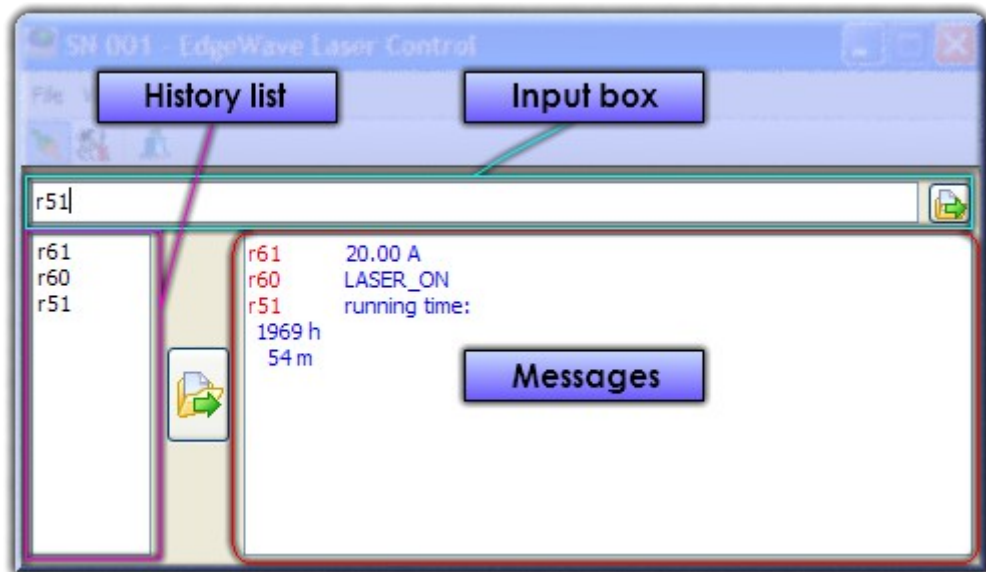


Figure 11: Advanced panel

The advanced panel consists of input box, command history and message box.

- **Input box**

A command should be input in this box. Press Enter key when the input focus is inside this box, or click the small button on the right side to send out a non-empty command (empty command means spaces only).



In a terminal emulator, e.g. [HyperTerminal](#), keystroke is sent out immediately. As a result, improper key sequence cannot be corrected. Unlike it, the command can always be revised inside the input box before sent out.

- **Command history list**

This box holds a list of recently used commands. Once a command is send through the input box, it will be appended to the end of the history list if no duplicate is found. To resend one of command, just double click with the left button of the mouse on the item, or single click to select/highlight the item then click the button on the right side of this box.

- **Message box**

After switch to advanced panel, all commands sent to Laser through the input box and messages received from it are displayed here. Outgoing command is in red, while incoming message is in blue. Right click inside this small window will bring a popup menu with which the contents can be copied or cleared.



Normally, the respond for the sent command is shown right behind it in the same line. In some cases, e. g. when the Laser is populating the oven temperature information, messages could be interrupt, but it is still visible.

3.6 Options

3.6.1 General options

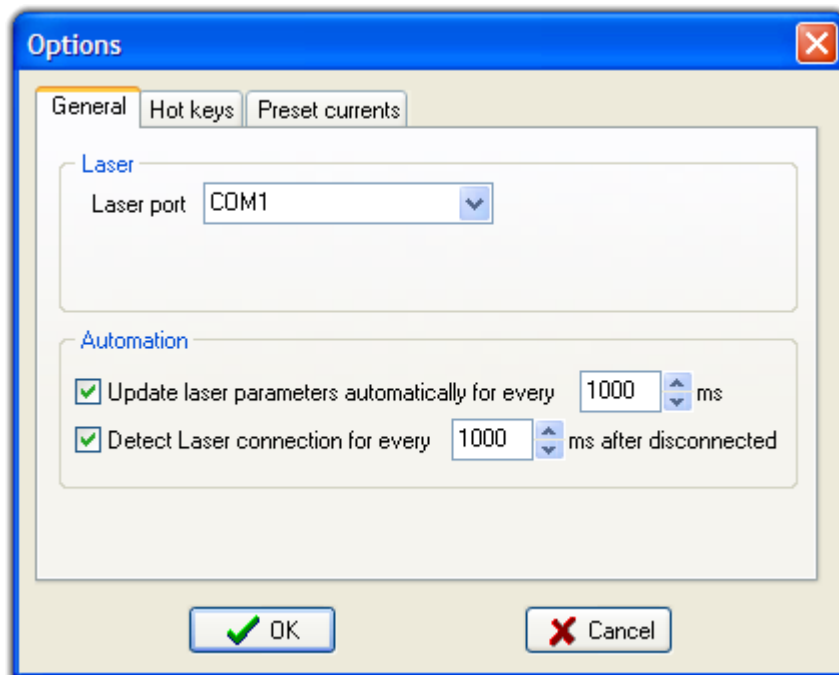


Figure 12: Options - General

- **Laser port**

A EdgeWave Laser should be connected to the computer through a RS232 interface. The EdgeWave Laser Control Software has to know which serial port is connected to it. The software can enumerate the COM ports present in the computer which will be shown when click the down arrow in the drop-down list window. The list will be updated only when click the button. If a COM port is inserted after the list is shown, it could be found by folding the drop-down list and open again.



In some cases, the software might be failed to fetch all COM ports information. The port number can also be inputted manually in the edit box even it is not listed here.

- **Update laser parameters automatically**

When this feature is enabled (checked), the software will update the information of the laser, including Laser On/Off state, trigger mode, internal trigger frequency, current and maximum current, at the specified interval. The connection between the computer and the Laser will also be detected in the meantime.

- **Detect laser connection**

When this feature is enabled (checked), the software will check whether a powered on EdgeWave Laser is connecting to the specified COM port or not at the specified interval. In either of the following situations

- Laser is not connected to the computer or power off when start the EdgeWave Laser Control Software,
- Laser was connected and controlled by the EdgeWave Laser Control Software. The cable is disconnected or broken during

normal operation,

- Laser was connected and controlled by the EdgeWave Laser Control Software. During the normal operation, the emergency stop is pressed,
- Laser was connected and controlled by the EdgeWave Laser Control Software. During the normal operation, the Laser power is shut off on purpose or not,

the software will try to reconnect the Laser when the hardware connection is fixed, emergency stop is released and the power is turned on.



The software will not try to reestablish the connection if it is disconnected manually by the [Connect/Disconnect](#) function described in section ??.

3.6.2 Hot keys

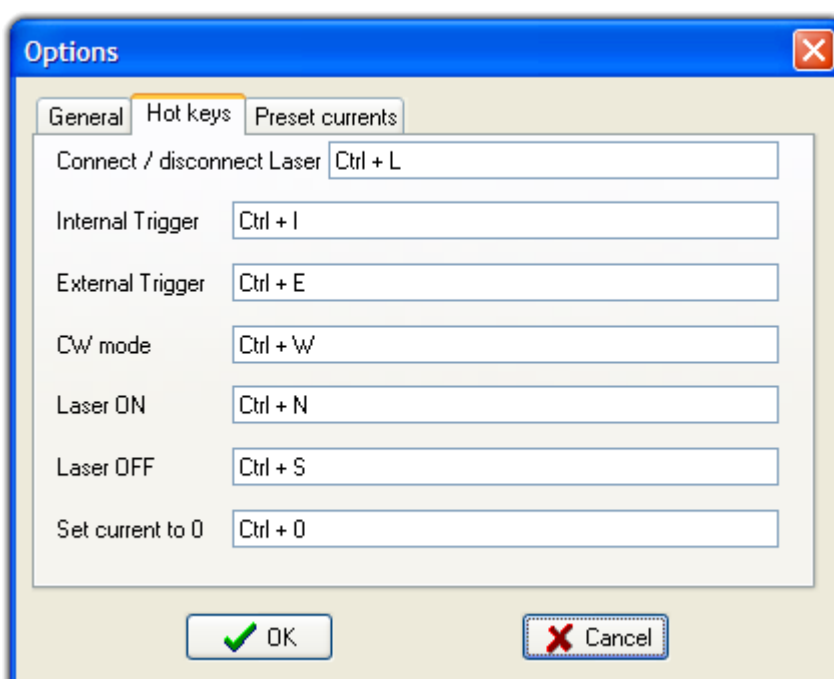


Figure 13: Options - Hot keys

Hotkey provides easier control in the software. To change the key combination used for certain function, use mouse to move the input focus into the corresponding edit box and then press the hotkey to be assigned to.



The software will NOT perform a conflicting check when assigning hotkeys. Please check all these fields carefully and avoid using the following hotkey which have been assigned to other functions: Alt+X, Ctrl+O, Ctrl+D, Ctrl+C, Ctrl+V, F1 and Ctrl+1 ~ Ctrl+9.

- **Connect / disconnect Laser**
Set the shortcut to establish / cut connections to laser
- **Internal Trigger**
Set [trigger mode](#) to Internal for all [branches](#).
- **External Trigger**
Set [trigger mode](#) to External for all [branches](#).

- **CW mode**
Set **trigger mode** to CW for all **branches**.
- **Laser ON**
Turn **Laser state** to ON.
- **Laser OFF**
Turn **Laser state** to OFF.
- **Set current to 0**
Set nominal currents of all **branches** to 0A.

3.6.3 Preset currents

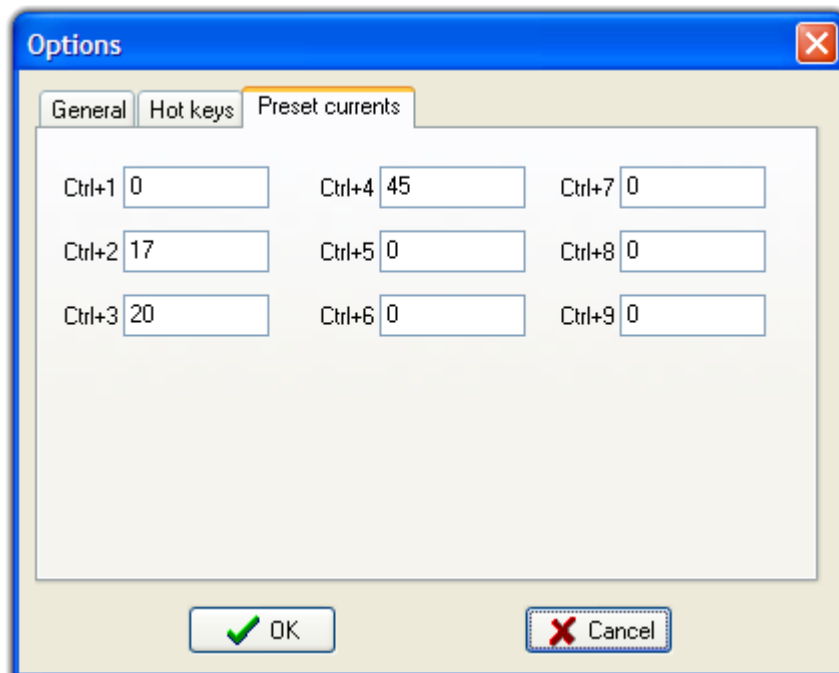


Figure 14: Options - Preset currents

This feature provides a faster way to change the laser current easily. The most frequently used current values can be set here and saved. When Laser is connected, pressing Ctrl+1 ~ Ctrl+9 will set the nominal laser current to the value listed here. If the Laser has 2 **branches**, nominal currents of both branches will be set according to the preset value simultaneously.



If the preset value is larger than the maximum current of the corresponding Laser branch, the maximum value will be used instead.



The decimal separator must be dot.

3.6.4 Save settings

The configuration of EdgeWave Laser Control is stored in the file called *EWLaserControl.ini* located at the same directory as the control software itself (*EWLaserControl.exe*). The settings including the options introduced above and the position of the main window will be loaded when launching EdgeWave Laser Control. If *EWLaserControl.ini* cannot be found or

corrupted, default settings will be loaded.

When the software is closed, all settings will be written into the setting file automatically. The software will create one if *EWLaserControl.ini* cannot be found and current Windows user has the privilege to create a file at the same folder.

Backup of the settings can be done by making a copy of *EWLaserControl.ini*.

4 Command line switch

Command line switches are some expressions appended at the end of the command used to launch EdgeWave Laser Control Software. It provides another way to override settings saved in the file EWLaserControl.ini. The overridden settings can still be changed after the software is started and the change will be written to the settings file as well.



This feature requires EdgeWave Laser Control Software version **3.0.2.63** or above. The version can be found in the [about dialog](#).

4.1 Syntax

The following rules apply to the usage of command line switches:

- Expressions in square brackets (between '[' and ']') are optional.
- The dots “...” is the place holder for similar expressions.
- Expressions in curly braces ('{' and '}') mean that instead of that Expression (including braces), the actual string or value must be substituted.

- Expression

```
expression1 | expression2 | ... | expressionN
```

means that any (but only one) from these expressions must be specified.

- All switch commands are case insensitive.
- Space(s) in command line is considered as the separator of switches.

The syntax of using command line switches is explained below:

```
EWLaserControl.exe [<switch>] [<switch>] ...
<switch> = <switch_symbol><switch_command>:{switch_parameter}
<switch_symbol> = '-' | '/'
<switch_command> = 'port' | 'left' | 'top'
```

Example:

```
EWLaserControl.exe -port:3 -left:100 -top:150
```

4.2 Command line switches

When start EdgeWave Laser Control Software from windows **Command Prompt** window, the switches can be effective simply by append them in the command line. They can also be saved in a windows shortcut for easier access in the future. Please follow the steps below:

1. Right click the shortcut of EdgeWave Laser Control Software created during [installation](#) with mouse. And then left click on **Properties**.
2. Input desired switches behind the EdgeWave Laser Control Software path in the **Target** filed.
3. Click **OK** button to close the dialog.

New settings will be effective on the next startup by clicking on this shortcut.

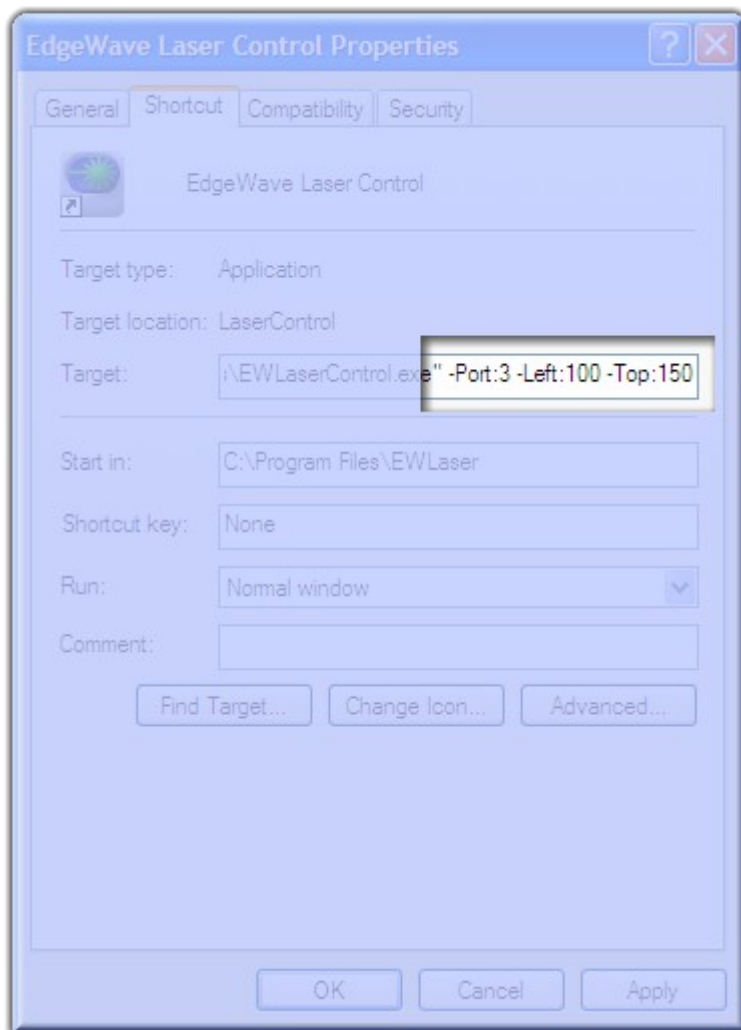


Figure 15: EdgeWave Laser Control - Shortcut properties

4.3 Switch commands

Command Word	Parameter Type	Description
PORT	Integer	The serial COM port connected to the Laser. Specify 1 for COM1, 2 for COM2 and so on.
LEFT	Integer	The position of the main window on the active windows desktop in the unit of pixel.
TOP	Integer	

Appendix A Multiple Lasers support

More than one running instance are allowed for EdgeWave Laser Control Software, which makes it possible to control more than one EdgeWave Lasers simultaneously if there are enough RS232 interface available (one for each laser). There are 3 ways to control multiple lasers with the same computer at the same time using EdgeWave Laser Control Software.

1. Only one copy of EdgeWave Laser Control Software exists. Launch it for multiple times and than choose the right COM port for each one.



In this case, options will be saved every time a instance is closed. But all earlier version will be overwritten and eventually only the last one persists.

2. Make 2 or more copies of EdgeWave Laser Control Software with different names in the same folder, or same name in different folders. Each copy has independent settings to control a EdgeWave Laser.
3. Use the command line switches to create different shortcuts pointing to the same copy of EdgeWave Laser Control Software.



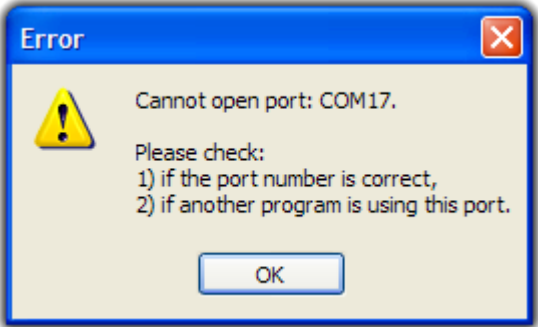
In this case, every running instance will share most of the same settings by default, especially the preset currents.

Appendix B Troubleshooting




Only the issues related to the EdgeWave Laser Control Software itself are listed below. For those of the Laser hardware, please refer to the Laser manual.

1. Cannot open port

Symptoms	<p>A dialog (Figure 16) appears when try to connect the Laser automatically or manually.</p> <div style="text-align: center;">  </div> <p style="text-align: center;"><i>Figure 16: Cannot open port</i></p>
Diagnose	<p>Double check the port number. Available COM ports can be found in the device manager of Windows, or in the options dialog of EdgeWave Laser Control Software.</p> <p>Check whether the connection between the device and computer is good or not, if a USB-to-RS232 adapter is used.</p> <p>A COM port is opened exclusively in Windows, which means only one program can use the port directly at any time. Close or disconnect the other program which is using the specified port and then try again.</p>

2. Cannot find the main window

Symptoms	No EdgeWave Laser Control Software window can be found.
Diagnose	<p>Check if the software is launched.</p> <p>Search on the windows task bar which normally located at the bottom of the desktop.</p> <p>Look for the icon  in the system tray area. If found, single click with left mouse button will bring the main window back. Uncheck "Minimize to system tray" in the menu can deactivate this feature.</p>

3. Cannot connect the Laser


Symptoms	There is not "Cannot open port" error. But the main window always shows Laser disconnected even after click the Connect button.
Diagnose	<p>Check the COM port.</p> <p>Check the connection of RS232 cable.</p> <p>Check if the RS232 cable is a 1-to-1 cable.</p> <p>Check if the power supply of Laser is connected to the mains and switched on.</p> <p>Check if the emergency stop button is engaged.</p>

	Check if the safety loops is connected well.
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4. System hangs up when connect

Symptoms	The windows system is slowed down dramatically or hangs up and the software has no response when trying to connect.
Diagnose	This is mostly caused by the failure of the COM port hardware or software driver. Try to use another port or computer.

5. Input current error

Symptoms	<p>The dialog (Figure 17) appears when sending a new current value.</p> <div style="text-align: center;">  </div> <p style="text-align: center;"><i>Figure 17: Value error</i></p>
Diagnose	There is a space character between the first digit and the decimal point which makes the format of the string invalid. "02. 0" will bring this warning as well. The solution is to use " 2.00" or "02.00" instead in case of Figure 17. It is recommended to input 4 digits in the nominal current box, which means to include the leading and trailing 0.

6. Initialization of connection fails

Symptoms	"Laser Disconnected" is always shown, but the serial number of is displayed in the title bar in a flash and then become "INNOSLAB" again. This repeat every time try to establish the connection.
Diagnose	Contact EdgeWave with the Laser serial number.