



Setting Up the Gardasoft TR-CL180 Liquid Lens Controller Manually with Some Lenses Equipped with the Optotune EL-3-10 Liquid Lens Module

The Gardasoft TR-CL180 liquid lens controller detects and utilizes the values of the EPROM mounted within the Optotune liquid lenses and liquid lens modules to automatically set the minimum and maximum focal power and control amperage value ranges required for proper operation of the connected liquid lens. Some OEM variations of lenses using the Optotune EL-3-10 liquid lens module utilize EPROMs that are developed in-house and may lack the auto-detect functions required to automatically connect to the Gardasoft TR-CL180 liquid lens controller. In this case, the liquid lens operation values can be entered manually using a command interface provided on the General Setup tab of the Gardasoft browser interface.

In the example below, the Optotune EL-3-10 liquid lens module used in the Opto Engineering lenses requires manual parameter entry via the command input shown below. The EL-3-10 has:

- Focal power range (@20°C) -13 to +13 diopters
- Nominal control current -120 to +120 mA
- In the command, note that the lens module's current range of -120 mA to 120 mA must be expressed in amps as **-.12 amps and .12 amps**.
- A password is not needed for operation.

The complete command is **RM1,-13,13,-.12,.12** and is shown below in the command entry in the General Setup tab:

The screenshot shows the Gardasoft Vision web interface. At the top, there is a navigation bar with the logo and links for "Go To Main Page" and "Set up Output 1". The "General Setup" tab is selected. The main content area displays "TR-CL180 Lens Controller - General" with hardware details "(HW01) V075, serial number 650668" and a link to "Get help using this controller". Below this is a "Set Password" section with two input fields for "Enter Password:" and "Repeat Password:", each with a password strength indicator, and a "Save" button. The "Send Command" section has an input field containing the command "RM1,-13,13,-.12,.12", a "Previous output:" field with a ">" symbol, and a "Send" button. A copyright notice "Copyright © 2005-17 Gardasoft Visi" is visible at the bottom right of the interface.



Once the lens parameter command is entered, we want to lock these values into memory, such that the Gardasoft TR-CL180 powers up with the appropriate lens parameters pre-populated every time. Enter the command **AW** and Send. To enter new lens parameters manually, enter the new RM1 values in the command window and lock them into memory.

The screenshot shows the 'General Setup' page for the TR-CL180 Lens Controller. At the top, the 'GARDASOFT VISION' logo is displayed. Navigation links include 'Go To Main Page' and 'Set up Output 1' on the left, and 'General Setup' on the right. The main content area is titled 'TR-CL180 Lens Controller - General' and identifies the hardware as '(HW01) V075, serial number 650668'. A link for 'Get help using this controller' is provided. The 'Set Password' section contains two password input fields and a 'Save' button. The 'Send Command' section has a command input field containing 'AW', a 'Previous output' field showing 'Evt1,190; >>', and a 'Send' button.

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When the lens parameter ranges are entered manually, the **Continuous** mode within the Gardasoft browser does not permit real-time viewing of the lens focus adjustments as the **Active Power** diopter slider is moved. You'll need to press the **Submit** button to make a change to the diopter value. The up/down arrow helps make very small changes in the diopter value, using vision tools to analyze image sharpness to select a diopter value that provides the highest sharpness value when setting up an inspection recipe. The resulting diopter value at a specific current value is very repeatable and may be made part of the Inspection Recipe.

The screenshot shows the Gardasoft Vision web interface. At the top, there is a navigation bar with the Gardasoft Vision logo and two links: "Go To Main Page" and "Set up Output 1". Below this, the main content area is titled "TR-CL180 Lens Controller - Channel 1 Configuration" and includes the hardware ID "(HW01) V075, serial number 649585". A link "Get help using this controller" is provided. The "Configuration" section contains the following controls:

- Mode: A dropdown menu set to "Continuous".
- Optical power range: A label with no input field.
- Active Power (dpt): A text input field containing "0.0" and a slider control.
- Idle Power (dpt): A text input field containing "0.0" and a slider control.
- Click to update: A "Submit" button.

Please refer to the Gardasoft documentation for the TR-CL180 Liquid Lens Controller.

Please contact Joe Gugliotti at R.J. Wilson, Inc. for more information on liquid lenses and lens controllers.

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