



## **USER MANUAL**



### **VLX2 LED Line Lighting**

Revision 4

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# 1 Disclaimer

Except as prohibited by law:

- All hardware, software and documentation is provided on an “as is” basis.
- It is essential that the user ensures that the operation of the product is suitable for their application.
- The user must ensure that incorrect functioning of this equipment cannot cause any dangerous situation or significant financial loss to occur.
- Gardasoft Vision Ltd and Gardasoft Products Ltd will not accept any liability for consequential loss of any kind.

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# 2 Getting Started

Read Section 3 on Safety. Ensure that the light can be used in a safe way.

Mount the light (Section 4). Connect the light (Section 5) up and set up the cooling system (Section 9).

Set up the VLX2 for the desired operation – See “Configuration” (Section 8).

Visit [www.gardasoft.com](http://www.gardasoft.com) for application notes on this product. There is also a Support page which has information on troubleshooting problems.

## 3 Safety

Read this before using the VLX2. Always observe the following safety precautions. If in doubt, contact your distributor or Gardasoft Vision. Refer to the label on the light and any supporting documentation supplied with the light.



Where these symbols appear in the manual, refer to the text for precautions to be taken.

### 3.1 Eye Safety



It is recommended that if the light source is installed such that there is the possibility of the personnel being directly exposed to the light output (i.e. during a product break) an interlock is fitted to shut the light off in this instance.

### 3.2 Heat



The VLX2 can dissipate up to 400W per metre during operation. In the event of a malfunction, it could get hot and should therefore be positioned where personnel cannot accidentally touch it and away from flammable materials.

Read the Mounting (Section 4). Do not exceed the power ratings given in the manual. Note that at the maximum ratings the case temperature can reach 45°C.

### 3.3 Electrical



The VLX2 is water cooled. Ensure that water from the cooling system cannot reach any high voltage circuits. Perform a risk assessment of all water leakage paths.

The VLX2 does not have complete tracking isolation of inputs and outputs.

### 3.4 Water Cooling

The VLX2 is a Water Cooled Device. Do not operate the unit without the Water Cooling System filled and running. Although the unit is temperature protected, damage could result if the unit is run at more than 5% output for a period without active cooling. Refer to the instructions for filling and operating the cooling system.

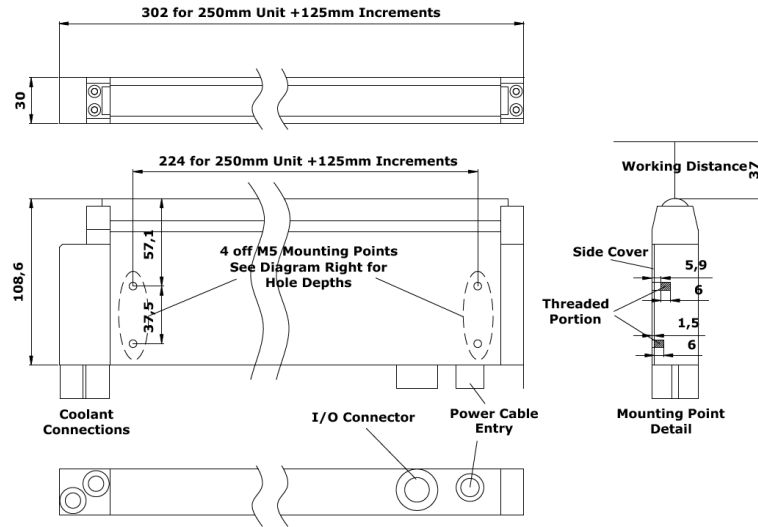
### 3.5 General

The VLX2 must not be used in an application where its failure could cause a danger to personal health or damage to other equipment.

If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

## 4 Mounting

The unit has two M5 mounting holes near each end as shown in the diagram below. The unit can be mounted in any orientation. When installed, the difference in height between the light source and cooling unit should be limited to 750mm. Should a difference greater than this be required then please contact Gardasoft Technical personnel for guidance.



## 5 Connections

See the Specification (Appendix A) for information on connection ratings.

### 5.1 Power Supply Voltage and Current Requirements

Refer to the label on the light and any supporting documentation sent with the light

Although the VLX2 is quoted as nominally as being a 24VDC device, due to the wide range of LED types now available there are some differences in the best supply voltage required depending on the wavelength.

The intensity also has an affect on the voltage required by the LEDs. In order to minimize the “wasted” energy, some additional data sheets have been issued giving guidelines about what supply voltage is optimal for particular LED types for specific output intensity settings.

NOTE: - This changing voltage is not the method used for regulating the intensity – the light sources all have current control circuitry as required by LED devices. However, if the supply voltage is significantly higher that is necessary then the additional (“spare”) voltage has to lost in the current control electronics which is both wasteful and generates additional heat which must then be removed.

The table below shows supply guide-lines but please refer to the label on the unit before use as LED technology is continually developing and these specifications could change.

#### 5.1.1 General Power Supply Guidelines

Colour / Wavelength	DC Supply Voltage for Maximum Output (140%)			Current @ Maximum Output / 125mm	Example Current for 500mm
	<50%	50-100%	>100%		
White, Blue, Green LEDs	24V	24V	26V	2A / 125mm plus 0.5A	8.5A
Red, Red/Orange	16V	17V	18V	2A / 125mm plus 0.5A	8.5A
660nm, 740nm Deep Red	24V	26V	28V	1.4A / 125mm plus 0.5A	6.1A
850nm, 940nm IR	15V	15V	15V	1.4A / 125mm plus 0.5A	6.1A
365nm UV LEDs	24V	24V	26V	2A / 125mm plus 0.5A	8.5A

If it is not intended to run the unit at full power then, as described above, there are benefits associated with running the supply at a lower voltage. For this reason, it is recommended that the power supply used with the unit is both capable of supplying the maximum voltage/current requirements of the unit but also the output voltage can also be adjusted down if necessary.

Additionally, the VLX2 units require high currents so care must be taken to ensure that an appropriate power supply is selected.

For further information please contact your distributor or Gardasoft Vision.

## 5.2 Power Supply



To avoid a fire hazard from the VLX2 or the power supply consider the implications of overheating in the unlikely event of a fault in the VLX2. The power dissipation in the VLX2 in a fault condition can be up to:

$$\langle \text{Power supply voltage} \rangle * \langle \text{max current delivered by power supply} \rangle$$

The use of a regulated power supply with 100% short circuit protection is recommended. If however a non-regulated power supply is used, then the maximum ripple voltage of this power supply must not exceed 10% of the actual DC value.

Route low voltage and mains wiring separately. If they must be loomed together ensure that low voltage insulation rating is sufficient or that supplementary insulation is used.

Standard units are shipped with a “wired in” power input cable.

For shorter lights a 2 core cable is supplied:

Core Colour	Function
Brown	Power 15V to 28V. See text
Blue	Power Ground

For longer lights a 5 core cable is supplied:

Core ID	Function
1	Power 15V to 28V. See text
2	Power 15V to 28V. See text
3	Power Ground
4	Power Ground
Green/Yellow	Functional Earth

The implementation of the 5 core cable rather than the 2 core depends on length and LED type - contact Gardasoft Vision for more details.

As a build option a 4-pin Bulgin 400 Series Buccaneer power connector can be fitted.

Pin	4-Pin Power Input Connector
1	Power 15V to 28V. See text
2	Power 15V to 28V. See text
3	Power Ground
4	Power Ground

The VLX2 is intended for industrial applications in a closed or protected environment. DC power supply cable length is recommended not to exceed 3m. If longer DC cables are fitted, or if surge or transient interference greater than +/-60V may occur on the DC power supply lines, additional surge protection should be provided.

### 5.3 IO Connector

The IO connector mating part is Bulgin Buccaneer PX0410/10P.

Pin	Function
1	RX (input to light)
2	TX (output from light)
3	RS232 GND
4	Reserved - Do Not Connect
5	Reserved - Do Not Connect
6	Reserved - Do Not Connect
7	Reserved - Do Not Connect
8	Reserved - Do Not Connect
9	Reserved - Do Not Connect
10	Reserved - Do Not Connect

The unit is supplied as standard with a “break out” cable to a standard RS232 serial port (9 Pin “D Type” line socket) or as an option with a “loose” Bulgin Buccaneer PX0410/10P connector for customer configuration.

## 5.4 Water Cooling



The system must not be operated without a cooling system fitted and running. Please refer to Section 9 below for further information on the cooling system.

### 5.4.1 End User Supplied Coolant Flow

Should the cooling fluid be supplied by the end user then it is important that the temperature of the water fed to the system is not so cold as to potentially cause condensation either within the light source or on the cooling tubing resulting in potential water drips.

It is recommended that, in a “normal” environment, the cooling water temperature is not lower than 20 °C. In a humid environment the temperature may need to be higher.

A flow rate of at least 900 litres/hour should be maintained at a maximum pressure of 4 Bar.

positive displacement pump

### 5.4.2 Coolant Flow Failure

Should the coolant flow fail for any reason, the VLX2 has built in autonomous over-temperature protection which will cause the unit to automatically shut down the light output. See Section 7 (Fault Detection) for further information.



## 6 Installation

Read Section 3 on Safety before installation.



The light source generates a significant amount of heat (approximately 400W/m of length) and needs to be water cooled to operate correctly. The water cooling is achieved either by a Gardasoft supplied cooler or chiller unit or by the customer's own cooled water supply.

After unpacking the light source and prior to use, it must be connected to the cooling unit and the system filled/topped up with coolant. The unit should be connected up using the pre-assembled tubing supplied as shown in the diagram below.

The "Quick Release" couplings are connected and disconnected by pressing the silver or grey buttons on the connector body. Although the connectors are valved (and therefore self sealing), a few drops of coolant may be present in the connector bodies when disconnecting.



**CAUTION:** - Always ensure that the cooling system is turned off before attempting to disconnect the tubing.

Chiller units, where supplied will run from 230VAC. Connect the light source and cooling/chiller unit to the power supply(s) and apply power. The pump and fans will start and the Line Light unit will illuminate to its stored level – this is generally set to 1% when shipped. If this is the first time that the unit has been used after filling then follow the instructions in the previous section ("Filling The Cooling System")

The light source intensity is controlled via RS232 serial communications control. See the "Configuration" section below for more details.

Should the light source start to flash on and off regularly (about once per second) it is likely that it has "tripped" on its internal over temperature or over /under voltage protection. Use the "E" command to diagnose the fault.

### 6.1.1 Focusing the Beam – Long Working Distance (LWD) Model Only

LWD units are generally shipped with the lens fully retracted into the body of the light source. In order to operate correctly the lens needs to be moved to the correct position to produce a focused line.

Once the unit has been mounted in its desired position, the focus (working distance) of the VLX2 can be adjusted by moving the position of the lens. The lens is clamped using two "grub" screws, one at each end of the lens accessed via holes in the covers.

To adjust the working distance, loosen the two "grub" screws using a 1.5 mm Allen key and slide the lens in and out to achieve the required focus. The line width can also be changed by the same means. Once the desired setting has been achieved, clamp the lens by lightly tightening the "grub" screws again. Ensure that the lens has been positioned evenly to ensure a consistent line width and intensity. **DO NOT OVER TIGHTEN THE SCREWS OR THE LENS WILL BECOME DAMAGED.**

### 6.1.2 Setting the Line Intensity



CAUTION: - Always ensure that the light source is connected to a cooling system before use.

The intensity of the light source can be set by means of a serial communications port. It is generally set to 1% prior to shipping but can be set any value from 1 to 140% (110% for Red & Red/Orange) – See Section 8 below for the commands for setting the intensity.

An output setting of 100% will run the LED devices used in the light source at the power level quoted by the LED manufacturer which will achieve a “lifetime”\* of 50,000 hours continuous running. Running the intensity at values above 100% will potentially reduce the effective “lifetime”\* of the LED devices in the unit. However, because the cooling system of the VLX2 ensures that the temperature of the LEDs runs significantly cooler than with an air cooled heat sink, it is likely that these higher intensities will not have a significant effect on the “lifetime”.

The “lifetime” in this case is defined as the time at which the intensity of the light output falls to 70% of the initial value (known as the R70 lifetime).

Please consult your distributor if clarification is required.

## 7 Fault Detection

The VLX2 unit monitors the following parameters: -

System Temperature – To detect cooling system faults

Supply Voltage – Checks for Over and Under Voltage (Alarm Levels depend on LED type fitted)

Internal Control Supply Voltage (5V) – Status only, No Alarm

In the event of a fault being detected, the unit will go into “Alarm Mode” and the light output will be automatically shut down and the unit will flash the light output at around 1 Hz to indicate the fault condition. The light source will remain in “Alarm Mode” until either the power to the unit is cycled or the Reset (Q) command is sent via the RS232 Port (see Section 8 on Configuration).

The cause of the alarm can be determined by either using the “E” command which will return a string describing the fault (e.g. VLX2 Over Temperature!) or the “Z” which returns a single character numeric code (more for use with bespoke software) representing the unit status.

Additionally, the supply voltage can be checked using the “V” command. The value returned is the supply voltage x 100 e.g. V2458 = 24.58 Volts.

If the option is fitted, the “Healthy” output will switch state if the unit goes into “Alarm Mode”.

### 7.1.1 Over-temperature

If an over-temperature Alarm occurs, ensure that the operation of the cooling system is checked before resetting the unit immediately once the power has been cycled and take appropriate action if necessary.

The Shut Down temperature is factory preset for operating in a “normal” ambient environment (<30°C). However, it can be changed via the serial communications link. Please consult your distributor if it is believed that this could be necessary.

## 8 Configuration

The VLX2 is configured using the RS232 interface.

### 8.1 RS232 Communication

When using RS232 the COM port should be set to 57600 Baud, 8 data bits, 1 stop bit, no parity, and no handshaking.

The RS232 connector is a standard 9-way female D-type. A standard straight through cable can be used to connect the controller to a PC serial port. The communications port should be set to 57600 baud, no parity, 8 data bits, and 1 stop bit.

### 8.2 HyperTerminal

If using HyperTerminal to communicate with the VLX2, ensure that the following are both selected:

- Send line ends with line feeds

- Echo typed characters locally

This is set on the Properties dialog, Settings tab, ASCII Setup dialog.

Also ensure that handshaking is turned off.

To test the RS232 link, press Enter and check that an "OK" message is returned by the VLX2.

### 8.3 Command Structure

The intensity of the light source can be set and stored by means of a serial communications port. It is generally set to 1% prior to shipping but can be set any value from 1 to 140% (110% for Red & Red/Orange).

Any serial communications software (e.g. HyperTerminal supplied with MS Windows) can be used to set the light level. The settings and commands available are as follows: -

The standard commands are given below. Commands are not case sensitive.

The Enter key or Linefeed (<LF>) character must be sent after each command. The VLX2 will reply with an echo of the command given, "OK" if a "Blank" command is sent or an error message.

### 8.3.1 General Command Functions

Command Syntax	Function	Response Format
?	On Screen Help - Lists available commands	Multi Line Help Text
R<CR><LF>	Read current intensity level percentage	Rxxx<CR><LF> – where xxx is current output intensity
Wxxx<CR><LF>	Set the intensity level percentage. Where: xxx = intensity % from 0 to 140	Wxxx<CR><LF> – where xxx is new output intensity
S<CR><LF>	Store the current intensity as the power-up default	Sxxx<CR><LF> - where xxx is current output intensity
T<CR><LF>	Read the VLX2 temperature sensor	Txx<CR><LF> – where xx is the temperature in DegC
E<CR><LF>	Read any error messages – Returns Text String	E“string” <CR><LF> - where “string” = VLX2 OK VLX2 Over Voltage VLX2 Under Voltage etc
Z<CR><LF>	Returns the Unit Status	Zxx<CR><LF> – where xx is the status code. 0 = OK. Refer to Gardasoft for other codes.
X0<CR><LF>	Turn light output off	X0<CR><LF>
X1<CR><LF>	Turn light output on (Default is on)	X1<CR><LF>
Q<CR><LF>	Reset and restart the light	Q1<CR><LF>

Commands Intensity Profile Setting – See below for more information.

Command Syntax	Function	Response Format
Oa,n<CR><LF>	Write Segment Offset a = segment address * n = Offset Value 0 – 255. Offsets are added to overall set point	Oa,n<CR><LF>
Pa<CR><LF>	Pa Read Segment Offset. A = segment address.	Pa,n<CR><LF> n = Offset Setting
\$ <CR><LF>	Store Offsets.	\$1 <CR><LF>
=<CR><LF>	Returns information including values of Offsets	See below

\* - Segment Addresses start from 0 at the coolant connections with two segments per 125mm on length. i.e. 375mm long has 6 segments numbered from 0 to 5 from coolant connection end of line.

“=” Command Typical Response below

Values after “Offsets” give the offset value of each segment starting with Segment 0

3 LED Modules
Addr. 2 4 6
3 Therm Modules
Addr. 2 4 6
Offsets: 0 0 0 0 0 0 0

## 8.4 Intensity Profile Setting

The intensity profile can be changed by applying “offsets” to the intensity level at different points along the length of the line. A typical application of this would be to compensate for the loss of light at the edges of the field of view due to camera optics / geometry.

Offsets can only be positive – i.e. they can only increase the intensity level above the “base” value. For this reason, the point in the intensity profile which requires the lowest intensity should have an offset of 0 with increasing offsets in other places.

The line is divided into “segments” of 62.5mm – i.e. there are two segments per 125mm of length, the incremental length of the VLX2 range. Segment Addresses start from 0 at the coolant connections i.e. 375mm long has 6 segments numbered from 0 to 5 from coolant connection end of line.

The commands used for setting the offsets are shown in the table below. The offset value can be from 0 – 255. For the VLX2 range each offset unit is equivalent to around 0.3% of the maximum intensity. NOTE: Offsets are absolute and not applied in proportion to the running intensity

#### **8.4.1 Example**

To create a “smile” type intensity profile (i.e. higher intensity on each end on the line) on a 500mm long line the following values might be used for the 8 “segments” available: -

35, 20, 5, 0, 0, 5, 20, 35. These would be set to each segment in turn using the commands in the table above.

e.g. Set segment 0 `O0,35<CR><LF>` sets segment 0 to 35 offset

Once all the segment offsets have been set and the desired profile has been created, use the “\$” command to store these. If the dollar command has not been used, the offset values can be set back to 0 by cycling the power to the unit.

To view the current offset values, use the “=” command as described above.

## 9 Water Cooler

The requirements for supply of the cooling water depend on the length of the line light and the ambient temperature in the area around the cooling unit.

If the end user supplies the cooling water then please read the notes in section 5.3 above. Otherwise, either a Water Cooler (this section) or Water Chiller (Section 10) will need to be used.

This cooler will work for VLX2 lights up to 750mm long except at high ambient temperatures. For longer lights use a Gardasoft Water Chiller – See Section 10.

### 9.1 Packing List

The cooler package includes:

Cooler

12V power supply

2 water tubes, length 1 metre c/w “Quick Connect” fittings for VLX2

Lights, pipes and coolers are generally supplied nearly full of coolant.

### 9.2 Safety



**CAUTION: This cooler includes propylene glycol coolant (CAS# 57-55-6). Obtain a safety datasheet before proceeding.**

#### Eye Contact:

Check for and remove any contact lenses. Immediately flush eyes with running water for at least 15 minutes, keeping eyelids open. Cold water may be used. Get medical attention.

#### Skin Contact:

In case of contact, immediately flush skin with plenty of water. Cover the irritated skin with an emollient. Remove contaminated clothing and shoes. Cold water may be used. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention.

#### Serious Skin Contact:

Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek immediate medical attention.

#### Inhalation:

If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.



**Ingestion:**

Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If large quantities of this material are swallowed, call a physician immediately. Loosen tight clothing such as a collar, tie, belt or waistband.

**9.3 Cooler Specification**

Parameter	Value
Dimensions	248mm by 149mm by 86mm (excluding pipes)
Cooler power supply input	2.1mm jack plug, requiring 12V at 500mA
PSU supplied with cooler	IEC connector, 100V to 240V AC input. 2.1mm jack socket, 12V at 1A or more output
Nominal flow rate	600 litres per hour
Heat Dissipation	225W
V LX2 heat dissipation	Suitable for VLX2 light lengths up to 750mm, running at 140% brightness.
Cooler water fittings	CPC mating connectors – supplied with cooler
Coolant pipe OD / ID	12mm / 9mm (older models 10mm / 7mm)
Coolant Pipe Material	Polyurethane - natural
Recommended coolant additive	Propylene glycol + corrosion inhibitors (HydraTech CoolFlow IG recommended – FG grade for food applications) 25% Concentration with distilled/de-ionised water
V LX2 water fittings	PLCD240-04BSP – CPC male threaded insert
Pipe water fittings	PLCD170-06 - CPC hose barbed body (old PLCD170-05)
Rated lifetime	50000 hours

**9.4 Installation**

Install the cooler so that there is good air flow from the fan through the radiator.

NOTE: Ensure that the cooler is above the light source before removing the filler cap to ensure no “back flow” out of the tank.

The cooler is filled when in the “Filling Position” orientation as shown below. Remove the filler cap and fill with coolant until 5mm from below the bottom of the threads at the top of the tank. Ensure the cap is correctly refitted before moving.

Once filled, the cooler should be operated in the “Running Position” orientation shown below. There are labels on the unit which indicate this.



Figure 1 - Filling Position



Figure 2 - Running Position

It is possible to replace the propylene glycol coolant with water. However propylene glycol additive has anti-corrosion and lubrication properties.

Connect the pipes between the cooler and the light. The pipe fittings are push fit. Ensure that the pipe connections are not under any tension.

Connect the PSU to the cooler and connect to the mains. Check that the fan is running and that water is flowing



through the tubes. The flow rate is typically 100mm per second. On first installation it should be possible to see small bubbles flowing through the pipes at this speed.

The photograph shows one of the couplings – the metal part is the release button for use when disconnecting the fitting.

Once the pipes have been connected, if the unit has not been supplied pre-filled, it will be necessary to fill the system. The reservoir filler plug is located on the top of the cooling unit as indicated in the photograph. BEFORE powering up the cooling unit for the first time, the reservoir should be filled (using a 25% mixture of De-Ionised or Distilled Water and Hydratech Coolflow IG coolant additive) to around 5mm below the bottom of the threads in the top up orifice. This ensures that there is enough air above the coolant to allow expansion. An additional quantity of coolant mixture should be available to top up the reservoir as the system fills up and bleeds when the cooling unit is first powered up.

It is not necessary to turn on the light source at this point but if the light source is also powered up then try to complete the filling operation quickly. Power up the cooling unit and, as the coolant circulates and fills, air will be dispelled from around the system and the reservoir level will fall. Add coolant to the reservoir to maintain the level specified above. The system should “self-bleed” and after a short period, most of the air should have been displaced - any small bubbles will disappear after the unit has been run for a period. If any larger bubbles persist turn off the cooling unit for a few seconds and then restart it - it may take a few of these cycles to move persistent trapped air.

Once the system has been filled the Filler Cap should be replaced and the cooler placed in the “Running Position” as shown to ensure good airflow around the unit.

As supplied there should be enough coolant. However once the system is free of air bubbles, check the reservoir to make sure the level is correct.

Turn on the VLX2 light. Ideally run the VLX2 for 30 minutes and check the internal temperature using the RS232 “T” command. This should typically be 5°C above the ambient temperature around the cooler.

To disconnect the pipes, first ensure that the cooler has been turned off and then push the metal lever on the fitting must be pushed sideways. There will be a few drops of coolant remaining in the fittings, but the fittings are valved to prevent loss of fluid when disconnected.

## **9.5 Maintenance**

If the cooling system fails for any reason, the VLX2 will detect its internal temperature rise and stop the light output. In this case the light is flashed slowly to indicate a problem. Fix the cooling problem and then power cycle the VLX2 to restart.

Each month:

- Check the reservoir to ensure it is at least half full. Top up if necessary.

- Examine the radiator in the cooler and ensure it is not clogged with dust.

Read and log the internal temperature of the VLX2 using the RS232 “T” command.  
Check it is within the expected range established at installation

## 9.6 Spares

The following water fittings can be purchased as follows.

Water fittings:

Replacement connections on VLX2 Unit – CPC PLCD240-04BSP

Replacement connections for tube to VLX2 - PLCD170-06 (12mm tube) / PLCD170-05 (10mm tube)

Tube: 9mm ID (12mm OD)

Coolant: The coolant additive is propylene glycol based with corrosion inhibitors. This can be obtained as normal automotive antifreeze.

## 10 Water Chiller

The previously described Water Cooler will work for VLX2 lights up to 750mm long except at high ambient temperatures. For longer lights use a Gardasoft Water Chiller. The recommended chiller is a Rittal recirculating re-cooler unit part number SK 3318-610.

### 10.1 Water Chiller Kit Packing List

The chiller package includes:

Rittal - SK 3318-610 Re-cooling Unit

Pipe Fittings

2 water tubes, length 1 metre c/w "Quick Connect" fittings for VLX2

### 10.2 Chiller Specification

Parameter	Value
Dimensions	600 x 400 x 430mm
Cooler power supply input	230VAC @ 4.2A (10A Startup)
Delivery Pressure	4 bar
Heat Dissipation	960W
VLX2 heat dissipation	Suitable up to 3000mm long
Cooler water fittings	Supplied with Cooler
Coolant Tube Type	Polyurethane recommended
Coolant pipe ID	9mm (12mm OD)
Recommended coolant fluid	HydraTech CoolFlow IG (FG for Food Applications)
VLX2 water fittings	PLCD240-04BSP – CPC Male Threaded Insert
Pipe water fittings	PLCD170-06 - CPC Hose Barbed Body (old PLCD170-05)
Rated lifetime	Recommended Service Interval – 2 Years

## A. Specification

<b>Light Source</b>	
Model Numbers (yyy = length in 125mm increments)	VLX2-yyy-SWD-x (37mm working distance) VLX2-yyy-LWD-x (110mm working distance)
Line Colour (x)	W - white, G - green, B - blue, R – red, IR850, IR940 - infrared UV365, UV395 - ultraviolet
Illuminated Line Length	125mm upwards in 125mm increments
Uniform Intensity Length (>95%)	Along illuminated length - 30mm
Nominal Supply Voltage	15 - 28VDC. See section 5.
Current Consumption	Up to 3A / 125mm plus 1A depending on LED wavelength/colour
Working Distance (depends on model number)	37mm or 110mm for focused line – See model number
Colour Temperature (White Only)	~5500°K
Intensity Control Method	RS232 - see text for commands (Ethernet module optional)
Dimensions	See “Light Source Dimensional Data” section
<b>Cooling Unit</b>	
Model Number	As supplied – various models used
Supply Voltage/Current - Nominal (See Page 3)	See manual supplied with unit
Recommended Coolant Mix	Distilled or De-ionised Water & Hydratech CoolFlow IG2
Coolant / Water Dilution	25%
Dimensions L x W x H/mm	260mm by 150mm by 85mm excluding pipes

## Gardasoft LED Lighting Controllers

The products available at the time of writing include the following. Other products are also available. See [www.gardasoft.com](http://www.gardasoft.com) for details of the current range.

### RT Range

- 2,4 or 8 output channels up to 20A each
- 2,4 or 8 trigger inputs
- Front panel, RS232 or Ethernet configuration
- Fast pulsing option

RT200-20	Lighting controller: 2 channels up to 20A pulsing, front panel
RT220-20	Lighting controller: 2 channels up to 20A pulsing, Ethernet
RT260-20	Lighting controller: 2 channels up to 20A pulsing, RS232
RT420-20	Lighting controller: 4 channels up to 20A pulsing, Ethernet
RT820F-20	Lighting controller: 8 channels up to 20A fast pulsing, Ethernet
RT860F-20	Lighting controller: 8 channels up to 20A fast pulsing, RS232
PP704	DIN Rail mounting clip for RT range

## Machine Vision Timing Controller

### CC320 Controller

- 8 digital inputs
- 8 digital outputs
- 1 or 2 wire Encoder input
- Very flexible operation
- Ethernet control
- Front panel configuration

PP703	DIN Rail mounting clip for CC320
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## **Gardasoft LED Lighting**

The products available at the time of writing include the following. Other products are also available. See [www.gardasoft.com](http://www.gardasoft.com) for details of the current range.

### **VLX1 LED Line light range**

- High intensity LED line lights for linescan applications
- Brightness up to 1.6 MLux
- Line lengths from 125mm to 2 metres+
- Range of wavelengths available
- Forced air cooling options for increased performance
- 50,000+ hours service life

### **VLX2 LED Line light range**

- Very high intensity LED line lights for linescan applications
- Water cooled for high efficiency cooling and long LED lifetime
- Brightness up to 2.3 MLux
- Line lengths from 100mm to 2 metres+
- Range of wavelengths available including UV and IR
- 50,000+ hours service life

### **VTR1 & VTR2 LED Strobe lights for traffic monitoring/ANPR/LPR**

- High intensity LED strobe lights for automatic license plate recognition applications
- Available in 740nm, 850nm and 940nm IR and white light
- High speed strobing, up to 65Hz (VTR2)
- Strobing can be asynchronous or free running
- Compact IP66 rated enclosures for outdoor use
- Excellent thermal management of LEDs ensuring long life service
- Full intensity control for dynamic brightness adjustment