CalUltra

Operation & Installation Instructions

CalUltra 12

CalUltra 22

WRAS APPROVED PRODUCT
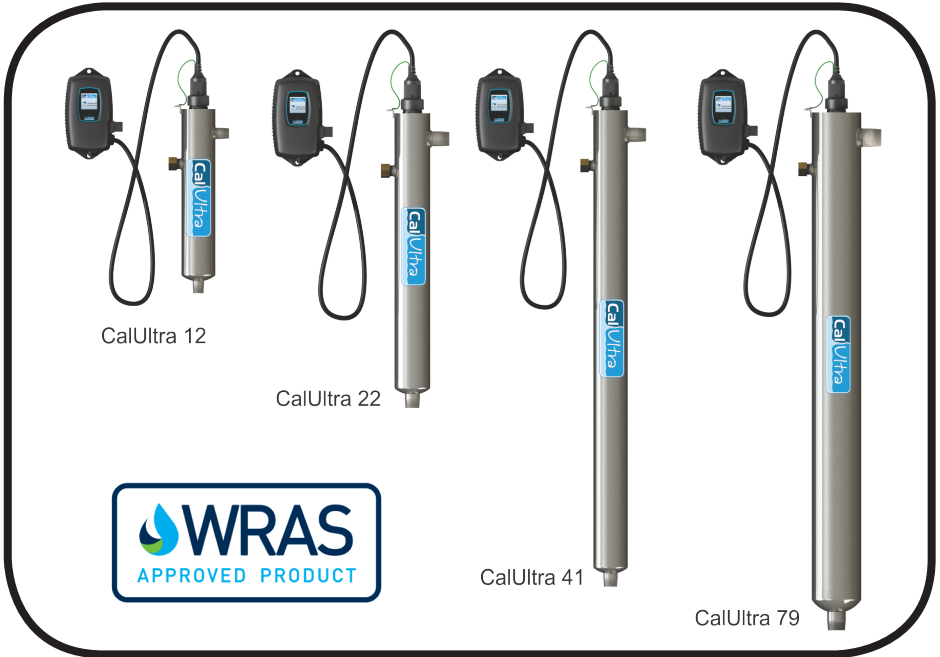
CalUltra 41

CalUltra 79

CalUltra UV - Standard Systems	
Model	Rated Flow
UV-CalUltra 12	12 lpm
UV-CalUltra 22	22 lpm
UV-CalUltra 41	41 lpm
UV-CalUltra 79	79 lpm

Remember don't guess....ASK

Congratulations on purchasing this ultraviolet disinfection system. By purchasing a CalUltra UV Disinfection system you are receiving not only a high quality product but also peace of mind. Protecting your water supply with a UV system gives you reassurance that your family will have access to safe drinking water throughout your entire home with no chance of microbiological contamination. This is a chemical free process which is simple in its concept and effective in its abilities to inactivate microorganisms present in the water supply. Simple maintenance, continuous disinfection and ultimately safe water, CalUltra makes it that easy.

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Safety Considerations

Although your UV system has been manufactured to the highest safety standards, care must be followed when operating and/or maintaining your system.

1. Before servicing this equipment, disconnect the power cord from the electrical outlet.

2. **Energy given off by the UV lamp is harmful to your eyes and skin**. NEVER look directly at an illuminated UV lamp without adequate eye protection and always protect your skin from direct exposure to the UV light.

3. For complete disinfection, use ONLY Calmag genuine replacement parts.

4. Do not operate the unit if it has any damaged or missing components.

5. To avoid possible electrical shock, use only with a properly grounded electrical outlet.

6. Never perform any maintenance to the system unless you are comfortable in doing so. Contact Calmag for service instructions if required.

7. Do not use this system for any purpose other than what it was intended for. Misuse of this system could potentially cause harm to the user or others.

8. Your system is intended to be installed indoors and away from leaking plumbing. DO NOT plug the unit in if the system or any of the components are wet.

9. The disinfection system should be directly installed into a ground fault circuit interrupter (GFCI). If the use of an extension cord is required, the cord must be manufactured with a minimum of 16 gauge wire and care should be taken to avoid potential tripping hazards.

10. We recommend that a competant plumbing installer install the system.

Before You Begin

The following will be needed for installing the UV system:

Tools

- Pipe cutter, hacksaw or other specialized tools required to cut into your existing plumbing (e.g. if you have PEX piping)
- Soldering tools (torch, flux, emery cloth and solder)
- Correct sized spanners (for tightening fittings)

Other Materials

- Various pipe fittings
- PTFE tape

Water Quality parameters

UV disinfection is extremely effective against microorganisms but only if the UV light can pass through the water it needs to treat. This means that the quality of your water is very important in order to ensure complete disinfection.

Treated water should be tested for at the least the parameters listed below. If the water exceeds the listed parameters Calmag strongly recommends that appropriate pretreatment equipment be installed (equipment required will depend on parameters being treated):

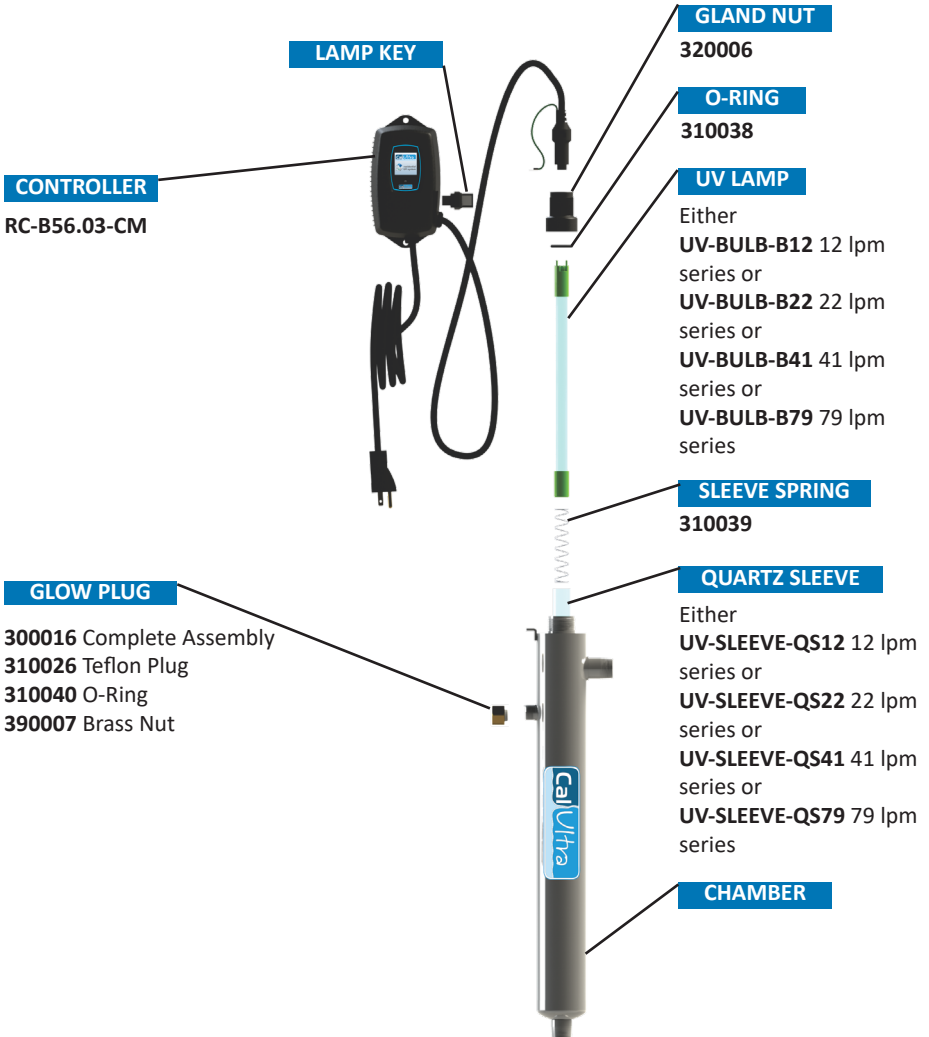|	
Hardness:	<120 ppm – if hardness level is 120 ppm or slightly below the quartz sleeve must be cleaned periodically in order to ensure efficient UV penetration; if above the water must be softened.
Iron (Fe):	<0.3 ppm
Manganese (Mn):	<0.05 ppm
Turbidity:	< 1 NTU
Tannins (organics):	<0.1 ppm
UVT (transmittance):	>85% (Please contact Calmag if water has a UVT that is less than 80% for pre-treatment recommendations)

You can have your water tested at a private analytical laboratory or by your local council. It is always recommended to install pre-filtration of at least 5 microns prior to a CalUltra UV disinfection system. The CalUltra 12 and CalUltra 22 models are already provided with a pre-filter. For other models, please contact Calmag for the appropriate filter housing and cartridge.

Parts List

Unpack the system and ensure all the components are included with the system. Your system is shipped with the following components that are pre-assembled:

CalUltra domestic units

LAMP KEY

GLAND NUT
320006

O-RING
310038

CONTROLLER
RC-B56.03-CM

UV LAMP
Either
UV-BULB-B12 12 lpm series or
UV-BULB-B22 22 lpm series or
UV-BULB-B41 41 lpm series or
UV-BULB-B79 79 lpm series

SLEEVE SPRING
310039

GLOW PLUG

300016 Complete Assembly
310026 Teflon Plug
310040 O-Ring
390007 Brass Nut

QUARTZ SLEEVE
Either
UV-SLEEVE-QS12 12 lpm series or
UV-SLEEVE-QS22 22 lpm series or
UV-SLEEVE-QS41 41 lpm series or
UV-SLEEVE-QS79 79 lpm series

CHAMBER

System Sizing

All CalUltra UV systems are rated for a specific flow rate in water that meets the quality parameters on page 5. **PLEASE NOTE** that increasing the flow above this rating or disinfecting water that does not meet the quality parameters will decrease the dose and therefore compromise the microorganism inactivation.

It is important to know the maximum flow rate that your water system delivers. If you do not have this information, you can simply fill a 10 litre bucket with water from the mains supply and tome how long it takes to fill up. This can then be calculated to litres per minute and the the approriate Calmag UV unit should be chosen.

Location

Choose a location where the main cold water line is accessible. The system must be installed after other water treatment equipment (softener or filters), but before any branches (See Figure 1). Calmag recommends that a 5 micron filter be installed **before** the UV system for a final polishing step before the water is disinfected (included with the CalUltra 12 and CalUltra 22 models).
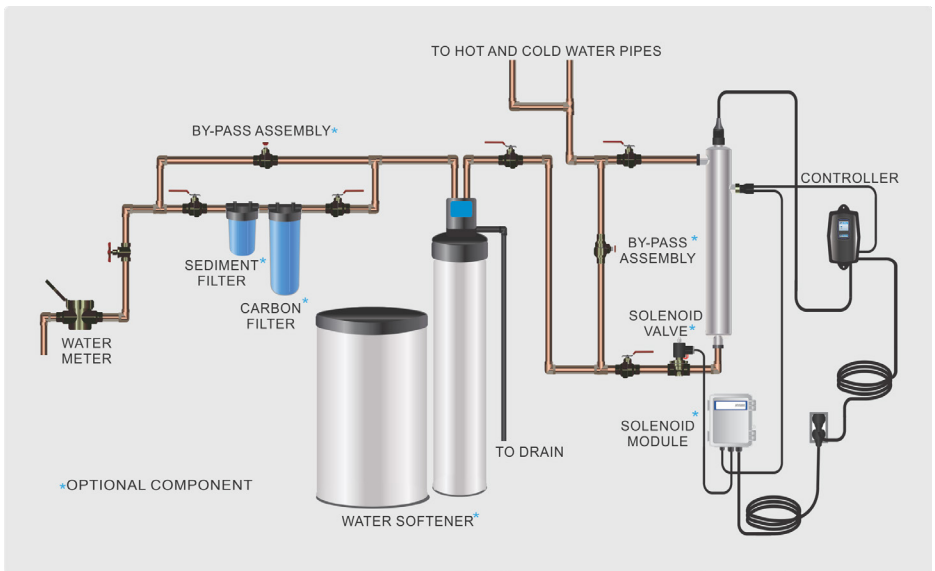

Figure 1. Example Installation

To facilitate lamp removal, ensure there is enough space at the lamp connector end to safely remove the UV lamp and/or quartz sleeve (See Figure 2). The controller will require a ground fault circuit interrupter (GFCI or GFI) outlet and should be mounted beside or above the chamber. **PLEASE NOTE**: All CalUltra UV disinfection systems are intended for indoor use only as they should not be exposed to the elements.

Installation

Step 1: The reactor can be installed either horizontally or vertically using the clamps provided. Vertical installation allows any air that may be in the lines to be easily purged from the system.

Step 2: The use of a by-pass assembly is recommended as it will allow you to isolate the UV unit. This will allow for easier access in case maintenance is required (See Figure 3).

Step 3: Use appropriate fixings to mount the UV unit.

Step 4: For water supplies where the maximum flow rate is unknown, a flow restrictor is recommended so that the rated flow of your particular CalUltra system is not exceeded. The flow restrictor should be installed on the outlet port of the unit.

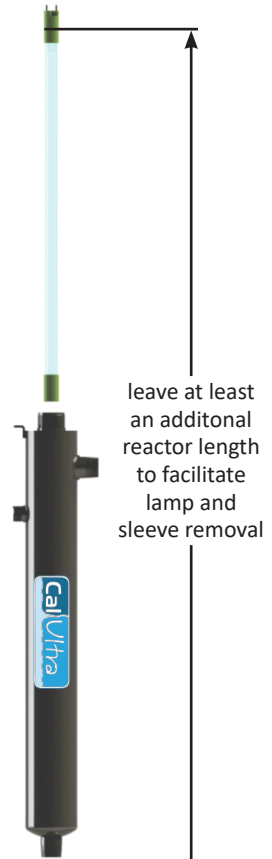**Step 5:** It is recommended to have a competent plumber connect the UV unit to the water supply.

leave at least an additonal reactor length to facilitate lamp and sleeve removal

Figure 2. Lamp Removal Spacing

Figure 3. By-pass assembly

Note: Installation of your CalUltra disinfection systems should comply with applicable regulations. Please check if unsure.

ON PRE-BUILT UNITS STEPS 6 & 7 HAVE BEEN PRE-ASSEMBLED

Step 6: Once the system has been plumbed in, gently remove the quartz sleeve from its packaging being careful not to touch the length with your hands. The use of cotton gloves is recommended for this procedure as oils from the hands can leave residue on the sleeve and lamp which can ultimately block the UV light from getting to the water.

Carefully slide the sleeve into the reactor until you can feel it hit the opposite end of the reactor. Align the sleeve so it centered along the length of the reactor, then gently push it in to lock it into the internal centering springs in the far side of the reactor. CAUTION: Pushing too hard when the sleeve is not aligned can damage the centering springs. Slide the o-ring onto the sleeve until it is butted up against the reactor.
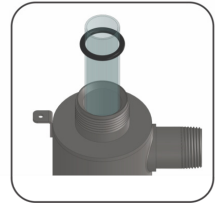

Figure 4. Quartz Sleeve Installation

Step 7: Hand tighten the provided gland nut over the quartz sleeve onto the threaded end of the reactor. It has a positive stop to prevent over-tightening. A firm force may be required to fully tighten the gland nut, but DO NOT USE TOOLS for this step. Insert the provided stainless steel compression spring into the quartz sleeve. The spring works with the lamp and lamp connector to create the proper lamp alignment. **PLEASE NOTE:** DO NOT install a UV lamp inside the quartz sleeve without the sleeve spring in place.

EXTRAS

Step 8: Install the UV sensor **(optional extra)**. Align the flat portion so it faces the gland nut end and matches up with the half metal lip on the sensor port (see Figure 5). Insert the sensor so it is fully seated and hand tighten the sensor nut. If no sensor is being installed insert the glow nut into the port.
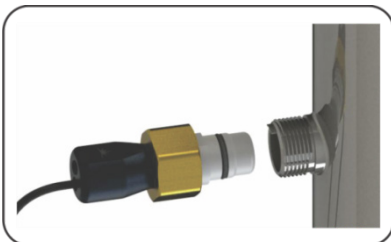

Figure 5. UV Sensor Installation

Figure 6. IEP Connection

Step 9:   The unit is now ready for water flow. When all plumbing connections have been completed, slowly turn on the water supply and check for leaks. Make sure the by-pass valves are functioning properly and that the water is flowing through the unit. The most common leak is from the o-ring not making a proper seal on the unit. For new installations, review steps 6 and 7. For older systems drain the unit, remove the o-ring, dry it and reapply silicon grease. Reinstall the o-ring ensuring that it is properly sealed against the unit and check again for leaks.

Step 10: Mount the controller (if required) to the wall so it is above or beside the reactor to ensure that no moisture can deposit on any of the connections (see Figure 1). Always mount the controller vertically. For sensor systems, insert the sensor connector into the IEP port located on the right side of the controller (Figure 6). For the sensor to be recognized by the controller, the controller power must be plugged in last. **Do not plug the controller power cord in before the last step.**

ON PRE-BUILT UNITS STEPS 11 - 14 HAVE BEEN PRE-ASSEMBLED

Step 11: Always hold UV lamps by their ceramic ends, not by the lamp quartz. Remove the lamp from its packaging. Again, the use of cotton gloves is recommended. Remove the lamp key from the lamp's connector and set it aside for the next step. Be careful to not touch the key's exposed contacts. Insert the UV lamp into the reactor, being careful not to drop it.
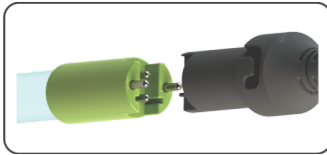

**Figure 7a. Standard Output UV
Lamp Connection**

Step 12: Install the lamp key into the controller. The key always comes packaged with the lamp and sits on the connector. With the key removed from the lamp, orient it so the label is upright and facing you. The key will plug into the lamp key port on the right side of the controller (Figure 8).

Step 13: Plug the lamp connector into the lamp. Note the keying for proper alignment (see Figure 7). Insert the lamp connector into the gland nut and turn the connector approximately ¼ turn to lock the connector to the gland nut as in Figure 9.

Figure 9. Lamp Connector

Figure 8. Lamp Key Installation

Step 14: Tighten the captive ground screw to the ground lug on the UV reactor to ensure proper grounding.
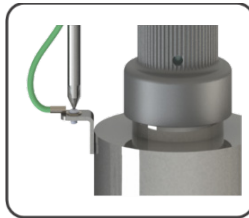

Figure 10. Ground Screw Connection

Step 15: Your system is now ready to be plugged into the appropriate GFCI protected outlet. Refer to the following section before any water is allowed to flow through the system.

System Disinfection

With a new installation, or any time the UV system is shut down for service, without power, or is inoperative for any other reason, the lines in the home or facility could be contaminated. Use the following steps to fully disinfect the lines throughout the entire home or facility.

Step 1: Check for and remove any "dead legs" in the lines throughout the home as these can harbor bacteria. Plug in the UV system and wait until it is ready for operation.

Step 2: Remove the filter cartridge from the filter housing and fill it with 1-2 cups of household bleach (most are 5.25% chlorine). Replace the filter housing and slowly turn on the water supply.

Step 3: At a water outlet, run the water until bleach can be smelled. Repeat this for all taps, toilets, shower heads, refrigerators, outdoor taps, washing machine, dishwasher, etc. at the home or facility. Once finished, wait a minumum of 30 minutes before continuing.

Step 4:   Reinstall the filter cartridge into the filter housing and flush the chlorine solution by opening all taps until chlorine can no longer be detected. Your home has now been completely disinfected with your CalUltra UV system ready to inactivate any microorganisms that enter the home.

Cleaning the Quartz Sleeve

Depending on the water quality, the quartz sleeve may require periodic cleaning. At a minimum, the quartz sleeve should be cleaned on an annual basis. The following steps outline a basic cleaning procedure.

Step 1:   If a by-pass assembly is installed, shut the inlet valve off to prevent water flow through the system. Otherwise, turn off main water inlet valve (and/or turn off the water pump).

Step 2:   Disconnect power cord of UV system from electrical outlet.

Step 3:   Release water pressure by opening a downstream tap and then close the outlet shut-off valve (if any). If there is no outlet shut-off valve, expect water to drain from the system as the head pressure in the system will cause the water to flow back down.

Step 4:   Remove the captive ground screw from the ground lug on the UV unit.

Step 5:   Remove the lamp connector from the unit (gland nut) by pushing the lamp connector in and turning it ¼ turn counter-clockwise. Disconnect the lamp connector from the lamp. CAUTION: the lamp may be hot!

Step 6:   Being careful to touch only the ceramic ends, remove the lamp out of the unit.

Step 7:   Unscrew the gland nut from the unit exposing the end of the quartz sleeve.

Step 8:   Remove the quartz sleeve and o-ring by **gently twisting and pulling** the quartz sleeve.

Step 9:   Using a soft, lint-free cloth or towel wipe the sleeve down using a commercial scale cleaner. This removes scaling or iron deposits that may be on the outside of the quartz sleeve. Be careful not to get any moisture or liquids inside of the sleeve.

Step 10:   Dry the sleeve with separate cloth.

Step 11:   Replace the o-ring and slide the sleeve back into the reactor following steps 7 and 8 from the installation section of the manual.

Cleaning the UV Sensor (if applicable)

Depending on the water quality, the UV sensor may require periodic cleaning. At a minimum, the UV sensor should be cleaning on an annual basis. The following steps outline a basic cleaning procedure.

Step 1: If a by-pass assembly is installed, shut the inlet valve off to prevent water flow through the system. Otherwise, turn off main water inlet valve (and/or turn off the water pump).

Step 2: Disconnect power cord of UV system from electrical outlet.

Step 3: Release water pressure by opening a downstream tap and then close the outlet shut-off valve (if any). If there is no outlet shut-off valve, expect water to drain from the system as the head pressure in the system will cause the water to flow back down.

Step 4: Place something under the unit to catch any water that may come out of the unit during the removal of the UV sensor.

Step 5: Unscrew (counterclockwise) sensor nut from the unit and pull the sensor slowly out of the sensor port.

Step 6: Holding the sensor in your hand wipe the flat portion (sensor face) of the sensor with isopropyl alcohol using a clean lint-free cloth.

Step 7: Replace sensor following step 9 from the installation section of the manual.

Operation

CalUltra systems come with a feature laden controller that incorporates both the lamp driver (ballast) and control features in one water-tight case. Four main controllers are available for the CalUltra systems (depending on your model). All four models feature a power factor corrected, constant current lamp driver with a universal power input.

Please Note: While the display screen is red and the buzzer is sounding the water from the system should NOT be consumed. If any water does pass through the system during this period, please follow the disinfection procedure as outlined in this manual before the water is consumed. Even though they have a visual and audible warning built into the controller, a "normal" status screen does not necessarily indicate that the water coming from this system is in fact potable (safe to drink). These systems do not measure the level of disinfection; they simply measure the "on-off" status of the lamp. Please have your water checked for microbiological contaminants on a regular basis.

CalUltra Controllers

A full colour LCD screen provides the user with a detailed description of the system's performance in addition to providing any applicable fault messages and system diagnostics. The controllers used in both the un-monitored and monitored systems are identical. The difference is that the monitored series of products include a UV intensity monitor. All CalUltra controllers include an "infinite expandability port" located on the right side of the controller. Simply plug in an optional UV sensor module into the expandability port of a CalUltra controller and the system will now monitor the UV intensity of the system!

Power-up Sequence

On start up, the controller will run through a diagnostic start-up and the sequence will be displayed as follows on the colour LCD:

Next, the controller checks for and initializes any optional modules that may be attached to the system.

	Ethernet Module Check	**ETHERNET** detecting	**ETHERNET** ✓ initialized	**OR**	**ETHERNET** ✗ not detected

Ethernet

Module Check

ETHERNET	ETHERNET	OR	ETHERNET
detecting	✓ initialized		✗ not detected

Remote Alarm

Module Check

REMOTE ALARM	REMOTE ALARM	OR	REMOTE ALARM
detecting	✓ initialized		✗ not detected

A final module screen is displayed showing which specific modules were initialized.

The controller then displays the lamp optimization screen for 60 seconds to allow the lamp to reach its optimum output. Finally, a final "start-up complete" screen is displayed. The system will now be ready to disinfect water flow.

| DETECTED MODULES	lamp optimization	Start-up Complete System Operational
all detected modules	lamp reaching max output	successful start-up
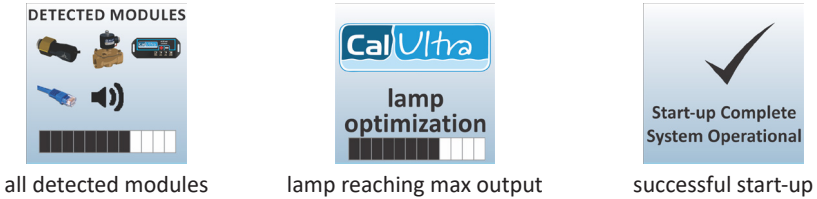
Operational Screens (standard product)

On systems without the UV monitor, the default screen shows the **CalUltra Home Screen**. At any point during operation the user is able to scroll through the **CalUltra Home Screen, Lamp life remaining**, **QR Code, Contact Info and Maintenance Parts** screens by pressing the button located on the front of the controller.

| CalUltra residential UV system	CalUltra 375 Days	QR Code	CalUltra Calmag (Yorkshire) Limited Riverview Buildings Bradford Road, Riddlesden Keighley, West Yorkshire BD20 5JH Phone: 01535 210320 www.calmagltd.com	**Maintenance Parts** **Lamp:** UV-BULB-B22 **Sleeve:** UV-SLEEVE-QS22 **Sensor:** RS-B2.5-CM **Controller:** RC-B56.03-CM
		Call Calmag at 01535 210320		
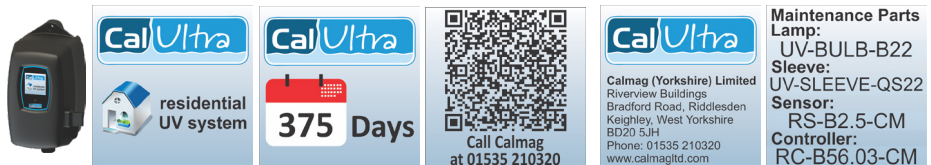
Operational Screens (with UV monitor)

On systems with the UV monitor, the system will display the same screens as on the un-monitored version except the UV Intensity replaces the home screen. The UV Intensity screen displays the level of UV light detected by the sensor. UV intensity can be affected by poor water quality, scaling on the quartz sleeve and/or sensor, lamp failure or lamp expiring. The following screens show the UV Intensity dropping.
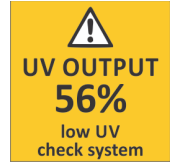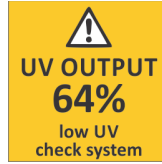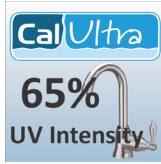
Below 56%, the numbers and warning sign turn red and an audible chirp is given by the ballast every 15 seconds. Below 51%, the screen is solid red and a constant audible alarm is given. This alternates with a screen indicating "water may be unsafe for consumption". With the solenoid module, the controller de-activates the solenoid valve, shutting off all water flow.
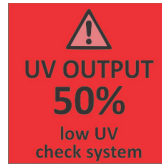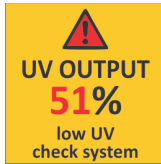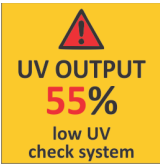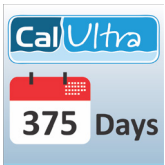

| audible chirp every 15 seconds | audible chirp every 15 seconds | constant audible alarm | cycles with red low uv screen |

Lamp Countdown Sequence

The system counts down the number of days until a lamp change is required.

At thirty days remaining, the LED or display screen will change to a yellow caution indicator. At seven days remaining, the sytem will additionaly repeat an audible chirp. Past the zero day threshold, the LED or display screen changes to solid red with a continuous buzzer.

At any point during this sequence, the audible chirp or alarm can be deferred for seven days by holding the controller button down for a period of five seconds. The number of deferrals used will be displayed as below. Once the deferral expires, the alarm will sound once again. The

deferral can be repeated up to three times. **PLEASE NOTE:** At any point after lamp expiration, the water may be unsafe for consumption and should not be consumed without another form of disinfection.

Lamp Replacement

After the lamp is expired, it must be replaced with the same part number as indicated on the Maintenance Parts screen or on the label on the unit. With the system powered down, remove and discard the lamp key from the controller. The replacement lamp is packaged with a lamp key on the connector at the end of the lamp. Remove the key from the lamp and place it in the controller. Refer to *Installation*, starting with step 11 (page 10) for instructions on installing the new lamp.
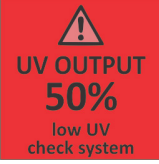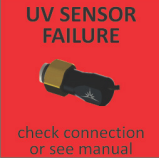
QR Codes

A **QR code** (Quick Response code) is a matrix barcode first designed for the automotive industry. Calmag uses the QR code to store a link to a specific page on our website. Users with a camera phone equipped with the correct reader application can scan the image of the QR code and over a wireless network connect to a Calmag web page in the phone's browser. Calmag's QR webpage has information on how to purchase replacement components as well as a helpful video directory on system servicing (i.e. How to change a UV lamp or quartz sleeve). To access the QR code on the Calmag controller, press the control button until the QR code screen appears.

Call Calmag
at 01535 210320

System Troubleshooting

Hard Alarms: The following give a constant audible alarm. If present, the solenoid valve is closed, and the 4-20, remote alarm and ethernet modules transmit the alarm.

System Display	Problem	Resolution
DANGER / lamp failure replace lamp / Call Calmag at 01535 210320	The system has detected a problem with the lamp.	Reset lamp protection circuit -unplug unit for 10 seconds. Replace the lamp with the part as indicated on the silver label on the unit or on the Maintenance parts screen.
DANGER / lamp expired / **1** days ago / Call Calmag at 01535 210320	Although the lamp is powered and visibly illuminated, due to the lamp's age its UV output is no longer sufficient for proper disinfection.	Replace the lamp with the part as indicated on the silver label on the unit or on the Maintenance parts screen.
UV OUTPUT / **50%** / low UV check system	Low UV Intensity.	Remove and clean the quartz sleeve and sensor. Check water quality meets requirements on page 5 and add filtration as required. Replace lamp.
LAMP INCORRECT / Required Part: / **UV-BULB-B22** / Installed Part: / **UV-BULB-B12**	Wrong lamp or sensor installed.	Replace component with proper model as indicated.
UV SENSOR FAILURE / check connection or see manual	The UV sensor is no longer communicating with the system.	Ensure all modules are connected properly to the system and to each other. Modules can be tested individually by plugging in one at a time and cycling power to the system. Replace any module that is not detected when plugged directly into the controller.
CONNECTION FAILURE / check connection or see manual	A bad connection has been detected in the IEP port.	

System Display		Problem	Resolution
LAMP KEY NOT FOUND check connection or see manual	**LAMP KEY INVALID** check connection or see manual	Missing or incorrect lamp key.	Ensure the lamp key (packed with the lamp, on the connector) is installed. Unplug and reinstall the key. Ensure the key part number matches Lamp on Maintenance Parts screen.

Soft Alarms: The following remaining errors give a 15 second audible chirp only

System Display		Problem	Resolution
SOLENOID FAILURE check connection or see manual	**4-20 mA FAILURE** check connection or see manual	The module indicated is no longer communicating to with the system.	Ensure all modules are connected properly to the system and to each other.

Modules can be tested individually by plugging in one at a time and cycling power to the system.

Replace any module that is not detected when plugged directly into the controller. |
| **REMOTE ALARM FAILURE** check connection or see manual | **ETHERNET FAILURE** check connection or see manual | | |

Warning: After any hard alarm, the home or facility should be disinfected. Follow the steps under the "System Disinfection" heading.

Boil Water Advisory: If any failure occurs on a CalUltra UV system, the water must not be used for human consumption until the system is returned to a safe operational mode. If the water is used for human consumption during this period, the water must be boiled (minimum 20 minutes at a full boil) prior to consumption.

OPTIONAL EXTRAS

Temperature Management Devices

Your CalUltra UV system is designed to run continuously to ensure optimal disinfection. However, during periods when no water is drawn through the system, the energy from the disinfection process can cause the temperature of the water inside the chamber to rise. In extreme situations elevated water temperature or the fluctuation in temperature can lower the output of the UV lamp. In these cases, or if the elevated water temperature is a nuisance, Calmag recommends one of the following forms of temperature management devices.

Cooling Fan

Designed for use on the 20 gpm system, the fan runs continuously to cool the water by forced convection. The long-life fan is powered independently using a compact modular power adapter that operates from 90-265V (47-63Hz). Contact Calmag for details**.**

Temperature Relief Valve (TRV)

On reaching a higher temperature, the TRV is designed to drain a small amount of water to allow fresh, cooler water to enter the system. The TRV works without power and comes complete with 10' of drain line. Contact Calmag for details.

Expansion Modules

CalUltra controllers incorporate an "**Infinite Expandability Port**" (**IEP**) which allows for expansion to the UV sensor and all other modules. Each module (including the sensor) comes with both a male and female connection. Connect any device to the controller and all subsequent devices are then connected into the female end of last device added in a "daisy chain" configuration.

The following optional expansion modules are available for use on all CalUltra controllers. Contact Calmag for further information.

REMOTE ALARM CONNECTION MODULE: Allows for a connection to a remote device such as a buzzer, light, alarm system, PLC, etc., via a pair of contacts. In normal operation the OK and COM contacts will be connected, and in a fault condition (Low UV, Lamp fail, Power Fail), the Fault and COM contacts will be connected. Maximum Contact Rating is 1A-120V AC/DC (use 16-22 AWG). Order PN **MOD-RAM-CM**.

SOLENOID CONNECTION MODULE: Connects a NORMALLY CLOSED line voltage solenoid valve to the system. On a non-monitored system, the solenoid will only close on a lamp failure error. On a monitored system, the solenoid is closed when the UV level drops below 50%. Also note that in cases where emergency use of untreated water is required, the controller can be placed into a manual override mode allowing for the flow of water in an alarm condition. Contact Calmag for details. Order PN **MOD-SOL-CM.**

4-20 mA MODULE: Outputs a 4-20mA signal of the UV output to a remote device such as a data logger or computer. Order PN **MOD-420-CM.**

ETHERNET MODULE: Allows for all controller functions to be connected to a computer via an Ethernet cable.

CalUltra UV Standard Output System Specifications

MODEL	CalUltra EQUIPMENT SPECIFICATIONS			
	CalUltra 12	CalUltra 22	CalUltra 41	CalUltra 79
Flow Rate 16mJ/cm² @ 95% UVT	23 lpm	41 lpm	77 lpm	150 lpm
Flow Rate 30mJ/cm² @ 95% UVT	12 lpm	22 lpm	41 lpm	79 lpm
Flow Rate 40mJ/cm² @ 95% UVT	9.1 lpm	17 lpm	31 lpm	59 lpm
Port Size	½"MNPT	¾"MNPT	¾"MNPT	1"MNPT
Electrical	230-240V/50-60Hz. 1A Max.			
Lamp Power (Watts)	15	22	39	42
Power (Watts)	20	30	49	51
Replacement Lamp	UV-BULB-B12	UV-BULB-B22	UV-BULB-B41	UV-BULB-B79
Replacement Sleeve	UV-SLEEVE-QS12	UV-SLEEVE-QS22	UV-SLEEVE-QS41	UV-SLEEVE-QS79
Chamber Dimensions	6.4 x 36.4 cm (2.5 x 14.3")	6.4 x 54.2 cm (2.5 x 21.3")	6.4 x 89.5 cm (2.5 x 35.2")	6.4 x 101.6 cm (3.5 x 36.4")
Chamber Material	304 Stainless Steel, A249 Pressure Rated Tubing			
Controller Dimensions	17.2 x 9.2 x 10.2 cm (6.8 x 3.6 x 4")			
Operating Pressure	0.7-10.3 bar (10-150 psi)			
Operating Water Temperature	2-40° C (36-104° F)			
UV Monitor	on UV monitored systems only			
Solenoid Output	YES (optional solenoid module sold separately, (MOD-SOL-CM) sold separately)			
Dry Contacts	YES (remote alarm module (MOD-RAM-CM) sold separately)			
4-20mA Output	YES (4-20mA module (MOD-420-CM) sold separately)			
Temperature Mgmt. Valve	contact Calmag for details			
Cooling Fan	contact Calmag for details			
Lamp Change Reminder	YES			
Lamp Out Indicator	YES			
WRAS Approval	YES	YES	YES	YES

CalUltra Systems Limited Warranty Statement

Products manufactured by Calmag (Yorkshire) Limited (Calmag) are warranted to the original user only to be free of defects in material and workmanship for a period as specified below. This warranty only applies to the original purchaser and is not transferable.

UV SYSTEMS
Ten (10) year Limited Warranty on the stainless steel chamber, from the date of original purchase, or installation (documentation required for verification).

ELECTRONICS
Three (3) year Limited Warranty on the ballasts and controllers, from the date of original purchase, or installation (documentation required for verification).

UV LAMPS, UV SENSORS & QUARTZ SLEEVES
One (1) year Limited Warranty on all CalUltra ultraviolet lamps, UV sensors and quartz sleeves from the date of original purchase, or installation (proper documentation required for verification).

Calmag warrants that it will repair, replace or refund, at Calmag's sole option, any ultraviolet system or component that is defective in materials or workmanship for the period as outlined above, subject to the "Limitations of Warranty" as outlined below. Calmag's liability under this warranty shall be limited to repairing or replacing at Calmag's discretion without charge, F.O.B. Calmag's factory or authorised service depot, any product that Calmag manufactures. Calmag will not be liable for any costs of removal, installation, transportation, or any other charges which may arise in connection with a warranty claim. Products which are sold but not manufactured by Calmag are subject to the warranty provided by the manufacturer of said products and not by Calmag's warranty. Calmag will not be liable for damage or wear to products caused by abnormal operating conditions, accident, abuse, misuse, unauthorised alteration or repair, or if the product was not installed in accordance with Calmag's printed installation and operating instructions.

LIMITATIONS OF WARRANTY
This warranty does not apply to any of the following:
- Water Quality Parameters lie outside of the following ranges
    - Hardness > 120 ppm
    - Iron > 0.3 ppm
    - Manganese > 0.05 ppm
    - Tannins > 0.1 ppm
    - Turbidity > 1 NTU
    - Transmittance (UVT) < 75%
- A product that has been incorrectly installed according to the technical installation manual.
- A product that has been modified in any manner, unless approved by the manufacturer.
- A product where the serial number has been altered defaced or removed.
- Damage caused by the use of parts that are not compatible, suitable and/or authorised by Calmag for use with the product (e.g. non-original lamps or sleeves).
- Damage caused during shipment of the product.

- Water damage is found inside ballast housing or controllers.
- Product is installed outdoors in direct contact with the environment (rain).
- Product is installed in freezing temperatures.
- Product is used in conditions that exceed Calmag's specifications.

WARRANTY SERVICE

To obtain service under this warranty, you must first contact CALMAG YORKSHIRE LIMITED'S Customer Service at 01535 210320 to obtain a Goods Return Number and authorisation. You will then need to return the product through the outlet where the product was originally purchased, together with proof of purchase and installation date, failure date, and supporting installation data, failure date, and supporting installation data. Unless otherwise provided, the merchant will contact CALMAG YORKSHIRE LIMITED for instructions on returning the product. Any defective product to be returned to CALMAG YORKSHIRE LIMITED must be sent carriage prepaid; documentation supporting the warranty claim and/or a Good Return Number must be included if so instructed.

CALMAG YORKSHIRE LIMITED WILL NOT BE LIABLE FOR ANY INCIDENTAL OR CONSEQUENTIAL DAMAGES, LOSSES, OR EXPENSES ARISING FROM INSTALLATION, USE, OR ANY OTHER CAUSES. THERE ARE NO EXPRESS OR IMPLIED WARRANTIES, INCLUDING MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, WHICH EXTEND BEYOND THOSE WARRANTIES DESCRIBED OR REFERRED TO ABOVE.

THIS LIMITED WARRANTY IS THE SOLE AND EXCLUSIVE WARRANTY MADE BY CALMAG YORKSHIRE LIMITED WITH RESPECT TO THE PRODUCT, AND IS GIVEN IN LIEU OF ANY OTHER WARRANTY. TO THE EXTENT ALLOWED BY APPLICABLE LAW, ANY AND ALL EXPRESS OR IMPLIED WARRANTIES NOT SET FORTH HEREIN ARE WAIVED AND DISCLAIMED, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR USE. CALMAG LIABILITY UNDER THIS LIMITED WARRANTY IS LIMITED SOLELY TO THOSE LIABILITIES SET FORTH ABOVE. IN THE EVENT THAT ANY PROVISION OF THIS LIMITED WARRANTY SHOULD BE OR BECOME INVALID OR UNENFORCEABLE UNDER APPLICABLE LAW, THE REMAINING TERMS AND CONDITIONS HEREOF SHALL REMAIN IN FULL FORCE AND EFFECT AND SUCH INVALID OR UNENFORCEABLE PROVISION SHALL BE CONSTRUED IN SUCH A MANNER AS TO BE VALID AND ENFORCEABLE.

Other UV units available from Calmag in regards to commercial applications.

CalUltra 132

CalUltra 220

MODEL	CalUltra EQUIPMENT SPECIFICATIONS							
	Commercial/Industrial Systems (amalgam lamps)							
	CalUltra 132	CalUltra 220	CalUltra 322	CalUltra 416	CalUltra 530	CalUltra 662	CalUltra 1500	CalUltra 2400
Normal Flow Rate 30mJ/cm² @ 95% UVT	132 lpm	220 lpm	322 lpm	416 lpm	530 lpm	662 lpm	1530 lpm	2360 lpm
Hot Water Flow Rate 30mJ/cm² @ 75% UVT	83 lpm	144 lpm	227 lpm	242 lpm	306 lpm	360 lpm	360 lpm	360 lpm
Low UVT Flow Rate 30mJ/cm² @ 50% UVT	53 lpm	87 lpm	133 lpm	136 lpm	170 lpm	193 lpm	193 lpm	193 lpm
TOC Flow Rate 150mJ/cm² @ 95% UVT	26 lpm	45 lpm	64 lpm	83 lpm	106 lpm	132 lpm	132 lpm	132 lpm
Port Size	1½"MNPT	2"MNPT	2"MNPT	2½"MNPT	3"MNPT	4"MNPT	4"Flange	6"Flange
Electrical	230-240V/50-60Hz. 1A Max.							
Lamp Power (Watts)	104	152	207	304	344	414	828	1242
Power (Watts)	120	170	220	320	360	430	900	1340
Replacement Lamp	UV-BULB-B132	UV-BULB-B416	UV-BULB-B662	UV-BULB-B416 (X2)	UV-BULB-B530 (X2)	UV-BULB-B662 (X2)	UV-BULB-B662 (X4)	UV-BULB-B662 (X6)
Replacement Sleeve	UV-SLEEVE-QS132	UV-SLEEVE-QS416	UV-SLEEVE-QS662	UV-SLEEVE-QS416 (X2)	UV-SLEEVE-QS530 (X2)	UV-SLEEVE-QS662 (X2)	UV-SLEEVE-QS662 (X4)	UV-SLEEVE-QS662 (X6)
Chamber Dimensions	10 x 69 x 14 cm	10 x 91 x 14 cm	10 x 119 x 14 cm	15 x 91 x 20 cm	15 x 103 x 20 cm	15 x 119 x 20 cm	28 x 139 x 45 cm	28 x 139 x 46 cm
Chamber Material	316L Stainless Steel, A249 Pressure Rated Tubing							
Controller Dimensions	30 x 20 x 16 cm			40 x 30 x 16 cm			16 x 20 x 7 cm	24 x 24 x 9 cm
Operating Pressure	0.7-10.3 bar (10-150 psi)							
Operating Water Temperature	2-60° C (36-148° F)							
UV Monitor Port (upgrade)	YES							
Remote On	YES							
Dry Contacts (solenoid ready)	YES							
4-20mA Output	YES							
Lamp Age Counter	YES							
Visual Lamp-Out Indicator	YES							
Audible Lamp-Out Alarm	YES							
WRAS Approval	YES	YES	YES	YES	YES	YES	YES	YES

WRAS
APPROVED PRODUCT

CERTIFICATION MARK

This certifies that

CALMAG YORKSHIRE LIMITED

has had the undermentioned product examined, tested and found,
when correctly installed, to comply with the requirements of the
United Kingdom Water Supply (Water Fittings) Regulations and
Scottish Water Byelaws.

**CALUTRA 12, CALUTRA 22, CALUTRA 41, CALUTRA 79, CALUTRA 132, CALUTRA 220, CALUTRA 322
CALUTRA 416, CALUTRA 530, CALUTRA 662, CALUTRA 1500 & CALUTRA 2400 DISINFECTION UNITS**

*The certificate by itself is not evidence of a valid WRAS Approval. Confirmation of the current
status of an approval must be obtained from the WRAS Directory (www.wras.co.uk/directory)*

The product so mentioned will be valid until the end of:

June 2022

1706086

Certificate No.

Secretary

Chairman, Product Assessment Group

October 2016

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Remember don't guess....ASK