DAVEY

microlene

Aquashield Centurion 3 Stage UV Disinfection System

Models: MCS & MCXS (without cartridges)
KMCS & KMCXS (with cartridges included)

Installation and Operating Instructions

Flow Rate (30mJ/cm² @ 95% UVT)	57 L/min

WaterMark
AS/NZS 3497

Please pass these instructions on to the operator of this equipment.

microlene

Aquashield Centurion 3 Stage UV Disinfection System

Congratulations on purchasing this ultraviolet disinfection system. By purchasing a Davey Microlene 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 protecting from 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
• Safe water

Microlene makes it that easy.

These instructions are also available in soft copy via email from Microlene Customer Service, or by downloading at daveywater.com.

Contents

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. 📖 Please read the instructions.

   > - This appliance contains a UV-C emitter.
   > - Unintended use of the appliance or damage to the housing may result in the escape of dangerous UV-C radiation. UV-C radiation may, even in little doses, cause harm to the eyes and skin.
   > - The appliance must be disconnected from the supply before replacing the UV-C emitter.
   > - The appliance is intended to be permanently connected to the water mains and not connected by a hose-set.

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

   > ⚠ **WARNING: Do not operate the UV-C emitter when it is removed from the appliance enclosure.**

3. **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.

4. For complete disinfection, use ONLY genuine replacement parts.

5. The appliance is not to be used by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction.

6. Children should be supervised so that they do not play with the appliance.

7. To avoid possible electrical shock, use only with a properly earthed electrical outlet. Appliances that are obviously damaged must not be operated.

8. Never perform any maintenance to the system unless you are comfortable in doing so. Contact the manufacturer for service instructions if required. Read the maintenance instructions before opening the appliance.

9. 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.

10. 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.

    The UV system should only be installed outdoors if a suitable covering has been installed to prevent direct contact with the environment (Rain and/or direct sunshine).

11. The appliance is to be supplied through a residual current device (RCD) having a rated residual operating current not exceeding 30mA.

12. Maximum working voltage of built-n UV driver U-OUT-250V

13. Maximum operating pressure stated in the instruction manual is 827 kPa (120 psi).

14. We recommend that a licensed plumber or certified technician install the system.

15. An electrical power surge or spike can travel on the supply lines and cause serious damage to your electrical equipment. If the installation is susceptible to electrical power surges, or lightning, we strongly recommend the use of a suitable surge protection device on ALL electrical equipment.

16. To protect your UV system from the weather, make sure the site is water proof, frost free and has adequate ventilation. Allow for drainage, to avoid damage to flooring etc., that over time may occur from leaking pipe joints or seals.

17. If the supply cord is damaged, it must be replaced by the manufacturer, its service agent or similarly qualified persons in order to avoid a hazard.

> ⚠ **This product is not to be used for general lighting / illumination.**

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 as required
  - depending on plumbing.)
- Wrench (for tightening fittings)

Other Materials
- Inlet/outlet connections
- Teflon™ thread 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 least the parameters listed below. If the water exceeds the listed parameters Davey strongly recommends that appropriate pretreatment equipment be installed (equipment required will depend on parameters being treated):

Hardness:	<120mg/L (7gpgUS) – if hardness level is 120mg/L (7 gpg) 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 (0.3 mg/L)
Manganese (Mn):	<0.05 ppm (0.05 mg/L)
Turbidity:	< 1 NTU
Tannins (organics):	<0.1 ppm (0.1 mg/L)
UVT (transmittance):	85% (Please contact Davey if water has a UVT that is

less than 80% for pre-treatment recommendations)

You can have your water tested via your local dealer or a private analytical laboratory. It is always recommended to install pre-filtration of at least 5 microns (1 micron preferred for Cyst removal on Rain Water) prior to a Microlene Aquashield Centurion UV disinfection system.

Assembly

The Microlene Aquashield Centurion 3 Stage UV disinfection system is designed with a single inlet and outlet port. Unpack the system and ensure all the components are included in the box. Your system is shipped with the following components:
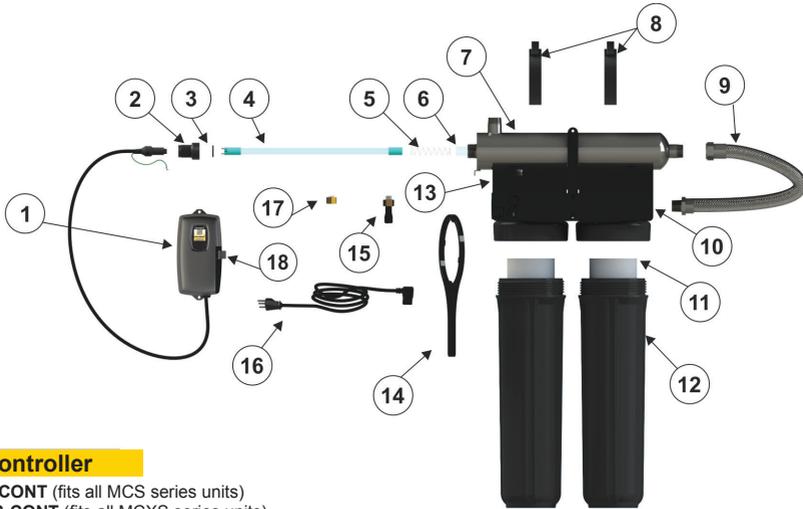
1 Controller

MCS-CONT (fits all MCS series units)
MCXS-CONT (fits all MCXS series units)

2 Gland Nut
Part # **DM320006**

3 O-ring
Part # **DM300038**

4 UV Lamp
Part # MC-HOLP

5 Sleeve Spring
Part # **DM310039**

6 Quartz Sleeve
Part # MC-HOSL

7 UV Chamber

8 Clamps

9 Flexible Hose

10 Mounting Plate

11 Filter Cartridges
(Only KMCS and KMCXS have filters included)
Part # **20PP20J** (20", 20 micron sediment)
Part # **1PS20J** (20", 1 micron sediment)

12 Filter Housings
Part # **DM160018** (double filter housing, two 20" sumps and caps)

13 Mounting Screws

14 Filter Wrench
Part # **WFH45**

15 UV Sensor
(optional module)
Part # **MCXS-UVS**

16 IEC Power Cable
Part # MC-CONT-PC Australian, AS/NZS 3112, 3 pin earthed

17 Glow Plug Assembly
### (on MCXS /KMCXS units only)
DM300016 Complete Assembly includes Teflon Plug, O-Ring, Brass Nut

18 Lamp Key
Comes with new UV lamps
(NOT sold separately)
(not for use on the MCS which has the MCS-CONT controller)

Location

Choose a location where the main cold water line is accessible. The system must be installed after other water treatment equipment (i.e. softener), but before any branches (See Figure 1).
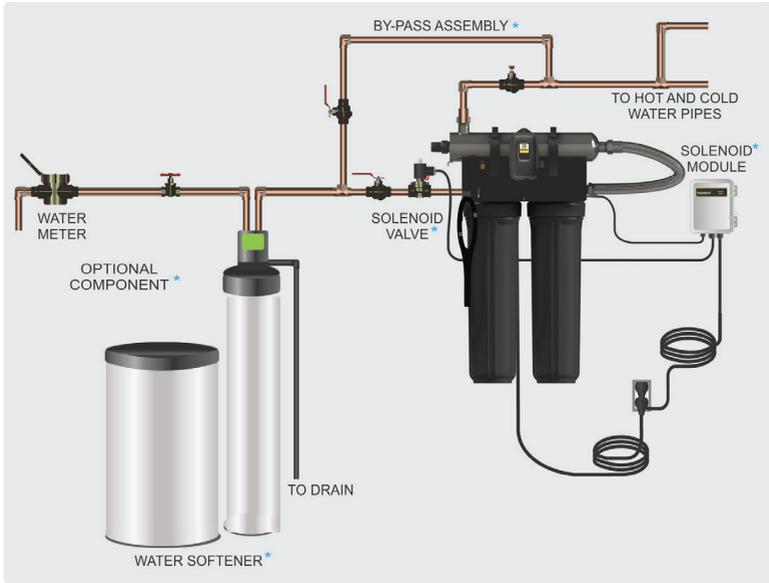
Figure 1. Typical Installation

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 Installation Figure 3). The controller will require a Residual Current Device (RCD) outlet and should be mounted beside or above the chamber.

> ⚠ **IMPORTANT:**
> **All Microlene Aquashield Centurion UV Disinfection Systems are intended to be installed under a weather proof cover and should not be exposed to the elements.**

MCS-C Weather proof cover (purchased separately)

- Protects the chamber and controller from rain and direct elements
- Enables the 3 Stage UV system to be set up left to right or right to left for ease of installation.
- Mounting holes are aligned with the UV System
- Insert locking pin or screwdriver to cover open during servicing
- Lamp change through side of the holes, no disassembling required
- Made from: 1.2mm titanium laminate zintek®
- Powdercoated with matt satin black finish

Orientation

This system has the ambidextrous capability of being able to have the main water inlet enter from either the left hand side or right hand side of the unit. The unit comes pre plumbed from the factory for a left hand water inlet.

To change to a right hand water inlet follow these simple steps (See Figure 2):

Step 1: Remove the two black filter sump housings from the filter head and set aside.

Step 2: Remove the filter head screws from the top mounting plate.

Step 3: Carefully lower the filter head (or heads) from the rack assembly and rotate 180 degrees. Reassemble onto the rack assembly and take note of the arrows located on the top of the filter heads indicating water flow (which now should be indicating a flow direction of right-to-left).

Figure 2. System Orientation (water inlet)

Step 4: Remove the stainless steel UV chamber from the two plastic clamps located on the top of the rack. Carefully remove the top straps securing the chamber with the aid of a standard (slot) screwdriver. Rotate the chamber 180 degrees (with the inlet now facing to the left and the lamp connections located towards the right) and place back into the cell clamps and re affix the two top straps.

In either the left or right configurations, 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 3).

> ⚠ **IMPORTANT:**
> **All Microlene Aquashield Centurion UV Disinfection Systems are intended to be installed under a weather proof cover and should not be exposed to the elements.**

Installation

Step 1: Once both the orientation and location have been selected, securely fasten the rack to a suitable backing. As the rack system is extremely heavy when filled with water, it is imperative that the rack be mounted with suitable fasteners for the particular installation. Mounting to a plasterboard backing is not suitable, unless the rack is fastened directly to the wall studs.
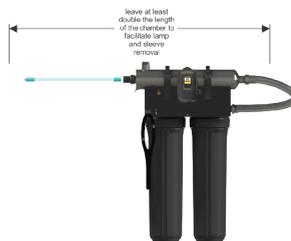

leave at least double the length of the chamber to facilitate lamp and sleeve removal

Figure 3. Lamp Removal Spacing

Step 2: The use of a bypass assembly is recommended as it will allow you to isolate the UV system This will allow for easier access in case maintenance is required.

Step 3: For water supplies where the maximum flow rate is unknown, a flow restrictor is recommended so that the rated flow of your particular Microlene system is not exceeded. The flow restrictor should be installed on the inlet port of the chamber.

Step 4: It is recommended to have a licensed plumber connect the UV chamber to the water supply and may be a requirement depending on where you are located.

Step 5: Connect both the inlet and outlet to the rack system with the applicable connections based on your particular plumbing requirements. The inlet port of the filter housing is a 1" FNPT connection and the outlet port of the UV chamber is a 1" MNPT connection.

These NPT threads will connect to the same size BSP threads on plastic pipe fittings, alternatively NPT to BSP adapters from your local plumbing store can be used.

Step 6: Once the system has been plumbed in, gently remove the quartz sleeve from its packaging being careful not to touch the sleeve or lamp 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.

Figure 4. Quartz Sleeve Installation

Carefully slide the sleeve into the chamber until you can feel it hit the opposite end of the chamber. Align the sleeve so it is centered along the length of the chamber, then gently push it in to lock it into the internal centering springs in the far side of the chamber. **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 chamber (See Figure 4).

Step 7: Hand tighten the provided gland nut over the quartz sleeve onto the threaded end of the chamber. 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.

Step 8: Install the filter cartridges in their appropriate housings. Refer to the specification chart in the datasheet or this instruction manual. **PLEASE NOTE:** This chart indicates the correct cartridge position for the default "left-hand" orientation with the water inlet located on the left side of the

rack system. If the orientation was switched, the cartridge placement must also be switched. Once the cartridges are in place, use the supplied filter wrench to "snug" the filter housing onto the filter head (See Figure 5).

turn clockwise to tighten housings

turn counter-clockwise to loosen housings

Figure 5. Cartridge Removal

Step 9: Install the UV sensor **(optional and only compatible with the MCXS system, not compatible on the MCS standard controller)**. 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 6). Insert the sensor so it is fully seated and hand tighten the sensor nut. Insert the sensor connector into the IEP port located on the right side of the controller (Figure 7). 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.**
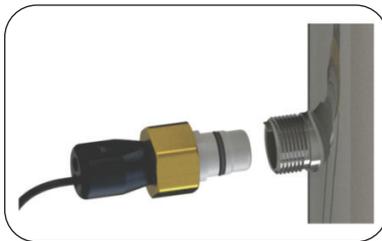
Figure 6. UV Sensor Installation

Figure 7. IEP Connection
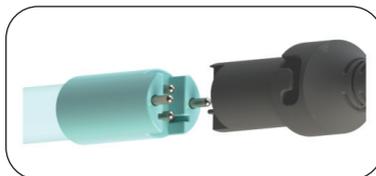
Figure 8. High Output UV Lamp Connection

Step 10: Install the lamp key into the controller (MCXS/KMCXS systems only). 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).

Note: All replacement lamps will come with a key. If you have the MCS controller, the key should be discarded as it can't be used in the MCS controller.

Step 11: Plug the lamp connector into the lamp. Note the keying for proper alignment (see Figure 8). 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 10.

Figure 9. Lamp Key Installation   **Figure 10. Lamp Connector**

Step 12: Tighten the captive earth screw to the earth lug on the UV chamber to ensure proper earthing.
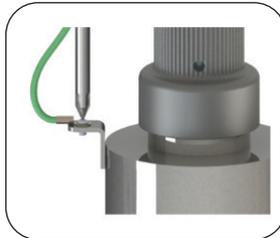
Figure 11. Earth Screw Connection

Step 13: Your system is now ready to be plugged into the appropriate residual current device (RCD) protected outlet. Refer to the following section before any water is allowed to flow through the system.

> ⚠ **Note: Installation of your Microlene disinfection systems must comply with applicable provincial/state & local regulations.**

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.

For Rainwater tanks, add Acquasafe to your tank water supply and mainatin the required result on test strips for the first month at least. This will clean your pipe lines downstream without water wastage. Acquasafe can be used at the same time as UV and is another protection against pathogens.

For other water sources or where the plumbing maybe suspected of having contamination the use of stronger chemical flushing maybe needed.

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

Step 2: Remove the filter cartridge from the last sump and fill it with the applicable volume of plumbing sanitiser or 1-2 cups of household bleach (most are 5.25% chlorine). Replace the sump 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 faucets, toilets, shower heads, refrigerators, outdoor taps, the washing machine, dishwasher, etc. at the home or facility. Once finished, wait a minimum of 30 minutes before continuing.

Step 4: Reinstall the filter cartridge into the sump and flush the chlorine solution by opening all faucets until chlorine can no longer be detected. Your home has now been completely disinfected with your Microlene Aquashield Centurion 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 faucet 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 earth screw from the earth lug on the UV chamber.

Step 5: Remove the lamp connector from the chamber (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 chamber.

Step 7: Unscrew the gland nut from the chamber 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 (i.e. CLR® or similar). 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 chamber following steps 7 and 8 from the installation section of the manual.

Cleaning the UV Sensor

Depending on the water quality, the UV sensor may require periodic cleaning. At a minimum, the UV sensor 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 faucet 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 chamber to catch any water that may come out of the chamber during the removal of the UV sensor.

Step 5: Unscrew (counterclockwise) sensor nut from the chamber 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

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

Please Note: While the LED or 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. For Microlene systems, even though they have a visual and audible warning built into the controller, a green LED or 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.

> ⚠ **IMPORTANT: Installation of a backflow valve should be in compliance with all local water authority regulations and in accordance with AS/NZS 3500.1.2 and complying with AS/NZS 2845.1.**

MCS Controllers

Simplistic in operation, these systems feature a tri-colour LED that indicating system status and a 4-digit display to indicate lamp life remaining. Pressing the button will change the display to indicate total running time. When the UV lamp is on and within its operating age, the LED will be green. When the UV lamp is not on or the lamp life has expired, the LED will be illuminated red and an audible buzzer will sound. To remedy this condition, the UV lamp must be replaced with a new genuine Microlene UV lamp.

MCXS 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 controller can be used as both a non-monitored and UV monitored system. If a true UV monitor is required, simply add the optional UV sensor module to the "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 Microlene controller and the system will now monitor the UV intensity of the system!
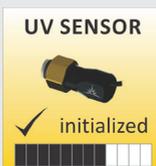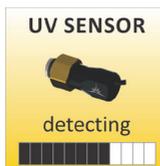
MCXS Power-up Sequence

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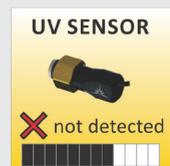

Next, the controller checks for and initializes any optional modules that may be attached to the system.
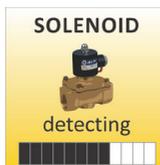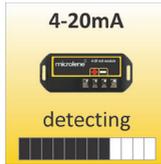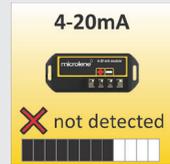
4-20 mA Module Check	4-20mA detecting	4-20mA ✓ initialized	OR	4-20mA ✗ not detected
Remote Alarm Module Check	REMOTE ALARM 🔊 detecting	REMOTE ALARM 🔊 ✓ initialized	OR	REMOTE ALARM 🔊 ✗ not detected
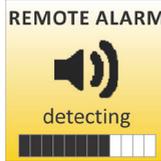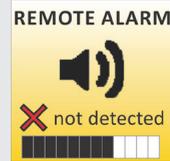
A final module screen is displayed showing which specific modules were initialised.

The controller then displays the lamp optimisation 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	microlene lamp optimization	Start-up Complete System Operational ✓
all detected modules	lamp reaching max output	successful start-up

MCXS Operational Screens

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

microlene
www.daveywater.com
AU 1300 232 839
NZ 0800 654 334

microlene
420 Days
Lamp Life Remaining

Call Davey at
AU 1300 232 839
NZ 0800 654 334

microlene
Australia
1300 232839
www.daveywater.com
New Zealand
0800 654334
www.daveywater.com

Maintenance Parts
Lamp:
  MC-HOLP
Sleeve:
  MC-HOSL
Sensor:
  MCXS-UVS
Controller:
  MCXS-CONT

On systems with the UV monitor, the system will display the same screens as on the Microlene MCXS controller 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.

microlene◊	microlene◊	⚠	⚠
100%	**65%**	**UV OUTPUT** **64%**	**UV OUTPUT** **56%**
UV Intensity	UV Intensity	low UV check system	low UV check system
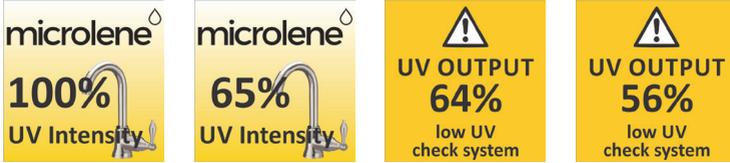
Below 56%, the numbers and warning sign turn red and an audible chirp is given by the ballast every 15 seconds. Below 51%, the screen is solid red and a constant audible alarm is given. This alternates with a screen indicating "water may be unsafe for consumption". With the solenoid module, the controller de-activates the solenoid valve, shutting off all water flow.
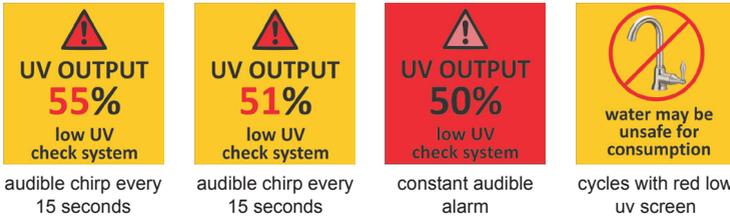
⚠ UV OUTPUT **55**% low UV check system	⚠ UV OUTPUT **51**% low UV check system	⚠ UV OUTPUT **50**% low UV check system	water may be unsafe for consumption
audible chirp every 15 seconds	audible chirp every 15 seconds	constant audible alarm	cycles with red low uv screen

Lamp Countdown Sequence

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

MCXS System (MCXS-Cont Controller)

microlene◊ 375 Days	microlene◊ 31 Days Lamp Life Remaining	microlene◊ 30 Days Lamp Life Remaining	microlene◊ 8 Days Lamp Life Remaining

MCS System (MCS-CONT controller)

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

MCXS System

⚠ CAUTION 7 Days Until Lamp Change required press button for lamp change info.	⚠ CAUTION 0 Days Until Lamp Change required press button for lamp change info.	⚠ DANGER lamp expired 1 days ago Call Davey at AU 1300 232 839 NZ 0800 654 334	water may be unsafe for consumption

MCS System

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.

MCXS System   **MCS System**

System Service Suggested

MCXS controllers will display the System Service Suggested Screen every 6 months to remind consumers to maintain both their UV and other prefiltration. This will serve as a prompt only and will not put the system into alarm. To clear this condition simply press the button located below the screen.

Lamp Replacement (MCS systems)

After the lamp is expired, it must be replaced with the same part number as indicated by the label on the chamber. Begin replacing the lamp by unplugging the power for the controller, then refer to *Installation*, starting with step 11 (page 11) for instructions on installing the new lamp. To reset the timer in the controller, firmly hold down the button on the controller for 10 seconds. The controller will read "rSt3", "rSt2", "rSt1" and then beep. The button can now be released, the lamp countdown timer has been reset. The lamp key that comes with the replacement lamp will not be required on the MCS system and can be discarded.

Lamp Replacement (MCXS systems)

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 chamber. 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 11) for instructions on installing the new lamp.
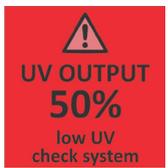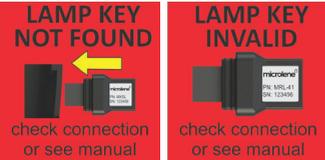
QR Codes

(Only on MCXS controllers MCXS-CONT) A QR code (Quick Response code) is a matrix barcode first designed for the automotive industry. Microlene uses the QR code to store a link to 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 our web page in the phone's browser.

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 WiFi modules transmit the alarm.

System Display	Problem	Resolution
DANGER lamp failure replace lamp Call Davey at AU 1300 232 839 NZ 0800 654 334 — microlene — 1F	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 chamber or on the Maintenance parts screen.
DANGER lamp expired 1 days ago Call Davey at AU 1300 232 839 NZ 0800 654 334 — microlene — -1	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 chamber 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: MC-HOLP Installed Part: MCXSL	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.	
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) / REMOTE ALARM FAILURE (check connection or see manual) / FLOW METER (check connection or see manual)	The module indicated 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.
ERROR Flow Rate FULL POWER	1. Turbulent flow is present. 2. Air bubbles or solid particles in the Flowmeter body/pipe. 3. Internal damage caused by plugging an AC/DC wall adapter. that is rated more than +5VDC or dropping the device.	1. Make sure there is proper length of straight piping on the inlet side of the Flowmeter. As well the direction of flow is in the correct direction. 2. Verify installation is correct, remove any air bubbles from water supply, add filtering to reduce solid particles from entering Flowmeter. 3. Replace Flowmeter.

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 Microlene 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.

Temperature Management Devices

Your Microlene 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, Microlene recommends the following form of temperature management device.

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. The TRV should be used in standard installs where the ambient temperature regularly exceeds 35 degrees C ambient temperature. Order PN **DM130033** for 1" ports.

Expansion Modules

Microlene MCXS 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 Microlene UV controllers. Contact your authorised distributor for purchasing 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 30V / 1A (use 16-22 AWG). Order PN **DMMOD-RAM**.

SOLENOID CONNECTION MODULE: Connects a NORMALLY CLOSED line voltage solenoid valve to the controller. 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. Maximum contact rating is 240VAC (50-60Hz) / 30VDC / 2A. Order PN **DMMOD-SOL1**.

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 **DMMOD-420**.

Expansion Modules

MODEL	Microlene EQUIPMENT SPECIFICATIONS	
	RACK-MOUNT UV SYSTEMS	
MODEL	**MCS**	**MCSX**
Flow Rate (@16mJ/cm²)	30.1 USgpm	
	114 lpm	
	6.84 m³/hr	
Flow Rate (@30mJ/cm²)	15.0 USgpm	
	56.8 lpm	
	3.4 m³/hr	
Flow Rate (@40mJ/cm²)	12.0 USgpm	
	45.4 lpm	
	2.7 m³/hr	
Filter Housing - 1	20 micron sediment **20PP20J**	
Filter Housing - 2	1 micron sediment **1PS20J**	
Port Size	1"FNPT (filter side) / 1" MNPT (UV side)	
Electrical	90-265V/50-60Hz	
Plug Type	Australian/New Zealand: AS/NZ 3112	
Lamp Power (Watts)	45 (high-output lamp)	
Power (Watts)	57 (48 @ 230V)	
Replacement Lamp	MC-HOLP	
Replacement Sleeve	MC-HOSL	
Chamber Dimensions	8.9 x 50.8 cm (3.5 x 20")	
Chamber Material	Polished 316L Stainless Steel, A249 Pressure Rated Tubing	
Controller Dimensions	21.8 x 10.7 x 8.9 cm (8.6 x 4.2 x 3.5")	
Operating Pressure	827kPa (120PSI)	
Operating Water Temperature	2-40° C (36-104° F)	
UV Monitor	not available	OPTIONAL (optional UV module sold separately)
Solenoid Output	YES (optional solenoid module sold separately)	
Dry Contacts	not available	YES (remote alarm module sold separately)
4-20mA Output	not available	YES (remote alarm module sold separately)
Lamp Change Reminder (audible & visual)	YES	
Lamp Out Indicator (audible & visual)	YES	

NOTES

Davey Warranty

Products manufactured by Davey Water Products Pty. Ltd. 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 chambers, from the date of original purchase, or installation (proper documentation required for verification).

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

UV Lamps, UV Sensors & Quartz Sleeves
One (1) year Limited Warranty on all US WATER ultraviolet lamps, UV sensors and quartz sleeves from the date of original purchase, or installation (proper documentation required for verification).

This warranty does not cover normal wear and tear or apply to a product that has:
- been subject to misuse, neglect, negligence, damage or accident
- been used, operated or maintained other than in accordance with Davey's instructions
- not been installed in accordance with the Installation Instructions or by suitably qualified personnel
- been modified or altered from original specifications or in any way not approved by Davey
- had repairs attempted or made by other than Davey or its authorised dealers
- been subject to abnormal conditions such as incorrect voltage supply, lightning or high voltage spikes, or damages from electrolytic action, cavitation, sand, corrosive, saline or abrasive liquids.

The Davey warranty does not cover replacement of any product consumables or defects in products and components that have been supplied to Davey by third parties (however Davey will provide reasonable assistance to obtain the benefit of any third-party warranty).

To make a warranty claim:
- If the product is suspected of being defective, stop using it and contact the original place of purchase. Alternatively, phone Davey Customer Service or send a letter to Davey as per the contact details below
- Provide evidence or proof of date of original purchase
- If requested, return the product and/or provide further information with respect to the claim. Returning the product to the place of purchase is at your cost and is your responsibility.
- The warranty claim will be assessed by Davey on the basis of their product knowledge and reasonable judgement and will be accepted if:
  - a relevant defect is found
  - the warranty claim is made during the relevant warranty period; and
  - none of the excluded conditions listed above apply
- The customer will be notified of the warranty decision in writing and if found to be invalid the customer must organise collection of the product at their expense or authorise its disposal.

If the claim is found to be valid Davey will, at its option, repair or replace the product free of charge.

The Davey warranty is in addition to rights provided by local consumer law. You are entitled to a replacement or refund for a major failure and compensation for any other reasonably foreseeable loss or damage. You are also entitled to have the goods repaired or replaced if the goods fail to be of acceptable quality and the failure does not amount to a major failure.

For any internet connected products the consumer is responsible for ensuring a stable internet connection. In the event of a network failure the consumer will need to address the concern with the service provider. Use of an App is not a substitute for the User's own vigilance in ensuring the product is working to expectation. Use of a Smart Product App is at the User's own risk. To the fullest extent permitted by law Davey disclaims any warranties regarding the accuracy, completeness or reliability of App data. Davey is not responsible for any direct or indirect loss, damage or costs to the User arising from its reliance on internet connectivity. The User indemnifies Davey against any claims or legal actions from them or others relying on internet connectivity or App data may bring in this regard.

Products presented for repair may be replaced by refurbished products of the same type rather than being repaired. Refurbished parts may be used to repair the products. The repair of your products may result in the loss of any user-generated data. Please ensure that you have made a copy of any data saved on your products.

To the fullest extent permitted by law or statute, Davey shall not be liable for any loss of profits or any consequential, indirect or special loss, damage or injury of any kind whatsoever arising directly or indirectly from Davey products. This limitation does not apply to any liability of Davey for failure to comply with a consumer guarantee applicable to your Davey product under local laws and does not affect any rights or remedies that may be available to you under local laws.

For a complete list of Davey Dealers visit our website (daveywater.com) or call:

DAVEY

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* **Installation and operating instructions are included with the product when purchased new.**
   They may also be found on our website.