Cobra UV®

Ultraviolet Water Disinfection System

Installation, Operation and Maintenance Manual

Deluxe Models

Standard Output, High Output & Amalgam Models

KEEP THIS MANUAL ON HAND

IMPORTANT: Anyone responsible for the installation, maintenance or operation of this equipment must have a thorough understanding of the instructions and safety requirements before attempting to install this system.

UV SUPERSTORE®

One Source for All Your UV Needs!

Rev. June 8, 2023

Dear Customer:

Thank you for selecting UV Superstore, Inc. to provide the equipment for your ultraviolet water treatment needs. The CobraUV® Series is specifically intended for ultrapure water requiring lower flows as well as less demanding applications. These systems can be used in a wide range of commercial and industrial applications. Your CobraUV® Series system reflects our broad experience in UV water treatment and our commitment to quality craftsmanship. At the heart of the CobraUV® Series system is our premium quality UV lamps that are manufactured in the USA. These systems are built with the customer in mind and incorporate reliable parts from around the world. When properly installed and maintained, your UV Superstore, Inc. equipment will provide years of reliable service.

Please review the Installation, Operation and Maintenance (IOM) Manual carefully and keep it on hand for readily available assistance. UV Superstore, Inc. designs its models for service maintenance ease. The IOM manual provides essential information to safely install and service your system.

UV Superstore, Inc. manufactures ultraviolet equipment with the highest quality components available. Your equipment has met thorough testing procedures ensuring the efficiency of your system. As with any equipment regular maintenance procedures are required. You will have to replace your UV lamps and other items from time to time. UV Superstore, Inc. offers a complete line of replacement parts, not only for your products, but for most lines of ultraviolet water treatment equipment. Please call us for details.

UV Superstore, Inc. has built an industry-leading reputation by providing a reliable and knowledgeable technical support team. We stand by ready to assist you in all of your UV water treatment needs. Please contact us with any questions you may have regarding your system.

Best regards,

The UV Superstore, Inc. Team

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Refer to the Options Manual for Operational Instructions for the Standard and WatchDog UV Monitoring System

SAFETY INSTRUCTIONS

In order to protect end users and operators from injury, safety precautions must be followed. This installation, operation and maintenance manual outlines important safety issues. The following **WARNING SYMBOLS** will be found throughout the manual to alert the end users to take important precautions:

EYE PROTECTION

This symbol indicates that eye protection must be worn to protect from UV light as well as debris.

HAND PROTECTION

This symbol signifies that hand protection must be worn to protect the lamps from skin oils as well as protect the operator from UV light and sharp materials caused by a broken lamp/ quartz.

ELECTRIC SHOCK WARNING

This symbol signifies electrical shock possibility. Failure to observe this warning may lead to serious injury or death.

CAUTION

This symbol indicates a potentially dangerous situation. Failure to adhere to this warning may lead to serious injury and/or death.

INFORMATION

This symbol signifies helpful information.

1) Information

Please read this manual prior to installing, starting up and operating the equipment. The equipment uses the latest in UV technology, but has been designed to make operation and maintenance easy.

The quality of the liquid entering the UV system needs to be monitored. Based on your water quality, the UV system will need to be cleaned on a periodic basis. Maintenance of the UV system will require replacement parts. It is suggested that key spare and replacement parts be kept on hand. For best operation, it is recommended to use the correct replacement parts. Incorrect replacement parts could result in damage to the system and void the warranty.

2) About Ultraviolet (UV) Disinfection

The technology uses UV light to target and disable disease-causing microorganisms (pathogens).

Over 100 years ago, scientists discovered that if you exposed pathogens to UV light, their reproduction was limited. The UV light source they used resided in the UVC range of the light spectrum. Specifically, they discovered that light in the 254 nanometer (NM) range was the most effective wavelength for this process.

When many pathogens are exposed to UV light, their cells become damaged and this damage inhibits reproduction. The UV light, produced by a special UV lamp, damages the cell's DNA and RNA and once damaged, they are unable to replicate. This physical process renders them harmless. The amount of damage is a result of the intensity of the UVC output multiplied by the time the pathogens are exposed to the light. The applied dosage is commonly referred to as microwatt seconds per square centimeter or millijoule per square centimeter and is often expressed as $\mu Ws/cm^2$ or mJ/cm^2. Most industrial applications require a dosage of 30,000 $\mu Ws/cm^2$ or $30mJ/cm^2$.

Why are plants and operators selecting UV technology?

a) UV is considered a green technology

b) No chemicals are added, so there is no need for chemical removal

c) No chemical storage

d) UV works instantly without requiring a residence time

e) Easy maintenance

3) Major Components

The UV disinfection system will come with a number of components.

The following list highlights the main ones:

a) Disinfection Chamber (aka vessel)
b) Remote Electronic Control Center (ECC) for Standard and High Output Models
c) Ultraviolet Lamps and Quartz Sleeves

a) Disinfection Chamber

The chamber is manufactured from high-grade 316L stainless steel. The chamber has been electropolished and passivated to protect the vessel against aggressive high purity water.

The chamber consist of an inlet/outlet connection and a viewport or sensor port. Depending on the model, the chamber is equipped with either a 3/4", 1" or 1.5" MNPT or Sanitary connection or a 1" or 1.5" Flange connection.

Viewport

b) Electronic Control Center (ECC)

The ECC is made of polycarbonate material. It is designed to be remote mounted within 4-6 feet of the chamber. Prior to final placement, ensure that the supplied cable lengths (8 ft.) are adequate to reach between the ECC and the chamber.

The ECC requires clean power. Information on voltage and cycle is provided on the wiring diagram in the back of this manual. Equipment should be kept off lines where there are surges or brownouts. Always disconnect power before servicing the system.

The ECC will contain the ballasts and other electrical controls. For models equipped with the standard UV Meter Board Monitor option and/or standard High Heat option, the ECC will display operation status such as individual Lamp Indicator, Elapsed Runtime Meter (ERTM), optional UV Monitor Intensity, optional Low UV Indicator, and optional High Heat indicator.

For models equipped with the optional Standard UV Monitoring System, the ECC displays operation status such as individual Lamp Indicator, Elapsed Runtime Meter (ERTM) , lamp runtime hours and relative UV lamp intensity. For models equipped with the WatchDog Monitoring System, the ECC will display operation status such as individual Lamp Indicator, and is capable of monitoring total runtime hours, lamp runtime hours, lamp intensity, relative UV percentage, temperature and in some models, real-time dosage.

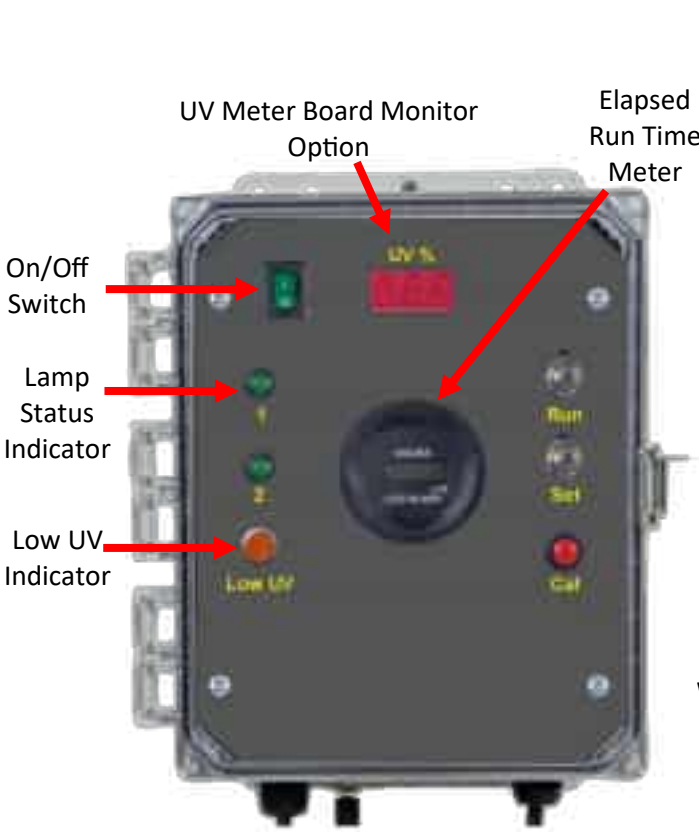


Photo shown is Display Plate for the Standard UV Meter Board Monitor Option and Standard High Heat Option

1-2 Lamp Display Plate for WatchDog Monitoring System Option

1-6 Lamp Display Plate for Standard UV Monitoring System Option

1-6 Lamp Display Plate for WatchDog Monitoring System Option

c) Lamps and Quartz sleeves Inspection

Use cotton gloves when handling lamps and quartz sleeves to prevent them from becoming dirty. If you break the lamps or quartz sleeves, take extra care to prevent yourself from becoming injured.

If damage has occurred during shipment, please put to the side in the original packaging and contact manufacturer. A claim will have to be made immediately to the shipping company.

4) Important Safety Precautions

Read and follow all safety precautions to guard against injury. Basic safety precautions must be observed. Keep on hand for future reference.
UV lamps and their quartz sleeves can become razor sharp if broken. Take care when installing and removing the quartz sleeves. Only hand-tighten compression fittings. Do not use wrenches or other tools.

	• Ultraviolet light (UVC) is harmful to eyes and skin. Use UV lamps only inside the disinfection chamber with the appropriate protective covering. Avoid exposure to UVC radiation. • CobraUV Series UV System should only be used for its' intended purposes as described in the IOM Manual. The use of attachments not recommended or sold by manufacturer may cause an unsafe condition. • CobraUV Series UV System must be properly installed in accordance with the IOM Manual and in compliance with all applicable local and state regulations before use. Read and observe all important notices on the disinfection system. • CobraUV Series UV System is intended for indoor use only.
	• To avoid possible electric shock, take special care when using water with this equipment. Always shut off and disconnect power to the unit before: 1. Making repairs—We strongly recommend that a qualified individual who fully understands the IOM Manual perform service and/or repairs to your system. 2. Cleaning 3. Replacing a UV Lamp • Do not operate disinfection system if it has a damaged cord or plug, if it is malfunctioning, or if it is dropped or damaged in any way. • The power cord of disinfection system is equipped with a 3-prong grounding plug that mates with a standard 3-prong grounded wall outlet to minimize the possibility of electric shock. Be sure the outlet for the disinfection system is wired and grounded properly. **DO NOT** under any circumstances cut or remove the third prong from the power cord. • Always unplug the disinfection system from outlet when not in use, before putting on or taking off parts, and before cleaning. Never unplug by pulling on the power cord. Always grip plug firmly and pull straight out of the outlet. • Shut down system before servicing: 1. Turn off water supply to the CobraUV Series UV disinfection system 2. Disconnect all power to the CobraUV Series UV disinfection system 3. Drain water from the system.
	• **Eye protection must be worn!** UV light is extremely harmful to eyes and skin and will cause burns. Do not look directly or indirectly at the UV light. • Never operate the UV lamp outside of the UV system. • Do not expose your skin for any prolonged time. Use protective clothing and eyewear (make sure it is UV resistant) when servicing equipment. • If accidentally exposed to UV light for an extended period, immediately seek medical attention. Symptoms for eye exposure include burning, itching and redness. Symptoms for skin exposure are similar to sun burn.
	• Use cotton gloves when handling lamps and quartz sleeves. Skin oils will adhere to the lamps and sleeves and prevent UV light from properly emanating. • If the sleeves become dirty, wipe them with a lint free cloth with denatured alcohol.

5) Preparation for Installing UV System

Before you begin, perform the following pre-installation steps:

a) System Inspection

Ensure that your CobraUV Series system is correctly sized for your desired dosage and flow capacity.

b) Water Quality

For optimum performance of your UV system, water quality is extremely important. Proper pretreatment is essential for the UV disinfection system to operate as intended.

UV disinfection dosages are dependent upon the quality and clarity of incoming water. Impurities in water can interfere with UV intensity and cause dosage to fall to unsafe levels. Have your water tested to determine it meets the standards in the below table. If any of the elements exceed the maximum levels shown in the table, contact your water professional for recommendations for proper pretreatment. All CobraUV Series models are rated for a UV Transmission (UVT) rate of 95% for clear fresh water and 99% for RO and DI water. If your UVT is less than 95/99%, contact your water professional.

The following table shows levels that are recommended for installation:

Table 1

Element	Recommended Maximum Levels (1mg/L=1ppm)	Actual Value
Turbidity	<5 NTU	
Suspended Solids	<5 mg/l	
Color	None	
Iron	0.3 mg/l	
Manganese	0.05 mg/l	
pH	6.5 to 9.5	
Hardness	<120 ppm	

c) Water Supply Pressure Check

Check the pressure of the water supply. The CobraUV Series UV system is designed for a maximum water pressure of 100 PSI. If your water pressure exceeds 100 PSI, install a pressure reduction valve before installing the UV system.

d) Electrical Configuration and Maintenance

The UV disinfection system uses sophisticated electronics and specialty lamps. The UV system's electronics require clean power. The system has been designed to use a certain specified voltage. UV equipment must be protected from surges. If the plant is susceptible to brownouts, please contact factory .

e) Location Selection

Select a location that meets the following guidelines:

- The unit must be installed between the cold water source and the water heater as inlet temperature must not exceed 100°F. (See Figure 1 for proper installation sequence.)
- The disinfection unit can be installed either horizontally or vertically. (See Figure1 for water flow direction.)
- The unit must be within 5' of an electrical outlet. A 6' cord is included with the system.
- The power supply contains sensitive electronic components. It is recommended that the unit be plugged into a surge suppressor to help protect electronic components.
- The unit must be protected from freezing. Freezing damage will void the warranty.
- The unit should be placed where a potential leak will not cause water damage. UV Superstore, Inc. is not responsible for water damage.
- Vibration of ultraviolet equipment will damage lamps and lead to premature system failure. Choose a location for your UV Superstore, Inc. Cobra System that is isolated from vibration. Potential vibration sources include heavy equipment, poorly connected pipes and erratic or improper pumps. A water hammer may cause O-Ring failure. If your system is subject to water hammer conditions, we recommend that you install a water surge suppressor.
- There must be enough clearance to remove the UV lamp and the quartz sleeve for replacement and regular maintenance.
- Recommended clearance is length of unit plus four inches.

f) Receiving UV Equipment and Spare Parts

Inspection of the UV equipment must be made immediately upon receipt for damage and verification of contents. It is important to compare the contents of your shipment to the actual packing list. Any deviations must be brought to the factory's attention. Additionally, lamps and quartz sleeves need to be inspected for damage. If shipment or parts are damaged, immediately contact factory and hold broken contents and their containers for inspection by shipping company. Failure to make a damage claim within 2 business days of receipt of product can result in loss of claim.

g) Optimizing System Performance

The UV lamps and their corresponding quartz sleeves need to be maintained. As a general rule, the lamps need to be changed after a year of usage (10,000 hours). Quartz sleeves should be changed about every three (3) years or sooner if degraded and/or damaged.

Quartz sleeves also need to be cleaned on a periodic basis based on real world plant conditions. The factory recommends using denatured alcohol or a commercially available non-abrasive cleaning product. In addition to cleaning, please remember to wear gloves when handling lamps and sleeves. It is important that the cleaning product you select leaves no residue.

6) Installation Instructions

Your CobraUV Series UV System can be mounted either horizontally or vertically.

WATCH FOR CLEARANCE
Be sure to allow a minimum clearance of the length of the unit plus 4" from the unit to any obstruction on one end in order to be able to replace the lamp and quartz sleeve.

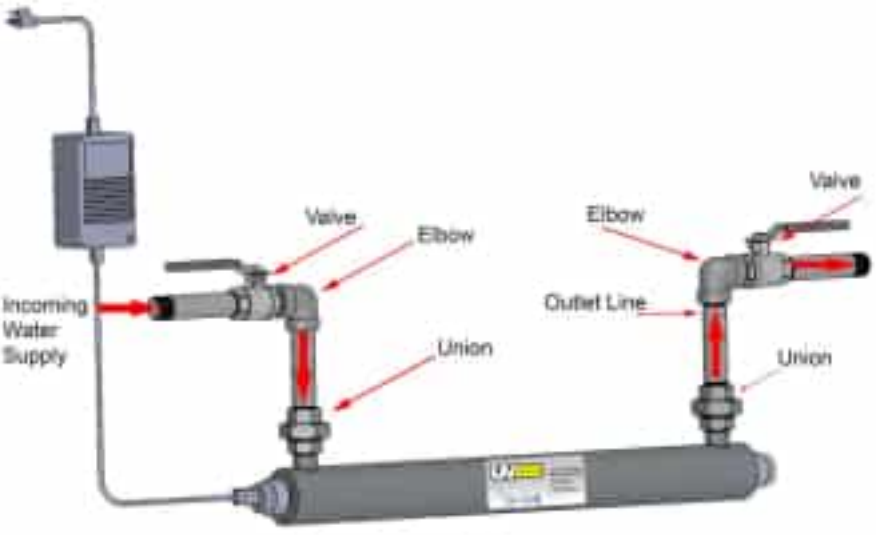
ELECTRICAL SHOCK Check for hidden electrical wiring before drilling holes.

INSTALLATION ORIENTATION!
Water flow must be from the bottom to the top of the unit for a vertical installation. Inlet and outlet must be pointing upward for horizontal installation.

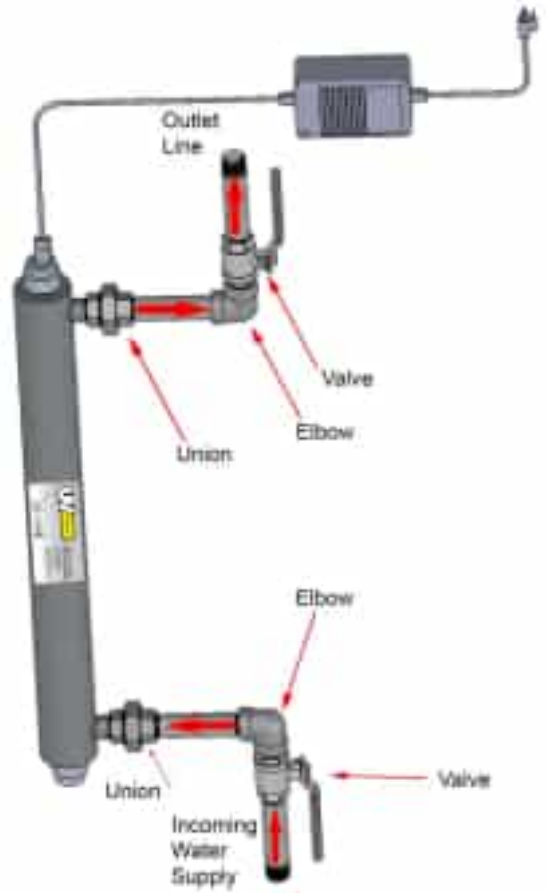
ECC INSTALLATION
The ECC is designed to be remote mounted within 4-6 feet of the chamber. Prior to final placement, ensure that the supplied cable lengths (8 ft.) are adequate to reach between the ECC and the chamber. Make sure power to the equipment matches the voltage requirements of the system. Make sure the system is properly grounded. Plug the power cord into the appropriate outlet.

LAMP OUT ALERT (OPTIONAL)
For models equipped with Lamp Out Alert ballast(s), connect your external control (PLC or SCADA) to the bottom of the enclosure via the auxiliary connection.
Warning! Control signal may not exceed 32V AC, 50V DC, 50mA current

TYPICAL CORRECT INSTALLATION (Figure 1)



Typical Horizontal Installation



Typical Vertical Installation

a) Quartz Sleeve Installation

The quartz sleeve surrounds the lamp and prevents water from contacting the lamp and electrical parts. The sleeve is made of pure fused quartz which allows 99% of the ultraviolet light to pass through.

The quartz must be kept clean and free of organic buildup to ensure optimum ultraviolet transmission. The quartz sleeves need periodic cleaning with the frequency of such cleanings determined by the quality of the water passing through the system. Use cloth gloves to handle quartz sleeves and UV lamps to avoid putting fingerprints on the sleeves and lamps.

After the ultraviolet unit has been secured and the inlet/outlet piping connections have been made, remove compression nuts from each end of the disinfection unit.

Take great care when removing the quartz sleeve from the packing carton.

Slowly and carefully slide the quartz through the head until it protrudes equally beyond the nipple on each end of the chamber. Place the O-Ring over the end of the quartz and push the O-Ring back until it stops at the nipple.

Be very careful when installing the compression nuts over the quartz sleeve. Tighten each compression nut simultaneously by hand making sure the sleeve protrudes from each nipple equally. **ONLY TIGHTEN BY HAND – NEVER USE PLIERS.** Make sure as you tighten the compression nut that you maintain a clearance between the stop ridge machined in the compression nut and the edge of the quartz sleeve.

Compression Nut

After you have tightened the compression nuts and all other plumbing connections, open the outlet valve. Slowly open the inlet valve and flush out all remaining air. Then, close the outlet valve and open the inlet valve fully. Check the unit for leaks. If you find a leak at the compression nut, tighten the nut further. If the leak continues, drain the unit and inspect the quartz O-Ring and quartz sleeve for possible damage. Once you complete checking the unit, carefully reassemble O-Ring and tighten compression nut. Re-pressurize the unit and check again for leaks.

b) UV Lamp Installation

The UV lamp is very fragile. Do not handle it with bare hands. Use **clean cotton gloves or cloth** when handling lamp to keep it free of dust or fingerprints. If dust or fingerprints get on the lamp, wipe it with a clean cloth and denatured alcohol.

Take care when removing the ultraviolet lamp from the packing carton. Slowly and carefully slide the lamp into the quartz sleeve. Attach the ultraviolet lamp socket and ensure the socket is pushed all the way down to the base of the lamp for proper contact. Then screw the strain relief into the threads of the compression nut.

c) Sensor Probe Installation—

Models with Standard UV Monitoring System

For models equipped with the Standard UV Monitoring System, a sensor probe and sensor cable will need to be installed on the UV chamber. The sensor probe contains an O-ring to ensure a watertight seal. To install, first attach the sensor probe to the sensor port on the UV chamber and secure. Then attach the sensor cable to the sensor probe.

Attaches to Sensor Cable →

Models with WatchDog Monitoring System

For models equipped with the WatchDog monitoring system, a sensor probe, sensor port fitting and sensor cable will need to be installed on the UV chamber. The sensor fitting and sensor probe contains an O-ring to ensure a watertight seal. To install, first attach the sensor fitting to the sensor port on the UV cylinder chamber. Slide the sensor probe through the fitting and secure. Then attach the sensor cable to the sensor port.

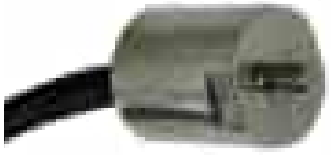
Attaches to Sensor Cable →

d) High Heat Sensor Installation—For Models with Standard High Heat Option

For models equipped with the Standard High Heat Option, a thermostat will need to be installed. A high heat bracket has been welded onto the chamber. First, connect the thermostat to the bracket on the UV chamber. Once secure, connect the sensor cable to the bottom of the electrical enclosure where indicated.

High Heat Bracket →

High Heat Thermostat



e) Plumbing System Sanitization Procedure

It is recommended before the initial use of your UV disinfection system and after routine maintenance procedures, to sanitize your water system to ensure that no organisms are present.

Prior to start-up, flush the UV system and discharge piping for at least 5 minutes to rinse out any possible debris left from installation**.**

NOTE: Always follow the sanitizing procedures required by applicable state or local laws.

7) Operation and Monitoring

a) Electronic Control Center (ECC)

The ECC will be the focal point for system Operation and Monitoring.

Do not exceed 3 ON/OFF cycles in a 24-hour period. Excessive cycling of the UV system will reduce the EOL (End of Life) output and/or cause premature aging of the UV lamps.

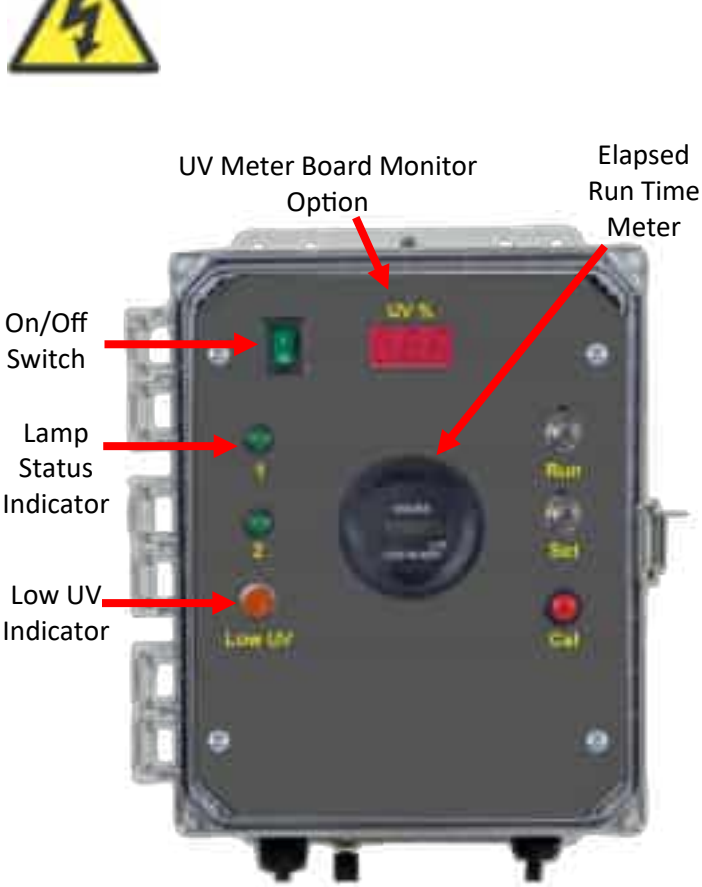


Photo shown is Display Plate for the Standard UV Meter Board Monitor Option and Standard High Heat Option

1-2 Lamp Display Plate for WatchDog Monitoring System Option

1-6 Lamp Display Plate for Standard UV Monitoring System Option

1-6 Lamp Display Plate for WatchDog Monitoring System Option

1. Lamp Status

The ECC will display each individual lamp status indicators in the form of Light Emitting Diodes (LEDs) located on the display plate behind the window on the front door. The LEDs glow green when the lamp is on. An extinguished LED indicates a possible lamp problem.

If the LED goes off, then it may mean that a lamp is no longer functioning. However, it may indicate a problem with the LED, the lamp's corresponding ballast or a problem located within the lamp holder.

2. Runtime Monitoring

A digital non-resettable time meter has been integrated into the display plate of the ECC. This elapsed runtime meter (ERTM) tracks operational hours on the system as a whole. It does not track individual lamp run hours nor does it indicate when to service. The runtime meter is a tool to help track running hours to help operators know when it is time to change lamps.

Operators should keep tracking logs in order to know when it is time to change lamps. Lamps need to be changed every 9,000 hours (one year). UV lamps lose intensity over time and the system is designed to provide proper dosage up to 9,000 hours of lamp life. Running the lamps more than 9,000 hours could result in improper UV dosage.

3. Lamp Out Alert (Optional)

Lamp out alert ballast(s) are used to connect an external control (PLC or SCADA) to the enclosure. These Lamp Out Alert ballast contain relay contacts which provides a signal to the external control via lamp on/ lamp fault conditions. The enclosure has been wired with two red terminal blocks specifically for this operation. An external control signal from a PLC or SCADA unit can be wired to the terminal blocks for a closed circuit/open circuit condition for external control logic.

To operate, the circuit starts at one of the terminal blocks and runs to the incoming contact of the lamp out relay of the first ballast and across the closed circuit contacts on the relay. From the outgoing relay contact of the first ballast, the wires are fed to the incoming contact on the next ballast and across the closed circuit contacts of the next ballast and so on to the last ballast (according to the number of lamps in the unit) and fed back to the second red terminal block. In the normal operating state with all lamps lit, the circuit is closed. If any of the lamps in the circuit fails, the corresponding lamp out relay will switch states, the chain will be broken, and the circuit will be open. An external control signal from a PLC or SCADA unit can be wired to the terminal blocks for a closed circuit/open circuit condition for external control logic.

Warning! Control signal may not exceed 32V AC, 50V DC, 50mA current

4. Viewport

For models not equipped with a UV Monitor, a viewport has been installed on the UV chamber. The purpose of a viewport is to safely verify lamp operation without the potential exposure to UV rays. The viewport assembly consists of a viewport, sight glass, foam washer and an O-ring.

8) UV Monitoring System Options

For units equipped with the Standard or WatchDog Monitoring System, refer to the Options Operational Manual for Operation and Monitoring Instructions.

a) Standard High Heat Shutoff Sensor (Optional)

Operation

Optimum operating temperature of a standard Low Pressure High Output lamp is around 105°F. UV intensity falls off when the temperature of the lamp rises above the optimum operating temperature. In order to guard against a possible falloff of UV intensity due to high heat and possible damage to other components, an optional high heat sensor can be used. The High Heat Sensor option consists of a thermostat. When an overheat situation occurs, the thermostat will shut off the system.

Operational "Normal" State – The High Heat Sensor controls voltage to the Electronic Control Console (ECC), feeding operating voltage to all components of the ECC allowing "normal" operation of the unit.

Fault State – The High Heat Sensor is factory set at 120°F. If vessel temperature reaches 120°F, the thermostat will not allow power to pass through to the electrical components. The UV lamps will shut off, and the runtime meter will shut off. If the unit is equipped with an optional UV Monitor, because the lamps are now shut off, the UV monitor will go into the fault state, illuminating the Low UV light, sounding the audible alarm, switching the state of the relay contacts on the UV Meter board, and the UV display should read "0". The unit will turn back on when water flows, cooling the unit or when water temperature falls below 90°.

Refer to the Options Operational Manual for Operation and Monitoring Instructions for models equipped with the Optional Standard UV Monitoring System or WatchDog UV Monitoring System

9) Maintenance

Always disconnect power before servicing the system!

a) UV Lamp Maintenance

Your CobraUV Series ultraviolet disinfection system will give many years of safe and effective disinfection service with minimal routine maintenance.

Replace your UV lamp on an annual basis

UV lamps lose intensity over the 10000 hours rated life, roughly one year of continuous use. Your UV lamp will still be glowing after the years worth of use, but the glow that you can see is not in the UV spectrum that provides the microorganism reduction the system is designed for. The Ultraviolet light is not visible to the naked eye, and the system has been sized to provide enough UV intensity to disinfect for up to the 10,000 hours of use. Using lamps longer than this can cause your system to not provide UV intensity high enough for proper dosage for disinfection. Knowing that the UV intensity will fall from the original levels at the end of one year, your UV system is designed to provide rated dosage ***at the end of lamp life to provide safe and effective disinfection***.

When a new lamp is installed, it is providing dosage higher than rated at, falling down to rated dosage at the end of one year. This is the reason it is highly recommended for you or your water professional to keep accurate records of when lamps are replaced and to replace them annually. For your convenience, a maintenance log has been provided in the back of the IOM Manual.

The UV lamp is very fragile. Do not handle it with bare hands. Use **clean cotton gloves or cloth** when handling lamp to keep it free of dust or fingerprints. If dust or fingerprints get on the lamp, wipe it with a clean cloth and denatured alcohol.

Take care when removing the ultraviolet lamp from the packing carton. Slowly and carefully slide the lamp into the quartz sleeve. Attach the ultraviolet lamp socket and ensure the socket is pushed all the way down to the base of the lamp for proper contact.

b) Quartz Sleeve Cleaning Procedure

In order to ensure proper disinfection, the quartz sleeves need to be inspected, monitored and maintained. The UV lamps produce heat and UVC output, which may cause certain water characteristics to adhere to and bond on the sleeve preventing the UVC from reaching the targeted pathogens. This can cause the quartz sleeves to foul. To a great extent, your frequency of cleaning will depend upon the water quality (i.e. amount of minerals present in the liquid). The more minerals present in the water, the more frequently the quartz will require cleaning.

Manual Cleaning

Significant film or debris deposits formed on the quartz sleeves will impair the ability of the Ultraviolet rays to penetrate through the quartz and into the water. To a great extent, your frequency of cleaning will depend upon the water quality. The more minerals present in the water, the more frequently the quartz will require cleaning.

A periodic visual inspection of the quartz will be necessary to determine the frequency of cleaning. Initial inspection should take place after thirty (30) days of operation. If the quartz is dirty, shorten the cleaning intervals. If the quartz is clean, lengthen the cleaning intervals.

To clean quartz sleeves, depressurize the unit by first turning off the valves on the inlet and then the outlet of the vessel. Turn off the power to the Ultraviolet system. Drain the vessel. Unscrew the strain relief securing the lamp connector from the compression nut and slide the lamp out about 2" from the compression nut. Remove the lamp connector from the lamp and carefully remove the lamp. Unscrew the compression nuts from the nipples. Remove the O-rings and slide the quartz sleeve out of the unit, taking care to not let the quartz bump against any metal parts. The quartz sleeves may be cleaned with warm soapy water and rinsed thoroughly. If this is not sufficient, denatured alcohol may be used. It is important to use cleaners that leave no residue. Whenever the quartz are cleaned, the quartz O-rings should also be cleaned. Install the quartz sleeves with clean cotton gloves.

It is recommended to replace the quartz sleeve and O-rings approximately every 3 years. The frequency can vary depending on water conditions.

Assembly is the reverse of removal.

Lamp and quartz sleeve are fragile

It is recommended to sanitize the entire system after servicing
(See Plumbing System Sanitization Procedures in Installation Section)

c) Lamp Recycling

UV lamps need to be recycled like fluorescent lamps because they contain mercury. Please follow your local recycling laws. Please visit www.lamprecycle.org for help finding a recycling center in your area. In the event that you are unable to find a disposal location, please contact manufacturer's representative.

d) ECC Maintenance

The Electronic Control Enclosure (ECC) is made of polycarbonate material and is custom designed with a sealed door. It should require little maintenance other than occasional cleaning. A damp cloth and mild detergent can be used to clean the outside of the enclosure. While most penetrations are sealed, it is not suitable to withstand a hose wash-down or large amounts of water. Any water penetrating the enclosure can lead to damage and possible electrical shock.

e) Chamber Maintenance

The chamber requires periodic maintenance. The Chamber is made of high-grade 316L Stainless Steel and is electropolished and passivated. It should provide years of reliable service. The exterior can be cleaned with a damp cloth, mild detergent or a stainless steel cleaner. Be careful around the compression nuts as the compression cap is not watertight. The chamber interior will require cleaning on a periodic basis depending on the quality of the water passing through. Some water will introduce solids, minerals, and other debris in the vessel.

Prior to performing inspection, ensure that the power to the ECC and that the water supply has been turned off before and after the chamber. Once isolated, drain the system. Prior to draining, release pressure in line by opening a valve. Failure to do these tasks can result in serious injury and property damage.

Once drained, the operator can remove a lamp and quartz sleeve to peek through to get a limited view of the vessel. The viewport can also be removed to inspect the chamber.

f) Viewport Maintenance

For models that are not equipped with a UV Monitor, a viewport has been installed on the UV chamber. The purpose of a viewport is to safely verify lamp operation without the potential exposure of the UV lamp rays. The viewport assembly consists of a viewport, sight glass, foam washer and an O-ring.

The foam washer acts as a cushion between one side of the sight glass and the viewport itself. The O-ring provides a seal and serves as a cushion to the other side of the sight glass.

This assembly will require periodic maintenance similar to the lamp and quartz maintenance schedule. A periodic visual inspection of the viewport assembly is recommended. Unscrew the nickel plated viewport from the chamber and inspect the sight glass for any cracks. If a crack has occurred this will need to be replaced. It is recommended to replace the O-ring every 3-5 years as the O-ring can degrade over time.

Reattach viewport after routine maintenance has been performed.

g) High Heat Shutoff Maintenance—Models with Standard High Heat Option

Many applications can have significant times of no flow. During these times, heat can build up in the vessel. To prevent the lamps from overheating and the quartz sleeve fouling, a thermostat (high heat shut off) may have been provided as an option.

The High Heat Sensor is attached to the UV chamber. It is held in place with a mounting bracket that is welded to the vessel. The sensor is attached to the electronics via a plug in connector. The sensor generally shuts down at 120°F. This is meant to protect the lamps. The system will turn back on once the system cools down. The sensor is factory set and cannot be adjusted. No maintenance is needed other than to make sure the sensor is held tightly in place.

h) Sensor Probe Maintenance

1) Models with Standard UV Monitoring System or WatchDog Monitoring System—

For models equipped with either the Standard UV Monitoring System or WatchDog Monitoring System, a sensor probe and sensor cable is used and attached to the UV chamber. The sensor probe consists of a an O-ring that will need to be replaced periodically. Annual routine maintenance is recommended similar to lamp and quartz maintenance.

You must shut down the system and depressurize the chamber before performing any maintenance. Detach the sensor cable from the sensor probe and unscrew the probe from the sensor port. Inspect and clean as needed. A buildup can coat the sensor probe and failure to clean may result in a false reading. It is recommended to replace the O-ring every 3-5 years as the O-ring can degrade over time.

Reattach sensor probe and sensor cable after routine maintenance has been performed.

Standard UV Monitoring System
P/N SNSR0007
Wetted Sensor Probe

WatchDog Monitoring System
P/N SNSR0007
Wetted Sensor Probe

Food and Drug Administration Statement

UV Superstore provides state of the art Ultraviolet Water and Air Treatment Systems for many commercial and industrial applications.

The U.S Food and Drug Administration approval process does not allow for individually approval of any material, piece of equipment, or apparatus that is not deemed a medical device. Therefore UV Superstore designs our brand UV Systems and spare parts to be in compliance with the U.S Food and Drug Administration Code Of Federal Regulations Title 21 Sub Section 177.

Stainless Steel and quartz material are acceptable in FDA applications. All O-ring and gasket materials are in compliance with Title 21 Sub Section 177.

The U.S Food and Drug Administration regulations that deal with the items addressed above are as follows:

1) Part 129, Subpart C, Sec. 129.40 Equipment and procedures.

2) Part 177, Subpart C, Sec. 177.2600 Rubber articles intended for repeated use.

3) Part 211, Subpart D, Sec 211.65 Equipment Construction.

All UV Superstore products are built to exacting standards with the highest quality materials available to meet the above referenced guidelines.

UV Superstore, Inc.

Engineering Department

CobraUV® HO Series

Ultraviolet Treatment Systems

Heat Sanitization

For Heat Sanitization, we recommend temperatures no higher than 194°F (90°C). If the unit has a UV Monitor, the sensor probe must be removed and the sensor port plugged prior to sanitization. The sensor probe manufacturer states temperatures higher than 140°F (60°C) can possibly either damage the electronic components inside the housing, or affect sensor calibration. The sensor port for P/N SNSR0004 requires a 1/4" BSPP male thread plug. The sensor port for P/N SNSR0005 requires a 1" BSPP male thread plug.

The most critical part is that the system is not heated or cooled too quickly, as with anything made with like materials, if this is heated or cooled too quickly there is a good chance of very fast expansion or contraction and this is where the problems will come from as far as cracking of the stainless steel chamber or welds, compression fittings failure, quartz sleeves failure and other components failure along with chances of leaking by the various seals for the UV system. Heat and cool SLOWLY.

- Turn UV System OFF, UV Lamps should not be operational during this process.

- Maximum Temperature:

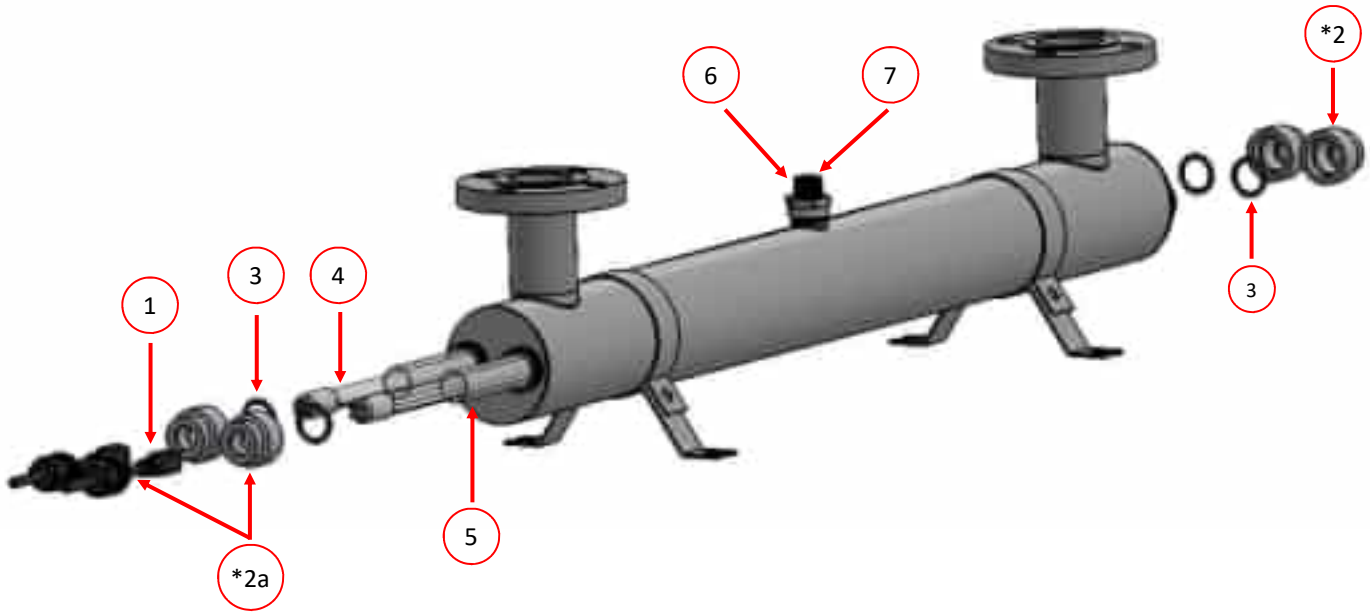
  Models without a UV Monitor: 194°F (90°C)

  Models with a UV Monitor: 140°F (60°C)

- Remove UV Sensor Probe and plug sensor port.

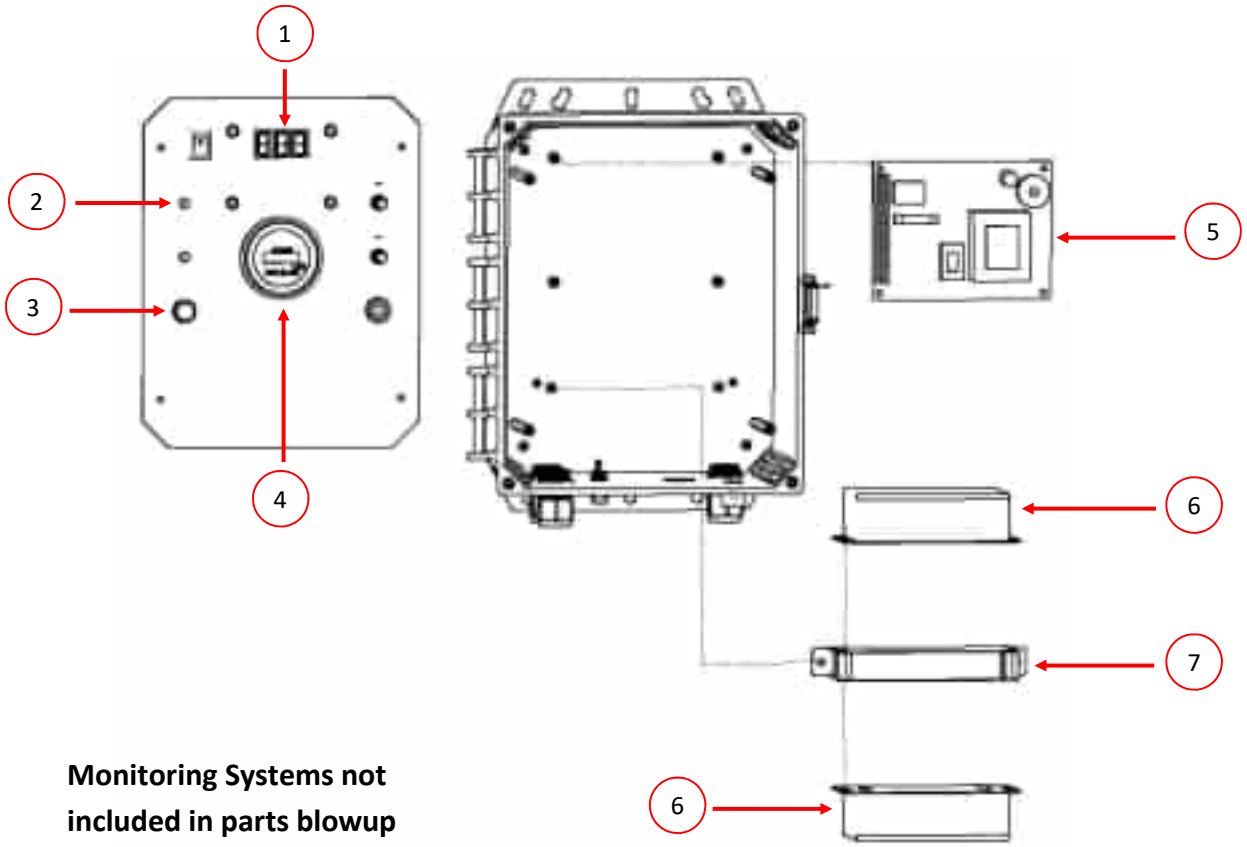
- Heat and cool SLOWLY to avoid fast expansion or contraction.

CobraUV® Series Deluxe Model Parts Breakdown



Item No.	Description	Part No.	Quantity required Model No.				
			CB1SS-SD	CB1-SD	CB1SS-HOD	CB1-HOD	CB2-HOD
1	Lamp Harness—8ft Lamp Harness—15ft	LH0001 LH0002	1	1	1	1	2
*2 *2a	Compression Nut Compression Nut Compression Nut Compression Nut (lamp harness end) Compression Cap for CN0043 ***Compression Nuts vary depending on chamber***	CN0007 CN0008 CN0042 CN0043 CN0044	1 1 2 1 1	1 1 2 1 1	1 1 2 1 1	1 1 2 1 1	2 1 4 2 2
3	Sleeve O-Ring, EPDM	ORNG0009	2	2	2	2	4
4	Standard Output Lamp—254NM Standard Output Lamp—254NM Standard Output Lamp—185NM High Output Lamp—254NM High Output Lamp—254NM High Output Lamp—185NM	GL-5463-4S74R GL-5843-4S74R GV-5843-4S74B GL-5463-4H74Y GL-5843-4H74Y GV-5843-4H74A	1	1 1	1	1 1	2 2
5	Quartz Sleeve, Open Ended	BA-Q7 BA-Q15	1	1	1	1	2
6	UV Viewport Assembly O-Ring for UV Viewport UV Viewport (For Models without UV Monitor) ***Viewports vary depending on chamber style***	VPM0001 002045 BA-VP	1 1 1	1 1 1	1 1 1	1 1 1	1 1 1
7	UV Sensor Probe (Standard Monitoring System) UV Sensor Probe (WatchDog Monitoring System) O-Ring for UV Sensor Probe **SENSOR PROBE ADAPTER PARTS** Sensor Probe Adapter Sensor Probe Adapter Cap O-Ring for UV Sensor Probe Adapter	SNSR0007 SNSR0004 ORNG0101 FTNG0021 FTNG0023-UV 11992	1 1 1 1 1 1	1 1 1 1 1 1	1 1 1 1 1 1	1 1 1 1 1 1	1 1 1 1 1 1
Not Shown	Thermistor (For Models with Standard High Heat)	THERM0100	1				

CobraUV® Series Deluxe Model Parts Breakdown



Item No.	Description	Part No.	Quantity required Model No.				
			CB1SS-SD	CB1-SD	CB1SS-HOD	CB1-HOD	CB2-HOD
1	UV Intensity Display Board (For Models with Standard UV Meter Board)	ELEN0028	Model Dependent				
2	Lamp Status Indicator	LED0100-18	1	1	1	1	2
3	Low UV Indicator—120V Low UV Indicator—220V (For Models with Standard UV Meter Board)	LGHT0003 LGHT0004	1 1	1 1	1 1	1 1	1 1
4	Elapsed Runtime Meter	ERTM0100	1				
5	UV Meter Board		Model Dependent				
6	Ballast 100-277V 50/60Hz Ballast 100-277V 50/60Hz Ballast 110-240V 50/60Hz with lamp out alert Ballast 110-240V 50/60Hz with lamp out alert	BLST0033 BLST0034 BLST0055 BLST0056	1 1 	1 1 	 1 1	 1 1	 1 2
7	Ballast Mounting Bracket	BRKT0002	1				

CobraUV® Series Specifications

Model #	CB1SS-S CB1SS-SD	CB1SS-HO CB1SS-HOD	CB1-S CB1-SD	CB1-SD-TOC CB1-SD-O3D	CB1-HO CB1-HOD	CB1-HOD-TOC CB1-HOD-O3D	CB2-HOD	CB2-HOD-TOC CB2-HOD-O3D
Max Capacity Clear Fresh Water	4 GPM	7 GPM	15 GPM		25 GPM		45 GPM	
Max Capacity DI/RO Water Disinfection	5 GPM	9 GPM	17 GPM	For sizing parameters consult Sales team	30 GPM	For sizing parameters consult Sales team	50 GPM	For sizing parameters consult Sales team
UV Dosage Millijoule/cm²	30 mJ/cm²	30 mJ/cm²	30 mJ/cm²	Dosage parameters vary depending on requirements	30 mJ/cm²	Dosage parameters vary depending on requirements	30 mJ/cm²	Dosage parameters vary depending on requirements
No of UV Lamps	1	1	1	1	1	1	2	2
Lamp Watts Total	25 W	40 W	40 W	40 W	80 W	80 W	160 W	160 W
Voltage	120V 50-60Hz	120V 50-60Hz	120V 50-60Hz	120V 50-60Hz	120V 50-60Hz	120V 50-60Hz	120V 50-60Hz	120V 50-60Hz
Treatment Chamber Material	316L SS	316L SS	316L SS	316L SS	316L SS	316L SS	316L SS	316L SS
Standard Operating Pressure	100 PSI	100 PSI	100 PSI	100 PSI	100 PSI	100 PSI	100 PSI	100 PSI
Fitting Size	3/4” MPT 3/4” Sanitary	3/4” MPT 3/4” Sanitary	1” MPT 1” Sanitary 1” Flange	1” MPT 1” Sanitary 1” Flange	1” MPT 1” Sanitary 1” Flange	1” MPT 1” Sanitary 1” Flange	1.5” MPT 1.5” Sanitary 1.5” Flange	1.5” MPT 1.5” Sanitary 1.5” Flange

Troubleshooting

Situation	Recommended Action
Unit is leaking	• Check to see that the compression nut is tight. • Verify that inlet pressure does not exceed 100 PSI. • Verify O-Ring is seated properly, follow manual instructions. • Lubricate O-Ring with food grade silicone. • Check O-Ring for cracks or tears. Replace if necessary. • Check quartz sleeve for possible cracks or chips. Replace if sleeve is cracked or chipped.
Poor bacterial performance	• Replace lamp if more than 365 days old or at end of its lamp life. • Make sure quartz sleeve(s) are clean. • Perform routine maintenance, if necessary. • Check water quality. If water quality has changed, take corrective action. Water supply cannot exceed maximum concentration levels as shown in Table 1 in Pre-Installation Instructions.
Lamp status LED is not glowing	• Check for power at outlet. • Inspect the lamp socket and lamp connection and verify it is securely connected. Repair and replace lamp, if needed. • If lamp is still out, replace ballast.
Audible Alarm Sounds (UV Monitor option)	• See conditions in low UV monitor reading below. • Lamp has reached end of lamp life, around 1 year. Replace lamp. • If ballast has failed, replace ballast. • Unit is in high heat shutdown. See run time meter below.
Power Fails	• Unit will restart automatically when power is restored. • The unit is designed for continuous operation. Never connect the unit to a timer or other device, which will cause the unit to cycle on and off. Excessive cycling will reduce lamp life.
Low UV Monitor Reading (Less than 85% transmission)	• Check water quality. Ensure that color, turbidity, and iron content are within normal parameters. • Verify lamp is on and less than 1 year old. • Ensure Input voltage matches requirements. • Replace old or defective lamp(s). • Clean quartz sleeve(s). • Clean UV sensor lens. • If reading is at 0%, ensure UV sensor cable is connected.
Run Time Meter is not working	Units with UV Monitor and High Heat Option— • High heat shutdown situation has occurred causing the UV meter light to be ON, alarm to sound, UV percentage to be at 0%, and the lamp LED (s) to turn OFF. Resume water flow. Units with High Heat Option only— • High heat shutdown situation has occurred causing the UV lamp LED(s) to turn OFF. Resume water flow. • Replace run time meter if power, lamps and LED's are all on.

If questions still remain after completing a troubleshooting procedure, please contact the manufacturer.

Maintenance Log

You must perform routine maintenance in order to achieve optimum performance levels from your CobraUV® Series water treatment system. As you perform routine maintenance or necessary service on your system, record the dates in the maintenance log. The maintenance section of the IOM Manual provides instructions for servicing and maintenance procedures.

Replace Lamp (every 365 days)	Clean Sleeve (as needed)	Replace Quartz Sleeve (every 3 years)	Replace O-Rings (with Quartz sleeve change)

Model Number

_____

Serial Number

_____

Limited Warranty

UV Superstore's CobraUV® Series Commercial/Industrial Water Treatment systems are provided with a limited warranty. These units carry a warranty to be free from defects in materials and workmanship for one year from date of purchase under the conditions of normal usage and service for the complete system and a four year warranty for the treatment chamber. If the product fails or malfunctions during the warranty period, UV Superstore shall inspect the inoperative product and have the option to repair or replace any components, which, in the assessment of UV Superstore were originally defective or became so under normal conditions of use and service. Customers must first call UV Superstore and be issued a Return Authorization number before returning any product or component. The equipment or component must be returned to UV Superstore freight prepaid and insured to the address below.

Warranty Statement

UV Superstore warrants replacement lamps, purchased for routine maintenance, to be free from defects in material and workmanship for a period one year from the date of purchase. During this time, UV Superstore will repair or replace, at its option, a defective lamp free of charge except for shipping and handling charges and any prorated charges (where applicable).

The warranty period on replacement lamps will be verified using date codes and/or purchase receipts. UV Superstore will advise whether the defective item needs to be returned for failure analysis.

None of the above warranties cover damage caused by improper use or maintenance, accidents, acts of God or minor scratches or imperfections that do not materially impair the operation of the lamp. The warranties also do not cover products that are not installed as outlined in the applicable IOM Manual.

The limited warranties described above are the only warranties applicable to the lamps outlined. These limited warranties outline the exclusive remedy for all claims based on a failure of or defect in any of these lamps, whether the claim is based on contract, tort (including negligence), strict liability or otherwise. These warranties are in lieu of all other warranties whether written, oral, implied or statutory. Without limitation, no warranty of merchantability or of fitness for a particular purpose shall apply to any of these lamps.

UV Superstore, Inc. does not assume any liability for personal injury or property damage caused by the use or misuse of any of the above products. UV Superstore, Inc. shall not in any event be liable for special, incidental, indirect or consequential damages. UV Superstore liability shall, in all instances, be limited to repair or replacement of the defective product or part and this liability will terminate upon expiration of the applicable warranty period.

For all warranty claims you must contact UV Superstore at the below address. All claims must be filed within 30 days.

820 Tucker Court, Winder, GA 30680

Phone: 770-307-3882

Fax: 770-307-3872

sales@uvsuperstore.com

www.uvsuperstore.com

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