

# GUARDIAN™

## ULTRAVIOLET MONITOR



**Digital**



**Analog**



**Digital Remote**

## Installation & Operation

**ATLANTIC**  **ULTRAVIOLET**  
CORPORATION®

375 Marcus Boulevard • Hauppauge, NY 11788 • USA  
631.273.0500 • Fax: 631.273.0771  
e-mail: [info@ultraviolet.com](mailto:info@ultraviolet.com)

Extensive Product Information Available at:

**[www.ultraviolet.com](http://www.ultraviolet.com)**

**Owner's Manual**

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These instructions generally describe the installation and operation of the **GUARDIAN™** Ultraviolet Monitor. Questions that are not specifically answered by these instructions should be directed to the Factory. Atlantic Ultraviolet Corporation takes all possible precautions when packaging equipment to prevent damage. Carefully inspect and report all damage upon receipt of product. Do not install damaged equipment. Follow all instructions on all labels and tags. Carefully inspect all packing materials before discarding to prevent the loss of accessories, mounting hardware, spare parts or instructions.

The information and recommendations contained in this publication are based upon data collected by the Atlantic Ultraviolet Corporation® and are believed to be correct. However, no guarantee or warranty of any kind, expressed or implied, is made with respect to the information contained herein. Specifications and information are subject to change without notice.



# SAFETY INSTRUCTIONS

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1. Read and follow ALL safety instructions.
2. Intended for indoor use only.
3. The **GUARDIAN™** Ultraviolet Monitor should be protected from harsh environments, high humidity, and temperature extremes.
4. The **GUARDIAN™** Ultraviolet Monitor housing is not waterproof. Serious damage can occur if internal electronics come into contact with water.
5. Do not alter the construction or design.
6. Do not use this monitor for other than its intended purpose, as described in this manual.
7. Do not operate the monitor if the power cord and/or plug are damaged, or if any other damage to the monitor is visible or suspected.
8. **⚠ CAUTION: Do not operate without proper electrical ground.**
9. Utility power supplied, to the monitor, **MUST** match power requirements listed on the monitor label.
10. **⚠ WARNING: Always disconnect power, to the monitor and unplug, before performing any service or maintenance.**
11. **SAVE THESE INSTRUCTIONS.**

# PRODUCT APPLICATION

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The **GUARDIAN™** Ultraviolet Monitor visually indicates the level of germicidal ultraviolet energy that penetrates the quartz sleeve and water within the purifier. The monitor will detect reduction of ultraviolet levels due to:

- Fouling or deposits on the quartz sleeve.
- Poor ultraviolet transmission through the water. Color, turbidity, and organic or other impurities in the water can reduce or interfere with the transmission of ultraviolet rays.
- Lamp outage, component or power failure.
- Depreciation of the lamp output due to usage or other cause (lamp output gradually depreciates with use).

**GUARDIAN™** monitors are available with either an analog or digital intensity meter.

All **GUARDIAN™** monitors provide output sockets for the operation of an optional solenoid valve or time delay/solenoid valve combination and optional audio alarm.

The digital **GUARDIAN™** can provide a programmed 2-minute time delay for solenoid valve operation. This feature is disabled when shipped. For the instructions to enable the time delay feature, contact the factory.

The digital **GUARDIAN™** provides outputs for remote monitoring of the water purifier's operation. The outputs;

- 4-20mA Output: Provides current for remote display of ultraviolet intensity.
- Dry Contacts: Provides contacts for remote indication of ultraviolet trip levels.
- 12v DC Output: Provides power for a low-voltage audio alarm.

# INSTALLATION

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## CONVENTIONAL INSTALLATION

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- Each monitor is calibrated with its accompanying sensor probe. The serial number engraved on the sensor probe must match the serial number of the monitor. If installing more than one monitor, **DO NOT** interchange sensor probes.
  - Newer **GUARDIAN™** monitors have been calibrated for use with updated sensor probes and cannot be used with earlier model probes without factory recalibration.
  - Verify that the operating voltage and purifier model number indicated on the monitor are the same as indicated on the water purifier.
  - Older model water purifiers may require a reducing bushing to properly mount the newer sensor probes. If you are unsure whether the reducing bushing is required, contact the factory.
1. Unplug the water purifier from electrical outlet.
  2. If the purifier has been in service, shut off water supply to the purifier via the inlet and outlet shut off valves.
  3. Remove the translucent sight port plug from the center, sight port fitting of the chamber.

# INSTALLATION

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## CONVENTIONAL INSTALLATION CONT.

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**▲ CAUTION:** The quartz rod protrudes out past the probe cap, be careful not to strike rod against fitting when installing the probe.

4. Insert probe into the center, sight port fitting of the purifier chamber and tighten securely. The use of thread sealing tape or sealing compounds, and hand tools, for tightening, are no longer required.
  5. Slowly restore water supply to the water purifier, pressurize (keeping the outlet valve closed), and check for leaks. Once it is determined that there are no leaks, the inlet valve can be fully opened.
  6. Seat the monitor on top of the sensor probe; position the monitor as desired, and secure by tightening the set screws in the aluminum collar.
  7. Any optional accessories such as; audio alarms, solenoid valves or cabling should be connected to the appropriate sockets or to the appropriate terminals (DC version) before connecting the monitor to power.
  8. With the monitor switch in the "OFF" position, plug the monitor into a convenient electrical outlet, or if the monitor is a DC version, connect power terminals to an appropriate DC power source.
  9. Plug the water purifier into electrical outlet and restore power. Allow purifier to warm up for approximately 10-minutes. Warm up period allows germicidal lamp to reach full output.
  10. Switch the monitor "ON". The solenoid valve (if installed) should open and the "NORMAL" indicator light should come on. The analog meter should read between .3 and 1.00, or the digital meter should read between 30 and 100.
  11. Open outlet valve.
- If for any reason the ultraviolet intensity falls to an inadequate level, the display will indicate in the trip area, (generally less than .3 on the analog meter or 30 on the digital), the "LOW" indicator light will light, the optional audio alarm (if installed) will sound, and the optional solenoid valve (if installed) will close.

## GUARDIAN™ CONNECTIONS FOR SANITRON™ MODELS S5,000 AND LARGER

### ANALOG GUARDIAN™

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On SANITRON™ models S5,000 and larger, with solenoid valves installed, two ultraviolet monitors can be operated in series with each pair of purifiers connected in series. If solenoid valves are not installed, see "**Conventional Installation**" for installation and connection instructions.

1. Install sensor probe and monitor. See "**Conventional Installation**" for installation instructions; connect as follows.
2. Plug the first monitor into an electrical outlet.
3. Plug the second monitor into the "SOLENOID VALVE" socket of the first monitor.
4. Plug the solenoid valve into the remaining "SOLENOID VALVE" socket.

**Note:** In operation, the solenoid valve will close if the ultraviolet intensity in either purifier falls below normal operating limits. An audio alarm should be plugged into each monitor.

### DIGITAL GUARDIAN™

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On Sanitron™ models S5,000 and larger, with solenoid valves installed, multiple monitors may be connected to operate together to power a solenoid valve when both monitors are reading "NORMAL" and to operate external warnings when any monitor's readings are "LOW". If solenoid valves are not installed, and the audio alarm outputs are not shared, see "Conventional Installation" for installation and connection instructions.

- To link the output signals of two or more digital guardian™ monitors, consult our technical support staff.

# TRIP SET POINT

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- The **GUARDIAN™** is calibrated at the factory to the ultraviolet™ output of the lamp, and the water purifier for which the monitor will be used. The sensitivity should not be changed, except where necessary for wastewater applications, contact the factory with specific requirements.
- On the digital **GUARDIAN™**, two push buttons on the back of the monitor allow the user to display or adjust the trip set point. (The point at which the indicator lights change from red to green, or vice versa, and the relay contacts change over.)
- The digital display on the front of the monitor will show the relative ultraviolet intensity (0 to 100%). After pushing either button for less than a second, the display will show the trip set point before returning to the normal display.
- For wastewater applications, the operator may wish to adjust the trip set point. Pressing and holding the "UP" button allows the operator to increase the trip set point, pushing and holding the "DOWN" button allows the operator to decrease the trip set point.

# OUTPUTS

## OUTPUT SOCKETS™

Every **GUARDIAN™** monitor, both the analog and digital versions, comes equipped with two 3-pin convenience sockets. These sockets provide output power for an optional solenoid valve or time delay/solenoid valve combination and remote audio alarm.

The combined load on the “AUDIO ALARM” and “SOLENOID VALVE” output sockets (120v and 220v AC versions) should not exceed 3 Amps.

## DIGITAL GUARDIAN™ MODULAR REMOTE OPTIONS

The digital **GUARDIAN™** Ultraviolet Monitor is capable of supplying outputs for remote monitoring of the water purifier's operation. An RJ45 modular jack, located on the back of the monitor, is provided to access these outputs. An RJ45 modular cable and RJ45 modular jack adaptor are required to interconnect between the **GUARDIAN™** and the remote monitoring devices. The RJ45 modular cable and modular jack adaptor are not supplied and can be obtained from the factory, see “**Accessories**” or contact the factory with specific requirements.

**Table 1 - Digital GUARDIAN™ Modular Remote Options Connection**

Wire No.	Application	Modular Jack Wire Color	Modular Network Cable Wire Color
1	Trip Input - Master Trip Input	Blue	White/Orange
2	Dry Contact - Normally Closed (NC) (UV "NORMAL")①	Orange	Orange
3	Output Current / Low-voltage Audio Alarm - Common Negative	Black	White/Green
4	Dry Contact - Common	Red	Blue
5	Output Current - 4-20mA (+)	Green	White/Blue
6	Dry Contact - Normally Open (NO) (UV "NORMAL")①	Yellow	Green
7	Low-Voltage Audio Alarm - +12v (UV "NORMAL")①	Brown	White/Brown
8	Low-Voltage Audio Alarm - +12v (UV "LOW")②	White	Brown

- ① UV “NORMAL”: Ultraviolet lamp operating, ultraviolet intensity above trip set point and “NORMAL” indicator light, lit.
- ② UV “LOW”: Ultraviolet lamp may or may not be operating, ultraviolet intensity below trip set point and “LOW” indicator light, lit.

**Figure 1 - Digital GUARDIAN™ Modular Remote Options Connection**

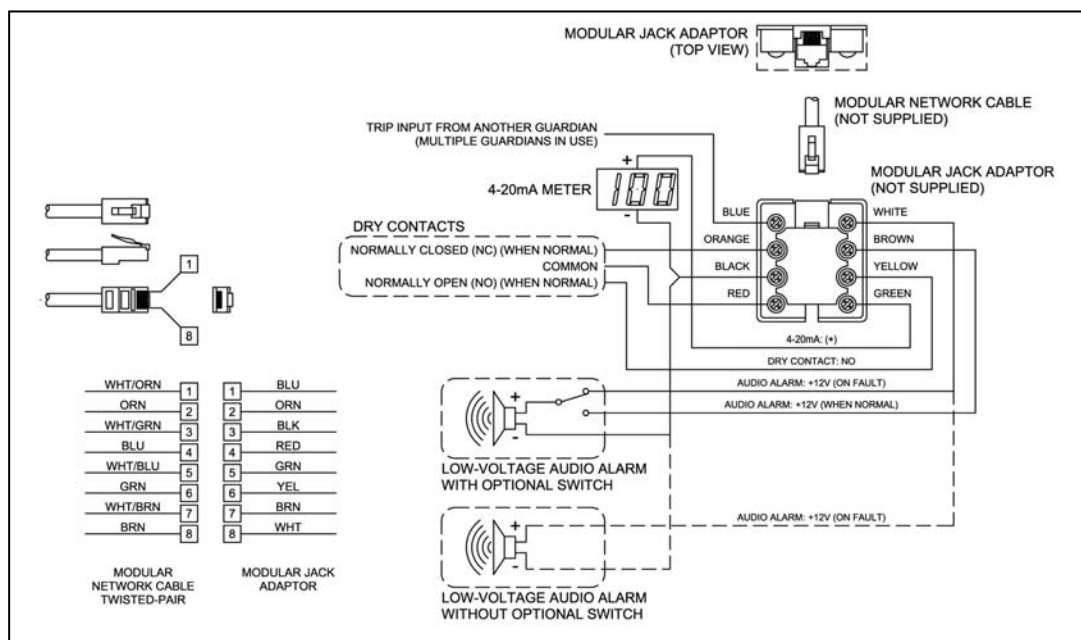


Figure 2 - Monitor Back (Analog GUARDIAN™)

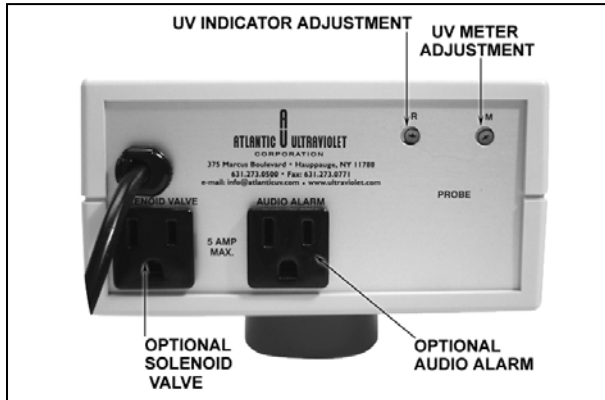
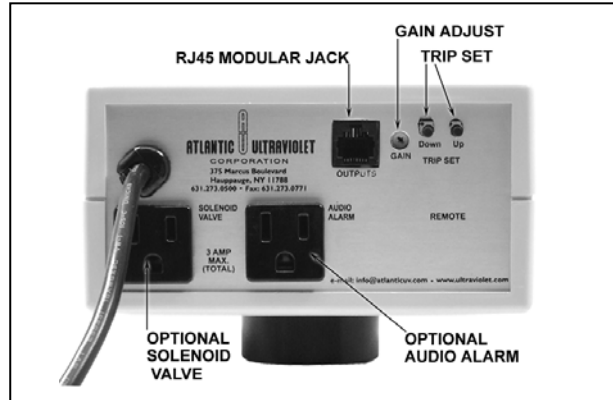


Figure 3 - Monitor Back (Digital GUARDIAN™)



## 4-20mA OUTPUT

The 4-20mA output supplies an output corresponding to the intensity meter, converted to a current between 4 and 20mA. The output is unaffected by reasonable line resistances, but the output must be displayed by a PLC, computer, or 4-20mA meter which can interpret the signal. A 4mA output will be displayed as 0% ultraviolet intensity and 20mA will be displayed as 100%.

## DRY CONTACTS

The Dry Contact output provides a Single Pole Double Throw (SPDT) output corresponding to the “NORMAL” or “LOW” intensity of the germicidal lamp. The contacts are rated at 50v 100mA maximum.

- “Common” will connect to “Normally Closed” (NC) when the display value is above the trip set point and the green “NORMAL” indicator light is lit.
- “Common” will connect to “Normally Open” (NO) when the display value is below the trip set point and the red “LOW” indicator light is lit.

## REMOTE LOW-VOLTAGE AUDIO ALARM

Although the “AUDIO ALARM” output socket provides power for a remote audio alarm, these alarms must be either 120v AC or 220v AC, depending on the AC voltage supplying the monitor.

A 12v DC 50mA maximum output is provided to power a remote low-voltage audio alarm.

An optional Single Pole Double Throw (SPDT) switch can be installed with the low-voltage audio alarm in a way that allows the audio alarm to be silenced during an alarm condition. The audio alarm will sound again when the normal condition is restored, this prevents the alarm from being accidentally disabled by the switch.

## DC MODELS

The operating power for a D.C. monitor may be supplied from a car, boat or truck battery. A relay, within the monitor can supply output voltages to power a solenoid, when the monitor reads a normal condition, and an alarm when the meter reads insufficient UV intensity. The voltage output for the solenoid or alarm is provided by the D.C. power input to the monitor. If it is required to have an isolated pair of contacts, the jumper may be removed between terminals 3 and 4, then the relay common contact is pin 4. Terminal 5 will be normally open and 7 will be normally closed when the meter is indicating a normal condition.

# TROUBLESHOOTING

## "LOW" INTENSITY READINGS

If, during the normal operation of the purifier, the intensity readings fall to an inadequate "LOW" level, take the following steps:

1. Clean the quartz sleeve; see the Owner's Manual supplied with the water purifier for the proper cleaning method, and note whether the intensity readings improve. **NOTE:** On water purifiers not equipped with a wiper mechanism, removal of the quartz sleeve is required for cleaning.
2. If after cleaning the quartz sleeve, there is no significant improvement in the intensity readings, it may be necessary to clean the quartz rod in the sensor probe, see the Owner's Manual supplied with the water purifier for the proper cleaning method.

**▲ WARNING: Germicidal ultraviolet rays are harmful to eyes and skin. DO NOT look directly at the germicidal lamp.**

3. Remove monitor and sensor probe. Place a small piece of common window glass over the sight port fitting and reapply power to the water purifier. Germicidal ultraviolet rays are absorbed by window glass and will not penetrate the glass.
4. Observe the condition of the lamp, quartz sleeve and water. The quartz sleeve should be clear and clean. The germicidal lamp should operate steadily, without flicker. The water in the purifier should be clear.
5. If the conditions of the lamp, quartz sleeve, and water are as stated, re-install sensor probe and monitor. Drain the water from the purifier, reapply power to the purifier and monitor, and check the readings with no water in the purifier.
6. If readings are "NORMAL", (1.0 on the analog version or 100 on the digital) with no water in the purifier, then there has been a change in water quality. Have water tested to confirm that it does not exceed maximum recommended concentration levels for use with the purifier. See the Owner's Manual supplied with the water purifier for the recommended concentration levels.
7. If you are still unable to correct the problem, consult our technical support staff.

## FUSE

A 5A, 5mm x 20mm, fuse protects the monitor from damage in the event that the audio alarm or solenoid valve outputs are short-circuited. The fuse can only be replaced by opening the case. NOTE: Opening the case may void the warranty, and should only be attempted after contacting our technical support staff.

# TECHNICAL SPECIFICATIONS

Table 2- Technical Specifications

	General Specifications	
<b>Voltage:</b>	120v +/-10%	
<b>Frequency:</b>	50/60Hz.(all models)	
<b>Output Current:</b>	3 Amps max.(all sockets)	
<b>Case Dimensions:</b>	6" wide x 4" high x 3 ¾" deep	
<b>Case Material:</b>	UL Rated ABS Plastic	
<b>Weight:</b>	2 lbs (approximate)	
	<b>GUARDIAN™ Analog Version</b>	<b>GUARDIAN™ Digital Version</b>
<b>Current:</b>	0.015A	0.025A (120v), 0.0125A (220v) (No load)
<b>Wattage:</b>	1.8 Watts	3 Watts (No load)
<b>4-20mA Output:</b>	NA	Sourced from <b>GUARDIAN™</b>
<b>Dry contact rating:</b>	NA	50v AC or DC. 100mA
<b>Low-Voltage Audio Alarm:</b>	NA	12v DC 50mA

# ACCESSORIES

Table 3 - Accessories

Part Number	Description
25-0844A	Modular Cable, 50 foot 8-way cable with modular plugs on each end.
30- 0122	Modular Jack: (8-Pin Surface Mount). With screw-terminal connection to access the output features. (See schematic diagram figure 1, Page 5).
35-0239	Cable Assembly: Coax BNC Male Connectors 50'
30-0100	Remote Monitor Extension Kit: 50' 8-way Cable including Connector.
30-0173	Audio Alarm: 120 - 240 VAC 50/60Hz
30-0172	Audio Alarm: 12v DC with 6 ft. lead included
30-1369B	Time Delay: 120v 50/60Hz 2-Minute (For Analog Guardians only).
30-0012B	Time Delay: 220v 50/60Hz 2-Minute (For Analog Guardians only).

# USER ASSISTANCE

Please read and become familiar with the contents of this manual before installing or using the **GUARDIAN™** Ultraviolet Monitor. If after reading the manual you still have questions, or concerns, regarding the installation or use of

the **GUARDIAN™**, contact our offices, weekdays between 8:30 am and 5:00 pm Eastern time, at:  
Atlantic Ultraviolet Corporation  
375 Marcus Boulevard  
Hauppauge, New York, 11788

Tel: 631.273.0500  
Fax: 631.273.0771

E-mail: [info@ultraviolet.com](mailto:info@ultraviolet.com)  
Website: [www.ultraviolet.com](http://www.ultraviolet.com)

For your convenience, record the following information below. The model and serial number can be found on a label located on the **GUARDIAN™** Ultraviolet Monitor. Keep this manual, along with proof of purchase handy when contacting our offices.

Purchased From:	Date:
Model:	Serial No.:

# WARRANTY

We warrant that this product will be free from defects in material and workmanship for a period of one year from the date of shipment thereof or the product's total rated life, whichever first occurs. Within the warranty period we shall repair or replace such products, which are returned to us with shipping charges prepaid, and which are determined by us to be defective. This warranty will not apply to any product, which has been subjected to misuse, negligence, or accident; or misapplied; or modified; or repaired by unauthorized persons; or improperly installed.

The Buyer shall inspect the product promptly after receipt and shall notify us at our main office in writing of claims, including claims of breach of warranty, within thirty (30) days after the Buyer discovers or should have discovered the facts upon which the claim is based. Failure of the Buyer to give written notice of a claim within the time period shall be deemed to be a waiver of such claim.

The provisions of the above warranty are our sole obligation and exclude all other remedies or warranties, expressed or implied, including warranties of merchantability and fitness for a particular purpose, whether or not purposes or specifications are described herein. We further disclaim any responsibility whatsoever to the customer, or to any person, for injury to person, damage to, or loss of property or value caused by any product which has been subjected to misuse, negligence, accident; or modified or repaired by unauthorized persons; or improperly installed.

Under no circumstances shall the Company be liable for any incidental, consequential or special damages, losses or expenses arising from the contract for this product, or in connection with the use of, or inability to use, our product for any purpose whatsoever.