

Sani-Ray®

GERMICIDAL ULTRAVIOLET FIXTURES

Models RRD-12-1, 2 & 4, RRD-18-1, 2 & 4, RRD-24-1, 2 & 4,
RRD-36-1, 2 & 4, RRD-48-1, 2 & 4 & RRD-64-1, 2 & 4



Installation, Operation & Maintenance

ATLANTIC  ULTRAVIOLET
CORPORATION®

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ultraviolet.com

Owner's Manual

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SAFETY WARNINGS

- All personnel should be alerted to the potential hazards indicated by the product safety labeling on this unit.
- The following conventions are used to indicate and classify precautions in this manual and on product safety labeling. Failure to observe precautions could result in injury to people or damage to property.



This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

DANGER

Danger indicates an **IMMINENTLY** hazardous situation, which, if not avoided, **WILL** result in death or serious injury.



This symbol/pictorial is used to identify an **ELECTRICAL SHOCK** or **ELECTROCUTION** hazard.

WARNING

Warning indicates a **POTENTIALLY** hazardous situation, which, if not avoided, **COULD** result in death or serious injury.



This symbol/pictorial is used to identify an **ULTRAVIOLET LIGHT** hazard.

CAUTION

Caution indicates a **POTENTIALLY** hazardous situation, which, if not avoided, **MAY** result in minor or moderate injury.



This symbol/pictorial is used to identify the need to wear approved ultraviolet resistant face shield.

CAUTION

Caution used without the safety alert symbol indicates a potentially hazardous situation, which, if not avoided, may result in property damage.






This symbol/pictorial is used to identify the need to wear protective gloves.

- Product safety labels should be periodically inspected and cleaned, as necessary, to maintain good legibility. Always replace illegible safety labels. Contact factory to obtain replacement safety labels.

SAFETY INSTRUCTIONS

WARNING: To guard against injury, basic safety precautions should be observed, including the following:

1. Read and follow **ALL** safety instructions.
2.  **WARNING: Avoid exposure to direct or strongly reflected germicidal ultraviolet rays. Germicidal ultraviolet rays are harmful to the eyes and skin.**
3. Intended for indoor use only.
4. Do not alter the construction or design.
5. Do not use this unit for other than its intended purpose, as described in this manual.
6. Do not mount under any source of moisture or condensation.
7. Do not mount this unit so that ultraviolet light is visible after installation.
8. **CAUTION:** Germicidal ultraviolet rays may break down plastic, rubber or other non-metallic materials, with inadequate resistance to ultraviolet. Shield all plastic, rubber or other non-metallic parts such as; plastic drain pans, wire insulation, flex ducts, humidifiers, filters, etc. which may be exposed to direct or reflected germicidal ultraviolet rays.
9.  **CAUTION: Do not operate without proper electrical ground.**
10. Do not operate the unit if the power cord and/or plug are damaged, or if any other damage to the unit is visible or suspected.
11. Utility power supplied, to the unit, **MUST** match power requirements listed on the unit label.
12.  **WARNING: Always disconnect power, to the unit and unplug, before performing any service or maintenance.**
13. Read and follow all notices and warnings on the fixture.
14. **SAVE THESE INSTRUCTIONS.**

PRODUCT APPLICATION

PRINCIPLE OF OPERATION

The **SaniRay**[®] design has been carefully conceived to provide adequate germicidal dosage for air stream or surface disinfection. The dosage, as it applies to ultraviolet disinfection, is a function of time, and the intensity, of ultraviolet radiation, to which the air stream or surface is exposed. The exposure time, in seconds, is the total time it takes the air to move through the ultraviolet field, produced by the germicidal lamp(s). Exposure time is related to the airflow rate; the higher the airflow, the lower the exposure time or the lower the airflow, the higher the exposure time. The UV intensity is the amount of energy, per unit time, emitted by the germicidal lamp.

CONSTRUCTION

The **SaniRay**[®] Germicidal Ultraviolet Fixtures consists of:

- Germicidal ultraviolet lamp(s), which deliver ultraviolet energy in the specific wavelength of 254 nanometers (**nm**) which effectively destroys airborne microbes including: virus, bacteria, and mold spores.
- Electronic ballast(s) capable of operating at 120v 50/60Hz.
- All electronics and wiring are housed in an enclosure constructed of stainless steel. Stainless steel construction provides strength, durability and will withstand most harsh environments.
- A polished reflector, whose design and specular aluminum construction, maximizes the exposure area and ultraviolet intensity.

LIMITATIONS

- The **SaniRay**[®] requires professional installation so all wiring complies with applicable state, local and national electrical and mechanical codes.
- **SaniRay**[®] requires knowledgeable planning for: location, installation, and supervision to prevent ultraviolet exposure of personnel.
- Overexposure to germicidal ultraviolet rays will result in the irritation of the eyes and reddening of the skin. For that reason, it is of the utmost importance that your ultraviolet application be carefully planned and implemented so as to avoid exposure, of personnel, to direct or reflected ultraviolet rays.
- The American Conference of Governmental Industrial Hygienists (**ACGIH**) has established a Threshold Limit Value (**TLV**) for occupational exposure to radiant ultraviolet energy.
- Currently the ultraviolet radiant exposure incident for unprotected eyes or skin should not exceed 0.2 microwatts per square centimeter (**μW/cm²**) at 254 nanometers (**nm**) for an eight (8) hour period.
- Safety and maintenance procedures should be implemented to prevent accidental exposure of personnel. All work performed in the irradiated space must be monitored to insure that it does not adversely impact the safety or effectiveness of the installation.
- Personal protection equipment is required only when entering the irradiated space with the germicidal lamp(s) operating. Personal protection equipment would include skin and eye protection such as gloves, long sleeves with no gaps between cuff and gloves, and an ultraviolet resistant face shield.

UNPACKING

- Remove the **SaniRay**® Germicidal Ultraviolet Fixture from its shipping carton.
- Atlantic Ultraviolet Corporation takes all possible precautions when packaging this fixture to prevent damage. Carefully inspect the fixture for damage, report all damage immediately. Do not assemble or operate if there is any damage, visible or suspected.
- Germicidal lamp(s) are packed separately, to ensure maximum protection for the lamp(s). Keep the lamp(s) aside until ready for installation.
- Carefully inspect all packing materials to prevent the loss of accessories, mounting hardware, spare parts or instructions.
- Do not discard packing materials until fixture is assembled and check out is complete.

INSTALLATION

FIXTURE PLACEMENT

Proper fixture placement is essential. To ensure safe and effective operation, the location should:

- Have an appropriate power source matching power requirements listed on the fixture label.
- Not be mounted under any source of moisture or condensation.
- Prevent exposure of any plastic, rubber or other non-metallic materials, with inadequate resistance to ultraviolet. If necessary, shield all plastic, rubber or other non-metallic parts using aluminum tape, or equivalent ultraviolet resistant material.
- Be free of any components that would be damaged by or interfere with the installation.
- Be easily accessible and allows enough clearance for routine cleaning or maintenance.

Figure 1 - SaniRay® RRD-xx-1S / RRD-xx-2S

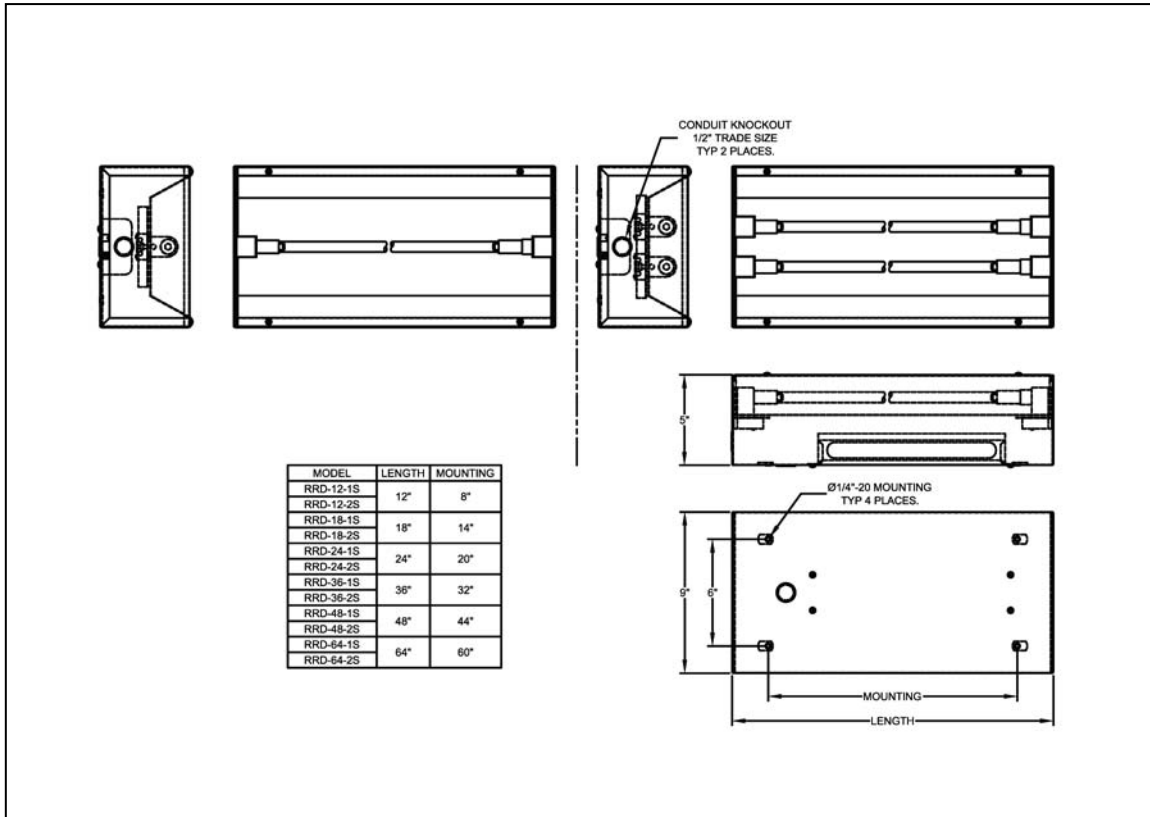
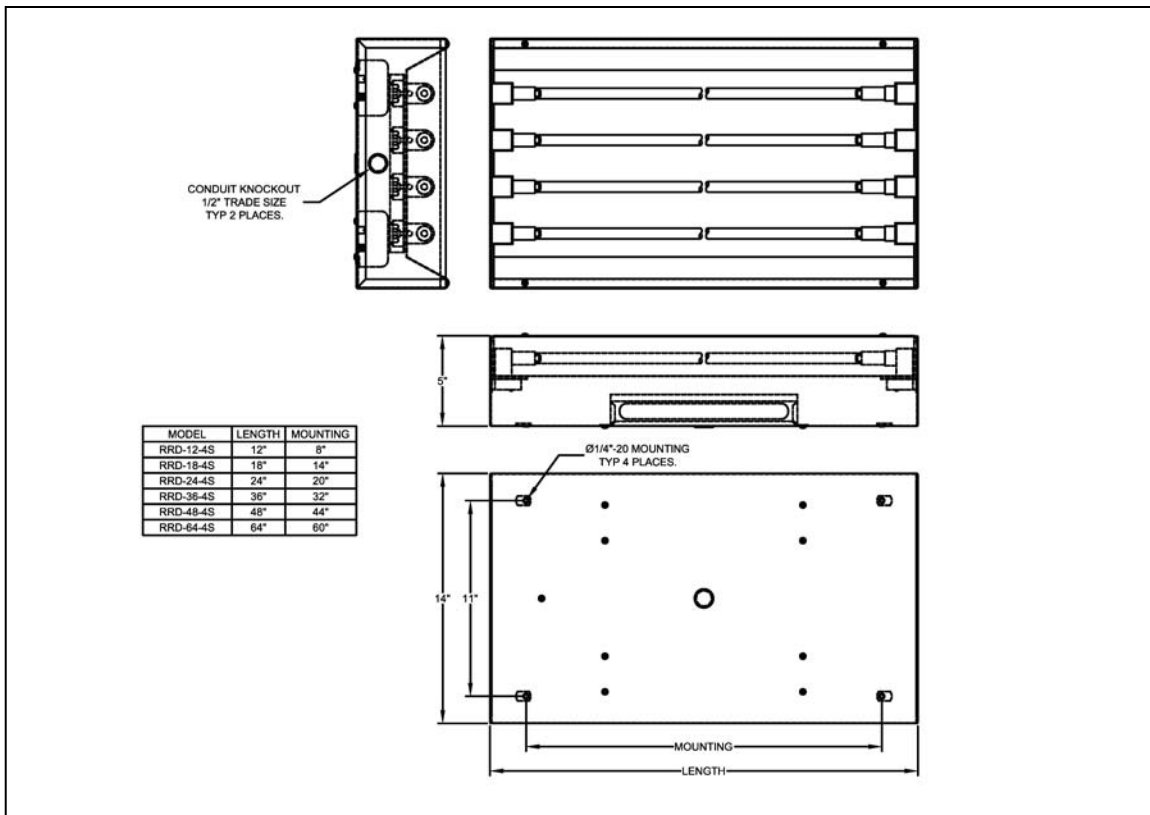


Figure 2 - SaniRay® RRD-xx-4S



INSTALLATION

1. All standard **SaniRay**[®] fixtures and **SaniRay**[®] fixtures not equipped with the optional power cord;
 - Require professional installation so all wiring complies with applicable state, local and national electrical and mechanical codes.
 - Require removal of the reflector to complete input power wiring.
 - Require suitable wire nuts or other interconnecting method to connect the **SaniRay**[®] ballast wiring to utility input power wiring.
 - Require an adequately sized ground wire. An 8-32UNC stud, located inside the chassis, is provided for securing the ground wire to the **SaniRay**[®] chassis.
 - Have two ½" trade size knockout plugs, for standard electrical fittings.

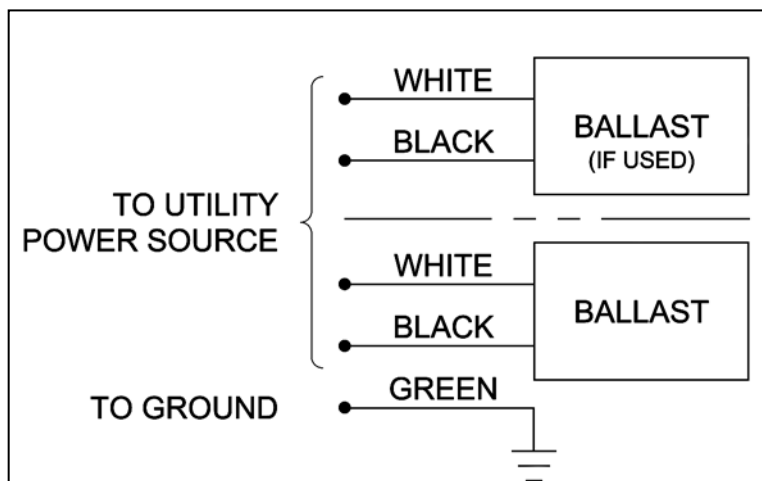
▲ CAUTION: Ultraviolet lamps are easily damaged and may cause injury if broken. Exercise care when handling lamps.

2. After fixture is mounted and wired, install lamp(s). To install; insert lamp pin into spring-loaded lamp holder. Carefully press lamp against the spring-loaded lamp holder. Align upper lamp pin with stationary lamp holder. Slowly ease the pressure until lamp is fully seated in lamp holders.
3. Verify that the lamp is properly seated.
4. Repeat until all lamps have been properly installed.
5. Moisten a clean, lint-free cloth with alcohol, or suitable glass cleaner, and clean lamp(s).
6. Apply power to the **SaniRay**[®] fixture or, if supplied with optional power cord, plug into properly grounded, electrical outlet.

▲ WARNING: Avoid exposure to direct or strongly reflected germicidal ultraviolet rays. Germicidal ultraviolet rays are harmful to the eyes and skin.

7. Verify operation by viewing lamp(s), use of personal protection equipment is required. If the fixture is not operating properly, go to “**Troubleshooting**” section.
8. The installation should also be inspected using a sensitive ultraviolet meter, to insure that the ultraviolet radiant exposure of personnel is within acceptable limits.

Figure 3 - Input Power Wiring Diagram



OPTIONAL ACCESSORIES

1. ArmorLite™ Safety Shield

Protective coating applied to *STER-L-RAY™* Lamps

Insures protection by eliminating the dangers associated with fragments of broken quartz and mercury contamination.

2. SENTINEL™ Remote Lamp Indicator

Monitors lamp operation of 1, 2 or 4 lamp ultraviolet fixtures, and can be mounted up to 25-feet from the fixture. Additional 25-foot extension cables are available.

4. Zenith™ Ultraviolet Meter

A sensitive, hand-held, ultraviolet meter; used to check the intensity of aging ultraviolet lamps.

- Other accessories, such as; handles, mounting legs, brackets for ceiling mounting, power cords and ON/OFF switches, are available contact our application specialists with your requirements.

PRECAUTIONS

- Procedures should be adopted to insure that the **SaniRay®** is disconnected from power whenever personnel work in the irradiated space. Personnel who work in and around the fixture should be briefed on the precautions to be observed.
- If there are any doubts or concerns about the safety or the effectiveness of the installation, or if a sensitive ultraviolet meter is required, please contact our application specialists.

TECHNICAL ASSISTANCE

Atlantic Ultraviolet Corporation maintains a qualified team of application specialists that can provide any technical assistance, which may be required during the use of this fixture. For any questions, concerns, or technical assistance, regarding this fixture or any of our other products, contact our application specialists. Contact options can be found in the “**User Assistance**” section of this manual.

MAINTENANCE

- The **SaniRay®** is designed to operate with a minimal amount of maintenance.
- A regular cleaning schedule of the germicidal lamp(s) and interior reflector should be established, and carefully maintained, based on visual inspection and experience. The time between cleanings will vary with the conditions surrounding each installation. It is recommend that the ultraviolet lamp(s) be cleaned whenever dust deposits are observed on lamp(s).
- Dust can accumulate on the ultraviolet lamp(s). Dust particles absorb ultraviolet radiation reducing the effectiveness of the **SaniRay®**.
- The germicidal ultraviolet lamp(s) used in the **SaniRay®** have a manufacturer's rated average effective life of 10,000 hours. Lamps may operate longer than their rated effective life, but the reduction in ultraviolet output will make it impractical to use past the manufacturer's rated life. For maximum efficiency lamp replacement is recommended every 10,000 hours of operation.
- Unless lamp replacement is due to failure or breakage, it is recommended that all lamps be replaced at the same time.

GERMICIDAL LAMP CLEANING OR REPLACEMENT

▲ WARNING: Always disconnect power, to the SaniRay® fixture before performing any service or maintenance.

1. Disconnect power to the SaniRay®

▲ CAUTION: Ultraviolet lamps are easily damaged and may cause injury if broken. Exercise care when handling lamps.

2. Remove lamp(s), carefully press lamp against the spring-loaded lamp holder, when upper lamp pin clears the stationary lamp holder pull lamp out, and away from SaniRay® fixture.
3. Moisten a clean, lint-free cloth with alcohol, or suitable glass cleaner, and clean lamp(s).
4. When lamp(s) have been removed, cleaned and safely set aside, remove any loose dust or dirt from the interior of the fixture with a soft dry cloth, or vacuum.
- The reflector of the SaniRay® is constructed from specular aluminum, a highly reflective mirror like material, used to maximize ultraviolet intensity.
5. To remove any dust, dirt, fingerprints, smears, etc, from the outer surfaces of the reflector, moisten a clean, lint-free cloth with alcohol, or suitable glass cleaner and wipe down the reflector. Buff out any streaks, left from the cleaning, using a soft dry cloth.
6. Install lamp(s), insert lamp pin into spring-loaded lamp holder. Carefully press lamp against the spring-loaded lamp holder. Align upper lamp pin with stationary lamp holder. Slowly ease the pressure until lamp is fully seated in lamp holders.
7. Verify that lamp(s) is properly seated.
8. Repeat until all lamps have been cleaned and properly reinstalled.
9. Restore power to the SaniRay®.
▲ WARNING: Avoid exposure to direct or strongly reflected germicidal ultraviolet rays. Germicidal ultraviolet rays are harmful to the eyes and skin.
10. Verify operation by viewing lamp(s), use of personal protection equipment is required. If the fixture is not operating properly, go to “**Troubleshooting**” section.

BREAKAGE

▲ CAUTION: Broken Quartz is SHARP. Wear protective gloves when handling broken ultraviolet lamps. In the event of breakage, **DO NOT use a household vacuum cleaner to pick up fragments of the lamp.** Sweep up debris into a plastic bag and dispose of properly.

DISPOSAL OF MERCURY ADDED LAMPS

Germicidal ultraviolet lamps, like standard fluorescent lamps contain small amounts of mercury. Mercury added lamps should not be placed in the trash. Dispose of properly.

For further information regarding the disposal and recycling of lamps containing mercury, along with Federal and State requirements visit <http://www.lamprecycle.org>. Product Data Sheets for germicidal ultraviolet lamps can be found in the “PDF Library for Ster-L-Ray™ Germicidal Ultraviolet Lamps” section of <http://www.ultraviolet.com>.

TROUBLESHOOTING

⚠ CAUTION: Always disconnect power to the unit, before performing any service.



Use **personal protection equipment**, such as gloves; long sleeves with no gaps between cuffs and gloves, and ultraviolet resistant face shield, if troubleshooting **SaniRay®**.

- IMPORTANT:** This fixture is to be serviced **ONLY** by qualified, and appropriately licensed, personnel.

Table 1 - Troubleshooting

Problem	Possible Cause	Corrective Action
Fixture not operating.	No electrical power...	Verify that the fixture is connected to a live power source.
	Power connections, to fixture, loose or disconnected...	Verify power connections to fixture are fully engaged.
	Ballast	Disconnect the fixture from utility power. Replace lamp.
Germicidal lamp not operating.	Lamp(s) not installed...	Install lamp(s).
	Germicidal lamp(s) not properly seated...	Confirm connection of lamp and lamp holder, make sure connection is tight and lamp is making full contact with lamp holder.
	Germicidal lamp(s) faulty...	Swap suspect lamp, with lamp known to be good. If suspect lamp does not operate, replace lamp
	Ballast not functioning...	Locate ballast and replace.

TECHNICAL SPECIFICATIONS

Table 2 - Technical Specifications

Model:	RRD-12			RRD-18			RRD-24			RRD-36			RRD-48			RRD-64		
	-1	-2	-4	-1	-2	-4	-1	-2	-4	-1	-2	-4	-1	-2	-4	-1	-2	-4
Volts: ①	120v			120v			120v			120v			120v			120v		
Hertz:	50/60Hz			50/60Hz			50/60Hz			50/60Hz			50/60Hz			50/60Hz		
Amps (120v):	.08A	.16A	.32A	.14A	.28A	.56A	.21A	.42A	.84A	.33A	.66A	1.32A	.42A	.84A	1.68A	.54A	1.1A	2.2A
Length:	12"			18"			24"			36"			48"			64"		
Height:	5"			5"			5"			5"			5"			5"		
Width:	9"		14"	9"		14"	9"		14"	9"		14"	9"		14"	9"		14"
Lamp Quantity:	1	2	4	1	2	4	1	2	4	1	2	4	1	2	4	1	2	4
Lamp Model:	G12T6L			G18T6L			G24T6L			G36T6L			G48T6L			G64T5L		
Power Consumption: ②	10w	20w	40w	17w	34w	68w	25w	50w	100w	39w	78w	156w	50w	100w	200w	65w	130w	260w
Ultraviolet Output: ③	3.1w	6.2w	12.4w	5.8w	11.6w	23.2w	8.5w	17w	34w	13.8w	27.6w	55.2w	19.3w	38.6w	77.2w	25w	50w	100w
Ave. Effective Life: (Hrs)	10,000			10,000			10,000			10,000			10,000			10,000		

① 230v 50/60Hz units are also available. Consult Atlantic Ultraviolet Corporation for specific voltage requirements.

② Wattage is lamp watts only and does not include ballast loss.

③ Ultraviolet output at 254nm at 100 hours and 80°F (approximate).

REPLACEMENT PARTS

Table 3 - Replacement Parts

MODEL NO.	Germicidal Lamp		120v Ballast		230v Ballast	
	PART NO.	QTY	PART NO.	QTY	PART NO.	QTY
RRD-12-1S	05-1500-R	1	10-0137	1	10-0136	1
RRD-12-2S		2		2		2
RRD-12-4S		4		4		4
RRD-18-1S	05-1340-R	1	10-0137	1	10-0136	1
RRD-18-2S		2		2		2
RRD-18-4S		4		4		4
RRD-24-1S	05-1348-R	1	10-0137	1	10-0136	1
RRD-24-2S		2		2		2
RRD-24-4S		4		4		4
RRD-36-1S	05-1343-R	1	10-0137	1	10-0136	1
RRD-36-2S		2		2		2
RRD-36-4S		4		4		4
RRD-48-1S	05-1334-R	1	10-0137	1	10-0136	1
RRD-48-2S		2		1		2
RRD-48-4S		4		2		4
RRD-64-1S	05-1338A-R	1	10-0091	1	10-1027	1
RRD-64-2S		2		1		2
RRD-64-4S		4		2		4

Other replacement parts are available. Consult the factory with specific requirements.

USER ASSISTANCE

Atlantic Ultraviolet Corporation makes every effort to ensure that the **SaniRay**[®] Germicidal Ultraviolet Fixtures are products of superior quality and workmanship. This manual describes the installation, operation and maintenance of the **SaniRay**[®] Germicidal Ultraviolet Fixtures.

Please read and become familiar with the contents of this manual before installing or using this unit. If after reading the manual you still have questions, or concerns, regarding the installation or use of this unit, contact our offices, week-days 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
Website: www.ultraviolet.com

Please fill out and return the Owner Registration card immediately. If the card is missing from this manual, please contact any of our application specialists to obtain one.

Atlantic Ultraviolet Corporation takes all possible precautions when packaging equipment to prevent damage. Carefully inspect and report all damage. **Do not** install damaged equipment. Follow all instructions on any labels or tags. Carefully inspect all packing materials before discarding to prevent the loss of accessories, mounting hardware, spare parts or instructions.

For your convenience, record the following information below. The model and serial number can be found on a label located on the **SaniRay**[®] Germicidal Ultraviolet Fixtures. 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.

PATENT NOTICE

No attempt has been made to determine the patent status of applications illustrated or described in this publication. Inclusion in this publication of any design or method of use, which may be patented, is not to be construed as promoting or sanctioning unauthorized use.