

Guide to the Atlantium Hydro-Optic UV System RZ163 series

**All-in-One Controller
For General Applications**

HP/UHP Lamps compatibility

Ultrasonic Cleaner Option

**Supported Electrical Voltage:
400/440/480VAC**

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IMPORTANT NOTICE

It is strictly forbidden to alter/change the system hardware in any way.

Any change made without written permission from Atlantium shall void the warranty.



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Validations and certifications completed:



Revision History

Revision #	Description	Date
001	AIO version based on previous Control Module versions.	Jun 2018
002	Updated screens, corrected images and text for electrical.	Oct 2018
003	Removed old drawings. Added AIO conditionals. Added images for Connection Box cards.	Nov 2018
004	Unified files for General, Aquaculture, and Power Plant applications	Jan 2019
005	Added: Electrical requirements for locations with 440Y/254 VAC 3~ +PE 50/60HZ or 480Y/277 VAC 3~ +PE 50/60HZ	Mar 2019
006	Added: compatibility for Ultra High Power lamps	June 2019
007	Update to entire manual to address gaps and provide clarifications Remove references to specific lamp numbers. Control software version AIO 2.1.1-B40 Application of EC180076/55/19; FCO180106	June 2020
008	Updated Modbus tables + Minor modifications	June 2021
009	Logo changes	Nov 2021



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1 Introduction

Congratulations on purchasing an Atlantium **RZ163 series** Hydro-Optic UV Water Treatment System. This user guide provides you with clear guidelines for preparing the site for installation, correct installation and software configuration procedures, and a good understanding of all system functions for maximum benefit from your Atlantium Unit.

The Atlantium **RZ163 series** systems guarantee water bio-security at optimized energy efficiency, and meet EPA criteria for providing bio-security.

Atlantium systems are designed to provide applications for the following Industries:

- | | |
|--------------------|-----------------|
| ■ Aquaculture | ■ Bio-Pharma |
| ■ Fish Hatcheries | ■ Bottled Water |
| ■ Dairy | ■ Beverages |
| ■ Municipal | ■ Breweries |
| ■ Power Generation | ■ Aquariums |
| ■ Ultra Pure Water | ■ ...and more |
| ■ Marine | |

Applications

- **Water Disinfection** - meets US Environmental Protection Agency (EPA) criteria for providing bio-security
- **Chlorine Replacement** - provides a chemical-free alternative to chlorine for treating source water. It easily inactivates microorganisms including those that are resistant to chlorine and heat.
- **Non-Thermal Pasteurization** - replaces energy-intensive heat pasteurization of water - meets US FDA criteria for pasteurized equivalent water.
- **Post-Active Carbon** - protects against breakthroughs and reduces bio-fouling downstream. Significantly reduces the frequency of aggressive cleaning, and lengthens the lifespan of RO membranes.
- **Dechlorination / Chlorine Destruction** - efficient, clean, non-chemical alternative to activated carbon filter or sodium bio-sulfite. Reduces risk, better protection, lower operating expenses.
- **Ozone Destruction** – efficient, cost-effective solution.
- **Ultra-pure water (UPW)** - efficient, cost-effective solution that complies with the uncommonly stringent specifications for *high-purity water*.
- And more....

Patented Innovative Technology

- Field proven worldwide, used by world-leading industries
- Based on Hydro-Optic engineering that optimizes UV efficiency and enables uniform dose distribution
- Medium Pressure High Intensity lamps provide a UV dose in the 200 to 454 nm spectrum which is much broader than low pressure UV (which yields a dose in the 254 nm range only). Hydro Optic Disinfection UV (HOD UV) is effective in cold & warm water and compromises microorganisms' repair mechanisms for long-term bio-security.
- Guaranteed required dose for complete microbial inactivation.
- Sustainable operation provides the security and stability that the industry demands.
- Uses "total internal reflection" of UV light within the outer quartz sleeve of the reaction chamber, enabling more effective treatment at a lower dose.

- Some enclosures/components as noted on the Atlantium main website under "About" <https://atlantium.com/about.html> include:
 - Nema 4x rating for indoor and outdoor use, protection against windblown dust and rain, splashing water and hose directed water.
 - IP56 rating protection from limited dust ingress. Protected from high pressure water jets from any direction

Real-time Monitoring and Control

- The sophisticated data logging system enables traceability over time of all monitored data.
- It maintains a database and provides detailed analysis and reporting functions that can be used for trend analysis or proof of compliance.

Guaranteed Dose Delivery

- Unique monitoring & control software ensures that required UV dose is being delivered at all times.
- Dedicated UV Intensity Sensor (UVIS) for each lamp for real-time monitoring.
- Automatically adjusts lamp power based on real-time analyses of critical parameters such as water flow rate, lamp intensity and water Transmissivity to UV (UVT).
- A user-friendly interface displays the monitored data in real-time including the actual delivered dose as well as the other critical parameters, so you can verify that you are actually getting the dose that you need.

Lower Electrical Consumption

- Optimized light distribution, through Hydraulic and Fiber optic principles applied to the UV system design, enable:
- Optimized UV power and uniform dose distribution.
- Efficient use of power, with lower electrical consumption than low-pressure based UV systems.

Minimum Down Time

- True in-line system.
- Quick lamp replacement (4 minutes) and better safety.

Integrates with your Process Line

- Field proven installation.
- With no additional software, you can integrate the Atlantium system into your current process using Atlantium's customizable settings.

Regulatory Compliance

- Meets the most stringent regulatory criteria including US Food and Drug Administration (FDA) and EPA.
- Automatically generated reports at the push of a button for proof of compliance and traceability.
- Provides validated minimum required dose and not average dose.

Efficiency and Easy Maintenance

- For total efficiency and dependable performance, the Atlantium system monitors the lamps for performance, ensuring that a lamp is replaced only when absolutely needed.
- By following the easy preventive maintenance programs, you keep the system working at peak performance.
- The **Viewport** allows you to safely peek at what's going on inside.

For further information about Atlantium products and technologies, visit our website at <https://atlantium.com/>

1.1 Before You Begin

Before you begin using this product, or any installation or service operation, please read the following safety information:

- Attention to these warnings helps prevent personal injuries and damage.
- It is your responsibility to use the product in an appropriate manner.
- This product is designed for use solely indoors.
- You are responsible if the product is used for other than its designated purpose or in disregard of Atlantium instructions. Atlantium shall assume no responsibility in any way for such use of the product.
- The product must be used for its design purpose, based on its product documentation and within its performance limits.
- Using the product requires technical skills. It is therefore essential that only skilled and specialized staff or thoroughly trained personnel be allowed to use the product.
- Keep the basic safety instructions and the product documentation in a safe place and pass them on to the users.
- Applicable local or national safety regulations and rules for the prevention of accidents must be observed at all times.

1.2 Tags and Their Meaning

The following indicators are used in the product documentation to warn the reader about risks and dangers



DANGER!

Indicates a hazardous situation which, if not avoided, will result in death or serious injury.



WARNING!

Indicates a hazardous situation which, if not avoided, could result in death or serious injury.



CAUTION!

Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.



ATTENTION!

Indicates the possibility of incorrect operation which can result in damage to the product.



Indicates a hazardous situation involving electricity which, if not avoided, can result in death or serious injury.



Indicates a hazardous situation involving Electrostatic Discharge (ESD), which, if not avoided, can result in damage to the product.



Indicates a hazardous situation involving UV light which, if not avoided, can result in death or serious injury.



Indicates a hazardous situation involving a hot surface which, if not avoided, can result in death or serious injury.



Indicates a hazardous situation involving working in an enclosure with moving parts, which if not avoided, can result in serious injury to the hands.



Indicates a hazardous situation involving mercury, a poisonous material which, if not avoided, can result in death or serious injury.



Indicates a hazardous situation involving caustic chemicals which, if not avoided, can result in death or serious damage.



Indicates that components or equipment are heavy and care is to be taken to avoid lifting incorrectly. Incorrect lifting can be dangerous to the personnel lifting and may result in dropping and damaging the components or equipment.



Indicates that components or materials to be discarded are classified as hazardous waste and must be disposed of appropriately.



Indicates information related to installation, safety or use of system.



2 About the RZ163 series Systems

The Atlantium **RZ163 series** Hydro Optic Water Disinfection System includes a disinfection chamber with one or more UV lamp chambers, a plug-style Ballast Module for each lamp, and a **Control Module**. The quartz disinfection chamber takes advantage of **Total Internal Reflection** to reflect UV light back into the water to uniformly distribute the UV dose. Water flows unimpeded, resulting in low head-loss.

The specially designed short (Arc length 155mm/6.1 inch) Medium Pressure High Intensity (MPHI) lamps deliver a broad spectrum disinfection that irrevocably damages DNA/RNA and proteins in microorganisms. Incorporation of Atlantium Quick Connect MPHI lamps within a thick quartz sleeve significantly reduces risk of breakage and its consequences. A UV Intensity Sensor (UVIS) provides continuous measurement of each lamp's output.

In addition, a UVT Analyzer reports and tracks the water transparency.

2.1 The RZ163 series units

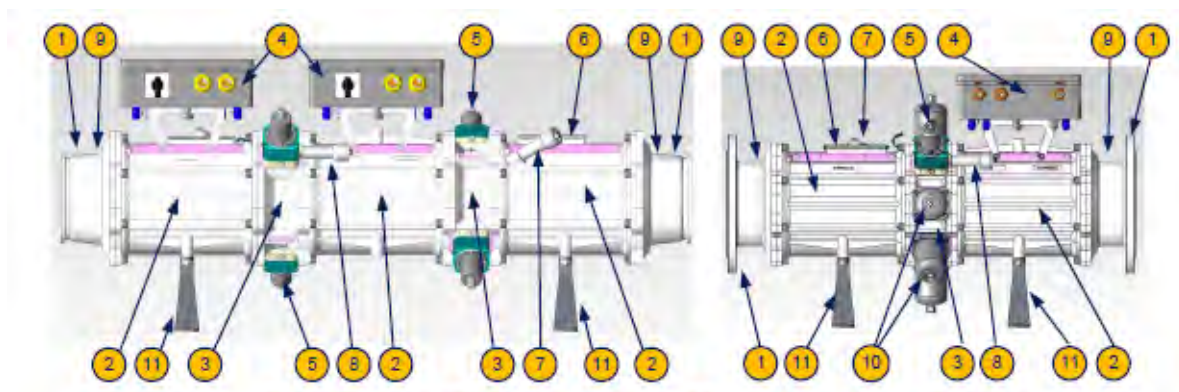


Figure 2-1: **RZ163-12, RZ163-11** Units

Table 2-1: Components key

#	Item	Description
1	Flange or Ferrule/Tri-Clamp interface	The unit connects to the facility piping via a flange interface as per customer order
2	Quartz Disinfection Chamber	The quartz pipe in which the disinfection occurs
3	Lamp Chamber	The chamber that holds the lamp and optional Cleaning system
4	Connection Box	The box that sits on top of each lamp unit and holds the electrical circuitry

#	Item	Description
5	Lamp Arc length (mm / inch): Lamp total length (arc + ceramic ends) (mm / inch):	Lamp encased in quartz tube assembly 155 / 6.1 322.8 / 12.71
6	Viewport	The UV-proof window that enables safe viewing of the interior of the working unit.
7	UVT Analyzer	The sensor that measures the UV transmittance through the water. Together with the UV Intensity sensor and the Control Module, it analyzes, tracks and reports the water quality.
8	UV Intensity Sensor	The sensor that measures the UV intensity in the Lamp chamber and feeds it to the real time dose calculation.
9	Lifting strap area	The place designated to fit lifting straps to lift and transport the Unit
10	Ultrasonic Cleaning system	A sophisticated cleaning system for the quartz tube utilizing ultrasonics
11	Triangle Support Brackets	Brackets that are used to support and balance a unit anchored to customer supplied supports or surface that hold up the unit at least 750mm / 29.5inch above the floor, see ICD.

2.2 RZ163 series Interface Control Drawings (ICD)

For full specifications of the supplied system, consult the accompanying **ICD** files.

2.3 Atlantium System Footprint

The Atlantium system has a small, compact footprint that facilitates in-line installation in any process train.

Table 2-3: **RZ163 series** Physical Specifications

Item	Details	
Number of lamps	Dependent on model supplied: RZ163-1X where X= No. of Lamps e.g. RZ163-12 refers to 2-lamp model Refer to ICD	
Atlantium Unit Construction Materials:		
Casing:	Electro-polished stainless steel 316	
Quartz Chamber:	Optional**: Super-Duplex stainless steel UNS S32750	
	High grade fused silica (Quartz)	
Dimensions (length, width, volume, weight)	Refer to ICD	
Standard Pipe Interface Options:	Flange	Ferrule/Tri-Clamp

Item	Details	
	DIN2576 DN150 PIN16 ANSI B 16.5 6" 150lb	6" ASME BPE / 3A (A4 Standard)
Flange inner Ø Diameter (mm / inch)	161 / 6.34	146.8 / 5.78
Flange Outer Ø Diameter (mm / inch)	279.4 / 11	166.8 / 6.57
Bolt Circle Diameter	241.3 / 9.5 *	N/A
Bolt Hole Diameter	22.4 / 0.88	N/A
Number of Bolts*	8	N/A
Bracket Nut / Bolt Size (mm / inch)	13 / 0.51	
Service Clearance on Sides (mm / inch)	750 / 29.53	
Minimum Height above Floor Level (mm / inch)	752 / 29.6	
Maximum Working Pressure	7 Bars / 102 psi	
Maximum Flow Rate	Application dependent	
Distance between Bolt Holes on Supports:	Refer to ICD	

* When tightening bolts to connect piping, use a torque wrench to apply correct and uniform torque, according to accepted standards and practices.

** Super-Duplex is available as an alternative construction material for use with seawater. Consult your Atlantium representative for details.

2.4 The Ballast Module

Ballast Module/Plug-style is a water-proof easy plug-n-play box that contains the ballast power supply and related circuitry. Its convenient plugs make it easy to service. Its modular design makes it serviceable and flexible and easier to fit into an existing plant. A Ballast Module is supplied for each lamp in the Atlantium system. Its heat sink frame complies with industry standards. It can be mounted on the wall or other suitable anchoring point. The location of the Ballast Module/Plug-style must be designated according to the maximum distance needed for positioning the **Cable Harness** of the Atlantium Unit. The **Cable Harness** is **5m / 16.4'** (also available in **10m / 32.8'** length).

For systems with more than one lamp, the Ballast Modules can be positioned one above the other or next to one another. The Ballast Module must have at least 300 mm (11.8 inches) of clearance on its right and left sides for proper ventilation and 300mm (11.8 inches) of clearance on the bottom for cable routing. For more details on mounting, see **Installing the Ballast Module(s)*** on page **54**.

Table 2-4: Ballast Module Physical Details

Physical	Details
Dimensions (H x W x D) (mm/inch): Ballast Module C (Active Cooling)	487/ 19.16 x 348 / 13.7 x 114.5 / 4.51
Weight (Kg/Lb): Ballast Module C	6.5 / 14.3
Heat Load per Ballast Module: (For calculating space cooling requirements) Standard Lamps High-Power Lamps Ultra High-Power Lamps	85W 115W 151W
Operating voltage range of ballast	380 VAC to 578 VAC
Protection Category:	IP 56 (Protected from limited dust ingress. Protected from high pressure water jets from any direction).

2.5 Electrical Usage

2.5.1 Residual Current Device

In addition to the circuit breakers defined in the electrical ICD provided with the **RZ163 series** system, you should install a Type A Residual Current Device (RCD) as extra protection for your Atlantium system, while ensuring that local safety regulations are complied with.

Atlantium recommends, for example, using ABB P/N F204 A-xx/0.1 RCD, where xx represents value of current that is at least 25% higher than the current rating of the system, provided in the electrical ICD.

When choosing the proper RCD take into account also the mains voltage and phase configuration of your locale.



The RCD should be tested regularly as per the manufacturers recommendations.

2.5.2 Mains power supply up to 480VAC

Atlantium systems require connection to mains power supplies (PS) of 400 to 480 VAC. If the local mains supply is outside of these limits, transformers or other adapters must be installed in order to provide the necessary PS of $\leq 480\text{VAC}$.



Throughout this User Manual, it is assumed that the Atlantium system is connected to a PS of 400 - 480VAC.

The tables below detail the Atlantium Unit's electrical usage and power consumption.

Table 2-5: **RZ163 series** Unit Electrical Usage

Electrical	Details
Main power source	400 VAC 3~ + N + PE 50/60Hz 440Y/254 VAC 3~ + PE 50/60Hz 480Y/277 VAC 3~ + PE 50/60Hz
Second power source (only for 440-480 main source)	100-240 VAC 1ph 50/60Hz
Maximum allowed voltage tolerance	$\pm 10\%$ from the nominal voltage

2.5.3 Power, Voltage and Grounding Requirements

The table below details the power consumption for the Atlantium system, according to local mains voltage.



All circuit breakers are sized according to the tables below and are to be type C.

The values in the table below are for Standard (S), High-Power (HP) or Ultra-High-Power (UHP) lamps in the **RZ163 series**.



- The power system must be solidly grounded where the nominal line to ground voltage does not exceed 277V.
- The system is not appropriate for use on corner grounded delta, resistance grounded and ungrounded power systems.
- If the power system at the site is not appropriate, you can create an appropriate power feed by using a 1:1 isolation transformer (by grounding the middle point of the star configuration at the secondary side of the transformer).

Table 2-6: Power Consumption for Standard, HP and UHP **RZ163** Systems

# of lamps			n = 1 to 24 lamps	n = 1 to 24 lamps	n = 1 to 24 lamps
Total nominal lamps power (kW):			Standard lamps n x 1.7	High-Power lamps n x 2.3	Ultra-High Power n x 3.0
Cleaner type	Feeding type	Feeding voltage (V)	Total current consumption each phase (A)	Total current consumption each phase (A)	Total current consumption each phase (A)
No Cleaner	Direct Feeding (w/o Power Module)	400	n x 2.7	n x 3.7	n x 4.8
		440	n x 2.5	n x 3.3	n x 4.4
		480	n x 2.3	n x 3.0	n x 4.0
	Through transformer	200 (to 400) (Transformer)	n x 6.2	n x 8.4	n x 11
		230 (to 400) (Transformer)	n x 5.4	n x 7.3	n x 9.6
		600 (to 480) (Transformer)	n x 2.1	n x 2.8	n x 3.7
Ultrasonic Cleaner	Direct Feeding	400	n x 2.7 + 1.7	n x 3.7 + 1.7	n x 4.8 + 1.7
	Direct Feeding (Power Module only for Ultrasonic)	440	n x 2.5 + 1.8	n x 3.3 + 1.8	n x 4.4 + 1.8
		480	n x 2.3 + 1.7	n x 3.0 + 1.7	n x 4.0 + 1.7
	Through transformer	200 (to 400) (Transformer)	n x 6.2 + 3.9	n x 8.4 + 4	n x 11 + 4
		230 (to 400) (Transformer)	n x 5.4 + 3.4	n x 7.3 + 3.5	n x 9.6 + 3.5
		600 (to 480) (Transformer)	n x 2.1 + 1.3	n x 2.8 + 1.4	n x 3.7 + 1.4

2.5.4 Ensuring Power Stability

The voltage of the electrical supply connected to every Atlantium system **must not vary** by more than $\pm 10\%$ from the correct value (sag, swell and surge) at the system inlet.

To comply with this requirement, you must protect the Atlantium system with a device that prevents electrical surges and fluctuations from causing damage. There are two types of surge protection:

- UPS (Uninterrupted Power Supply) has an internal battery that allows the equipment plugged into it to continue to run in the event of a power outage until power is restored. It also has the benefit of performing the same functionality of surge protectors, protecting against spikes and surges. Make sure to use a UPS that is capable of supplying sufficient current to the system and that the cable length is not more than 10m (33ft) in length. If needed, the UPS allows the system to be shut down cleanly if power is out for a lengthy period.
- Surge protection device protects your equipment from variations in electrical current, such as surges and spikes.



Surge protector devices /UPS must be inspected periodically and replaced if their protection capacity has expired.

2.5.5 Surge Protector Devices

Surge protection devices are designed to protect industrial communication networks. This device recommended by Atlantium uses a combination of 3-electrode gas discharge tubes and fast clamping diodes. Typical applications include industrial processing equipment, transmission systems, I/O cards, probes, actuators, and displays. Surge protection devices are available via Atlantium.

Table 2-8: Surge Protector Details

Atlantium PN	DATA SHEETS	Module PN	Description
EP0002300	DOC002300	8859660000	SURGE PROTECTOR 400V 3P 40KA TNC CONFIG
EP0002000	DOC002000	4983-DS277-404	SURGE PROTECTOR 440-480 3P 40KA
EP0002600	DOC002600	4983-DS120-402	SURGE PROTECTOR L + N, 115V
EP0002800	DOC002800	1352740000	SURGE PROTECTOR L + N, 230V

2.6 The Control Module

The Atlantium system is monitored and controlled from a **Control Module**. It can be mounted on a wall or suitable anchoring point up to 50 meters (164.04 ft.) from the Atlantium Unit. However, it should be located in a close proximity to the Atlantium Unit in a place that it is easy to reach the touch screen and read the monitoring information. See the **AIO Control Module ICD** accompanying the documentation.

Table 2-9: Control Module Details

Physical	Details
Dimensions (W x D x H) (mm/inch):	400/15.75 x 300/11.82 x 144.4/6.12
Weight (Kg/Lb.):	9.8/21.6
Minimum Clearance for Electrical Cables Routing (mm/inch):	50/2
Electrical	
Maximum Power Consumption:	Maximum 40W
Voltage:	1 or 2 phase 120-240VAC
Protection Category:	IP 56.

2.7 Environmental Requirements

The Atlantium system should be located indoors in an area that is adequately cooled and ventilated with clean airflow. However, there have been many successful Atlantium installations in less friendly environments. For locations with high temperatures - above 45°C (113°F) - air conditioning may be required. Consult with your Atlantium representative.

Table 2-10: **RZ163 series** System Environmental Details

Environmental	Details
Maximum ambient air temperature:	45°C (113°F)
Maximum ambient air temperature in the Ballast Modules environment:	45°C (113°F)
Maximum atmospheric relative humidity:	90%
Water Temperature:*	
Maximum Water Temperature (lamps off)	90°C (194°F)**
Maximum Water Temperature (lamps on)	60°C (140°F) **
Minimum – cold temperature:	No limit - if the unit is fully drained of water before it freezes



* For water temperature above 70°C (160°F) consult with Atlantium service engineers

** Any deviation from either of these values require consultation with Atlantium applications department and written approval by Atlantium.

2.8 Regulatory Compliance

Atlantium Systems are designed to comply with the following regulatory standards*:

- EMC directive 2014/30/EU
- European Low Voltage Directive (LVD), 201*4/35/EU for electrical safety
- Council Directive 98 / 83 / EC of 3 November 1998 for the quality of water intended for human consumption
- ISO 9001-2015 2018-2021 Quality Management Standard - Development, Design, Production and Sales of Water Disinfection Systems
- US Federal Performance Standards 40 CFR 141.720, Long Term 2 Enhanced Surface Water Treatment Rule of January 5th, 2006. 3rd party validated by HDR/HydroQual, Inc.
- UL 508, CSA C22.2 No, 14-13. By MET Labs (eurofins) NRTL certification
- IP54/IP56 & TYPE4X
- NSF 61. By NSF International.
- Hygienic certificate, National Institute of Public Health, Poland

**Note: Compliance is model dependent, for more details of specific UV Unit model. Consult your Atlantium representative.*



3 Getting Ready for Installation

Using the guidelines and information in this section, you can prepare the piping and electrical setup for installing the Atlantium Hydro Optic Water Treatment System. If you have any questions, consult with an Atlantium application engineer.

3.1 Planning

Consider where to locate the unit from the perspective of your process. Prepare your installation plan according to the Mechanical and Electrical ICD drawings provided with the system and to planning points below, as well as the other guidelines in this manual.

3.1.1 Access

■ Installation Access

- Take into account that sufficient door space is required to transport the Atlantium Unit into the facility where it is to be placed.
- The Atlantium units are packed and transported in large wooden crates. Consider the need for a place near the installation area for unpacking of the units from the crates, prior to installation.

■ Service Access

- Ensure that sufficient space is required for maintenance personal to access the Atlantium Unit for periodic component replacement and maintenance.
- The installed units must also be accessible: for example if a unit is installed high above the ground, permanent stairs or walkways may be needed for convenient and safe service access
- Ensure sufficient space to access the back of the unit, to allow removal and replacement of lamps as well as to do maintenance on cleaning systems (where these are installed), connection boxes, etc.

■ Installation: vertical or horizontal

- Vertical installation of the Atlantium unit and piping, with an upwards direction of flow, is the preferred configuration for installation, where this is possible.
- If mounting the unit in a horizontal configuration, a slope of at least 5 % is recommended to minimize the risk of air pockets developing or remaining trapped in the Atlantium unit. The Customer is to supply the mechanical means for ensuring this slope.

3.1.2 Hydraulics

■ Piping

- Align the upstream and downstream piping with the designated location for the Atlantium unit.
- Prepare the flanges/ferrules and piping as specified according to ***The Piping Infrastructure*** on page 30. To avoid a step in the connection, make sure that the internal diameters where the Atlantium Unit and your piping match.
- **Do not** use sealing material that contains graphite when sealing the flanges/ferrules and gaskets as it accelerates the corrosive process on stainless-steel components, including those of the Atlantium system.
- To promote laminar flow of water through the Atlantium unit:
 - ◆ The piping connected to either end of the unit should be of the same diameter as the unit itself. Connection of narrower piping may reduce flow and increase water temperature and turbulence.

- ◆ Allow a straight length of 10 pipe diameters (10D) before the Atlantium unit (upstream) and a straight length of 5 pipe diameters (5D) after the unit (downstream). In situations where less space is available, review with your Atlantium representative.
 - ◆ In order to minimize turbulence and air pocket formation in a vertical installation, install a concentric reducer/expander adapter to streamline the transition between piping dimension and the internal dimension of the unit.
 - ◆ For a horizontal installation, install an eccentric reducer/expander adapters, with downstream outlet higher than inlet.
- **Mechanics.**
- Prepare the supports needed for the Atlantium Unit, ensuring that the minimum height above the floor is 750mm / 29.5 inch (between the floor and the bottom of the provided triangle support brackets).
 - Check that the piping on the inlet and outlet sides has adequate support structures so that there are no mechanical stresses that may endanger the Unit.
 - Check the upstream and downstream piping for vibrations. Make sure that the piping to be attached to the Atlantium Unit is anchored and reinforced to protect the Unit against vibration. A high vibration level can cause damage to any hydraulic system, including the Atlantium unit. High vibration can be caused by an unbalanced pump or by sudden valve close.
- **Hydrodynamics**
- Water hammer can cause damage to any hydraulic system, including the Atlantium Unit. Make sure that this phenomenon does not occur in your facility's water line. To prevent water hammer, consult your system engineer and check your facility system procedures, including:
 - ◆ When starting the water flow when the lines are empty, keep valves open so that the air in the pipes has a simple release pathway.
 - ◆ Sudden valve closures can cause water hammer. Make sure that valves close gradually, enough to avoid this problem.
 - ◆ Ensure that all pumps that impact the Atlantium system employ soft start-up procedures.
 - ◆ The Atlantium Unit must be totally filled with water. Assure that no air can be trapped in the unit and that air can be released. Verify through the Unit's viewport after installation that there are no bubbles.

3.1.3 Flow Data

- Evaluate your flow trends to determine whether you require a flow meter or flow switch. If the flow varies, a **flow meter** is required to detect and report on the flow coming into the unit. Make sure that there are to be **no** branches on or off the pipes between the flow meter and the Unit inlet. If the flow rate is static, a **flow switch** can be used instead.

3.1.4 Application

- Verify that the dose-related parameters, such as the UVT and the flow, are the same as those defined in the Atlantium application scope of supply.
- Determine what a low flow situation means to your process and whether you need to shut down the Unit (low flow indicates upstream problems) or recirculate (low flow normal) when the flow goes below the normal range.

3.1.5 Feed Water Quality

If the water entering the Atlantium Unit contains debris or particles in suspension, pre-treatment (e.g. filtration) may be required to maximize the effectiveness of UV disinfection and protect internal parts from blockage or damage. Consult with your Atlantium representative.

3.2 Typical Installation Set-Up

Use the diagram below as a basis for your installation drawings. Vertical installation with upward flow is preferred where it is possible and accessible, as it prevents the accumulation of air pockets. If horizontal installation is required, be sure to include a 5 degree slope (recommended/minimum) in the direction of flow to reduce the potential for air pockets. Be sure to include service access as you fit the Atlantium system into your facility (i.e., nearby pipes, electrical fixtures, support beams, etc.)

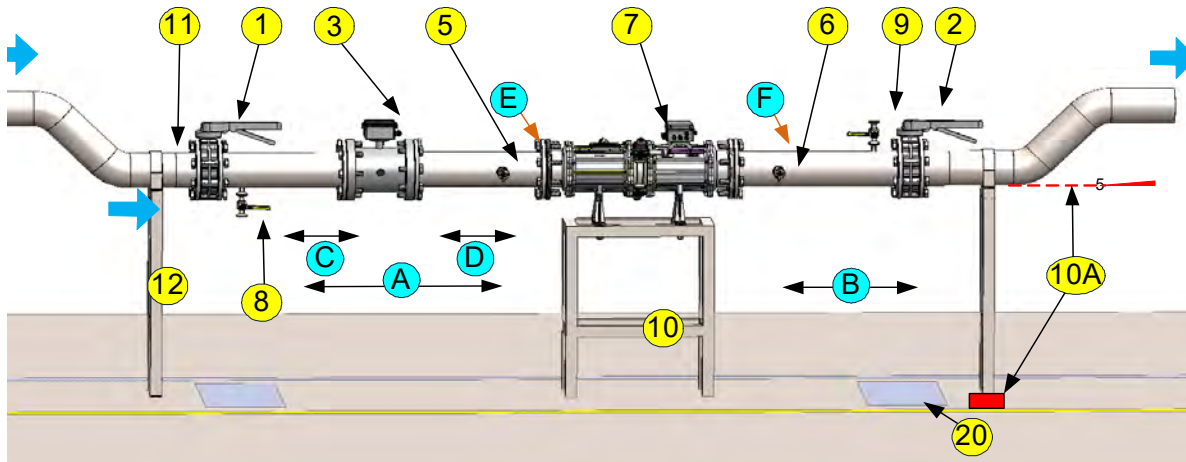


Figure 3-1: Generalized Atlantium system setup, horizontal (no bypass)

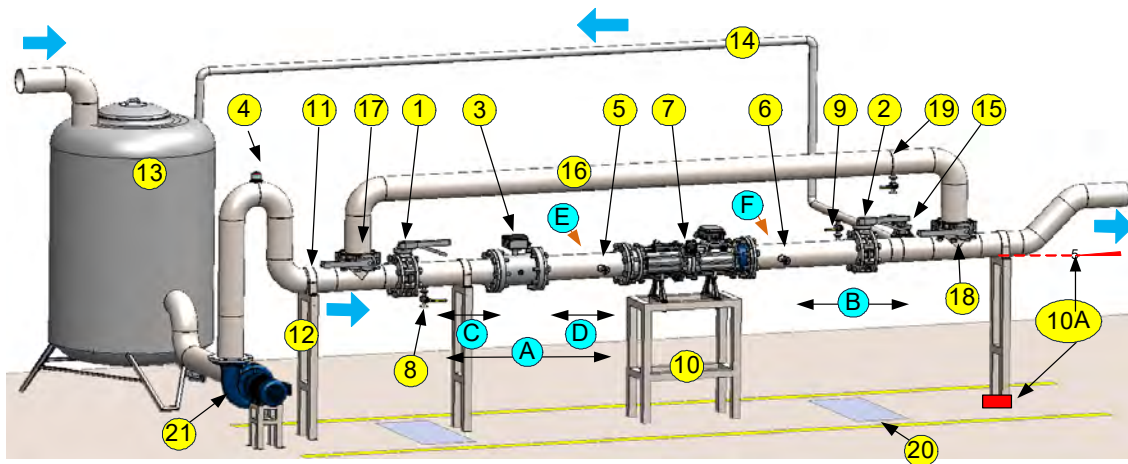


Figure 3-2: Generalized Atlantium system setup, horizontal (with bypass)

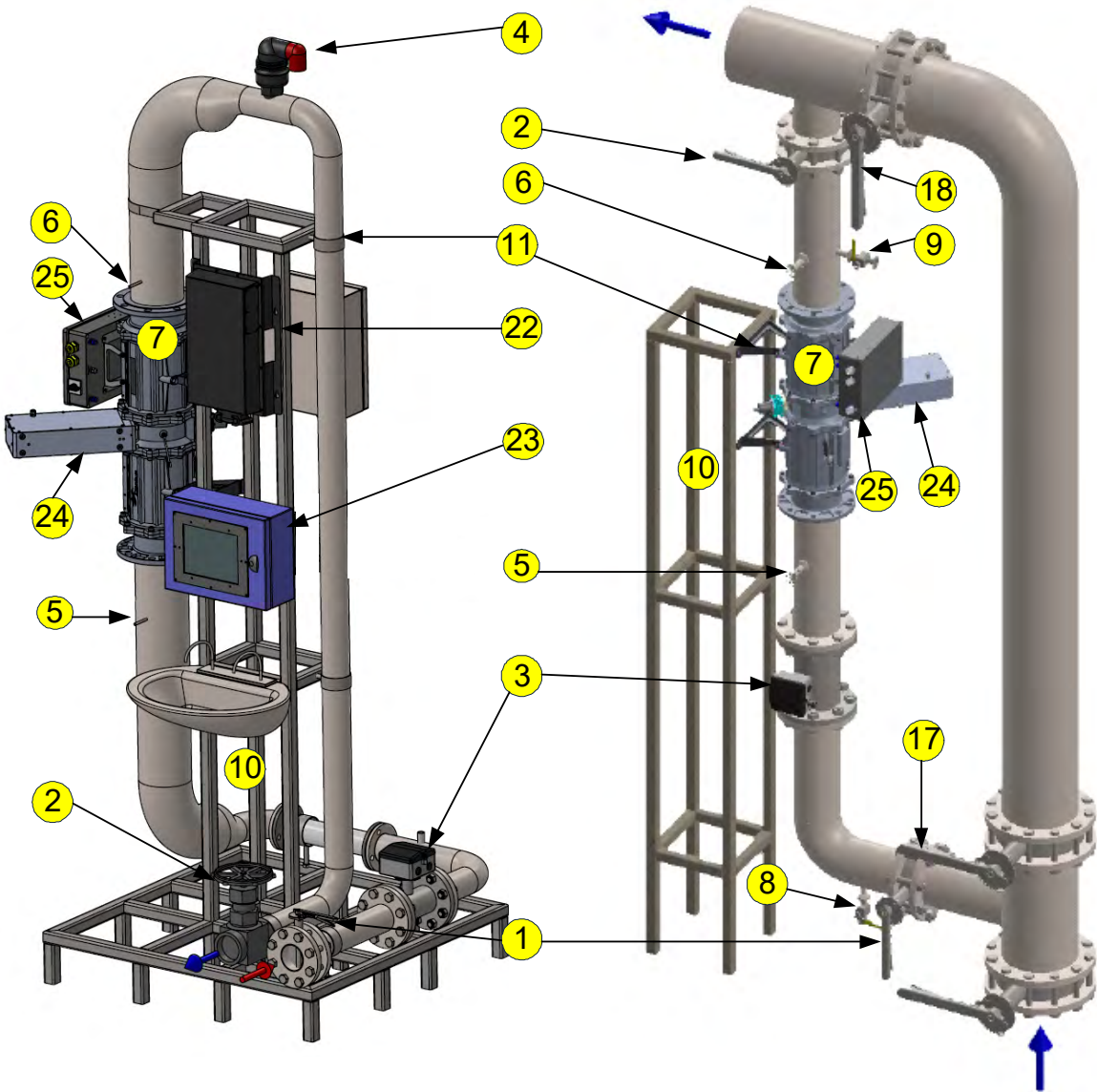


Figure 3-3: Generalized Atlantium system setups, vertical - Left: no bypass, Right: with bypass

Table 3-1: Typical Atlantium System Component Setup Key







#	Description		Atlantium P/N or recommended and available at Atlantium
	Direction of water flow in the pipes		-
1	Inlet isolation Valve ■ Isolating Valve on the Inlet side		-
2	Outlet isolation Valve ■ Isolating Valve on the Outlet side		-
3	<ul style="list-style-type: none"> ■ Flow Meter flow measurement device with 4-20mA analogue output signal ■ To be installed on the same line as the Atlantium system, with no branching before or after the flow meter ■ Follow the manufacturer's Installation instructions 		Available Flow Meters: KROHNE OPTIFLUX 6000 KROHNE OPTIFLUX 2300
4	Air Release valve - To prevent air bubbles where necessary <ul style="list-style-type: none"> ■ Automatic Air Release valve is used to release air bubbles trapped within the line ■ Install at a high position to allow air bubbles to accumulate and release from this point 		-
5/6	Inlet/Outlet Sampling Points <ul style="list-style-type: none"> ■ Position aseptic sampling valves horizontally (90°) on the pipe center, within 50cm of the Unit ■ Aseptic sampling valve must be a dedicated valve for sampling only and resistant to alcohol and flame 		<ul style="list-style-type: none"> ■ Aseptic Sampling Valve Kit for Stainless Steel Pipe - KTB005700 ■ Aseptic Sampling Valve Kit for Plastic Pipe - KTB0011500
7	Generic Atlantium Unit (shown with flange interface. Systems are also supplied with ferrule interface.)		-
8	Draining/CIP Port - For performing CIP on the Atlantium Unit <ul style="list-style-type: none"> ■ The Draining port should be positioned close to the Inlet valve and between that and the Unit, on the bottom of the pipe ■ It is also used as one of the CIP ports and connects to a hose 		<ul style="list-style-type: none"> ■ CIP Kit - SAB012900 ■ CIP Valve Kit for Stainless Steel - KT0011600 ■ CIP Valve Kit for Plastic - KT0011700
9	CIP Port - For performing CIP on the Atlantium Unit <ul style="list-style-type: none"> ■ The CIP port should be positioned between the Unit and the Outlet valve, on top of the pipe, at the highest point before the isolation valve, in order to allow the pipes to be completely filled with solution 		(the valve itself is not part of the kits) See CIP Ports and CIP Kits on page 34., for information on CIP equipment.

Table 3-1: Typical Atlantium System Component Setup Key



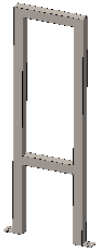

#	Description		Atlantium P/N or recommended and available at Atlantium
10	<p>System Supports</p> <ul style="list-style-type: none"> Supports are required to assure no mechanical stress on the Atlantium Unit 		-
10A	Shim, block or higher downstream support, to achieve 5° slope in horizontal installation		supplied by customer
11	<p>Support brackets</p> <ul style="list-style-type: none"> Brackets are used to hold the Atlantium Unit and pipes attached to the support mounts Is to include internal flexible material to absorb vibrations and assure that the pipes and Atlantium Unit are mounted tightly and securely 		-
12	<p>Pipe Supports</p> <ul style="list-style-type: none"> Pipe Supports are required to assure no vibrations in the pipeline 		-
13	Water tank		-
14	<p>Recirculation Line >5m³/h (>20gpm) (Optional)</p> <ul style="list-style-type: none"> A Recirculation line is highly recommended to keep water flowing constantly, thereby assure a high disinfection level 		-
15	Recirculation Line Isolation valve (Optional)		-
16	<p>By-Pass (Optional)</p> <ul style="list-style-type: none"> If the facility uses quartz corrosive CIP chemicals, such as caustic soda, use a By-Pass line to prevent damage to the Atlantium Unit 		-

Table 3-1: Typical Atlantium System Component Setup Key



#	Description		Atlantium P/N or recommended and available at Atlantium
17	By-Pass Inlet isolation Valve (Optional)		-
18	By-Pass Outlet isolation Valve (Optional)		-
19	By-pass draining port (Optional) <ul style="list-style-type: none"> The Draining port should be positioned on the bypass line, at the lowest point of the pipe 		-
20	Drain <ul style="list-style-type: none"> It is recommended to install a drain in the floor, close to the draining valve 		-
21	Pump <ul style="list-style-type: none"> To prevent water hammer, the pump must be able to start up gradually. 		-
22	Ballast Module (certain Atlantium systems)		
23	Control Module		
24	DPM cleaning system (certain Atlantium systems)		
25	Connection Box		

Table 3-2: Typical Atlantium System Distances Setup Key

#	Description
A	<ul style="list-style-type: none"> The pipe between the Inlet isolation valve and the Atlantium Unit should be straight and horizontal. For most applications, a minimum 10D (1500mm/ 64inch) of straight horizontal pipe is needed between the Inlet isolation valve and the Atlantium Unit. For Power Plants, and other applications with space constraints, consult an Atlantium Application Engineer to find appropriate solutions.
B	<ul style="list-style-type: none"> The pipe between the Atlantium Unit and the Outlet isolation valve should be straight and horizontal. For most application, a minimum 5D (750mm/32inch) of straight horizontal pipe is needed between the Atlantium Unit and the Outlet isolation valve. For Power Plants, and other applications with space constraints, consult an Atlantium Application Engineer to find appropriate solutions.
C	<ul style="list-style-type: none"> Some manufacturers require positioning the Flow Meter at a minimum of 5D (750mm/32inch) of straight horizontal pipe immediately preceding it on the Inlet side. Refer to the manufacturer's instructions.
D	<ul style="list-style-type: none"> Some manufacturers require positioning the Flow Meter at a minimum of 2D (300mm/13inch) of straight horizontal pipe immediately following it before the Atlantium Unit. Refer to the manufacturer's instructions.
E	<ul style="list-style-type: none"> Position the Inlet Sampling Point at a maximum distance of 0.5 meters/1.5ft. from the Atlantium System Inlet.
F	<ul style="list-style-type: none"> Position the Outlet Sampling Point at a maximum distance of 0.5 meters/1.5ft. from the Atlantium System Outlet.

3.3 Electrical Requirements

The electrical infrastructure is to be installed and in place prior to the system's delivery.

For information on the footprint of the components of the Atlantium system, see the section, **About the RZ300 System** on page 12. Use the Electrical ICD provided by Atlantium to help you plan the electrical infrastructure. See also **Power, Voltage and Grounding Requirements** on page 17 and **Connecting the Ballast Module Cables** on page 56.

Take into account:



For locations with 440Y/254 VAC 3~ +PE 50/60HZ
or 480Y/277 VAC 3~ +PE 50/60HZ

The Atlantium System requires a balanced voltage supply (WYE configuration). If you do not have such a connection, you must create an appropriate power feeding using a 1:1 isolation transformer (where the ground is connected to the middle point of the star configuration at the secondary side of the transformer).

- Evaluate the quality of your power and the likelihood of blackout/brownouts, electrical surges or interruptions. Determine if you need power surge protection and or uninterrupted power supply if any.
- To verify that you order the correct lengths for cables (i.e., Cable Harness, power cables, data cable, etc.), measure the distance between the proposed location of the relevant Atlantium components and between them and the Power source.
 - Planning the placement of the Ballast Modules, **Control Module** and the path of the various cables must take into consideration the length of the **Cable Harness** and the other cables. Cables must be placed in a path that does not interfere with passage ways.
 - The power mains connections must be in the vicinity of the Ballast Modules, Control Module.
 - The power cable and connecting plug are to be obtained locally.

- If the location experiences periodic power outages, consider including uninterrupted surge protection devices.
- Prepare cables of sufficient length to connect from the auxiliary equipment (i.e., the flow meter/flow switch, etc.) to the Atlantium system.
- **For Systems Utilizing Seawater** Minimize the corrosion potential of the treated water by ensuring that there is sufficient grounding. Do not leave the Atlantium Unit standing with seawater. Either rinse with fresh water and leave the Atlantium Unit standing with fresh water or empty.

3.3.1 Preparing for the Electrical Wiring to the Mains

You must prepare the elements listed below for connecting the Atlantium system to the mains.



- For preparing all electrical connections, be sure to use the *Electrical ICD* drawing provided to you by Atlantium with this manual. If no electrical drawings were provided please contact your Atlantium representative.
- Atlantium systems require connection to mains power of 400 to 480 VAC. See *Mains power supply up to 480VAC* on page 17.
- Mains system area circuit breaker, according to the total systems' power consumption to be connected to this line. See *Electrical Usage* on page 16.
- Install the Required Circuit Breakers, as defined in the Electrical ICD.
- If you intend to lengthen or replace the mains power cable connected to the Atlantium Unit with a longer cable, prepare the cables according to your location electrical distribution system requirements.
 - For locations with 400 VAC: 5-wire system that contains 3 phases, Neutral and Ground (The Neutral and Ground are mandatory)
 - For locations with 440Y/254 VAC 3~ +PE 50/60HZ
or 480Y/277 VAC 3~ +PE 50/60HZ
The Atlantium System requires a balanced voltage supply (WYE configuration). If you do not have such a connection, you must create an appropriate power feeding using a 1:1 isolation transformer (where the ground is connected to the middle point of the star configuration at the secondary side of the transformer).
 - For sites with 400VAC 3 phase + Neutral, the Control Module's Mains feeding voltage is 230 VAC (L1 to N or L2 to N or L3 to N).
 - For sites with 440/480VAC 3 phase, the Control Module **cannot** be fed from one phase of the 3 phase supply. The Control Module **must** be connected to a separate mains feeding, which is in the voltage range of 100-240 VAC.

3.4 The Piping Infrastructure

To review how to prepare the infrastructure, read through the typical installation section before you begin and refer to the section, *About the RZ300 System* on page 12.

Install the piping infrastructure before the Atlantium system arrives, but to avoid built-in mechanical stresses perform the final pipe adaptations and welds when the unit is actually situated in its permanent position.

ATTENTION!

- When tightening bolts to connect piping, use a torque wrench to apply correct and uniform torque, according to accepted standards and practices. Guidance for bolt tightening techniques may be found at:

http://www.wermac.org/flanges/flanges_torque-tightening_torque-wrenches.html

- When sealing the flanges/ferrules and gaskets, **do not** use sealing material that contains graphite as it accelerates the corrosive process on stainless-steel components, including those of the Atlantium system.
- Be sure to align the piping on the inlet and outlet sides of the designated location for the Atlantium Unit with the unit to avoid mechanical stress on the Unit.

Be sure to secure the piping around the designated location for the Atlantium Unit so that there is no vibration.

- Be sure to position adequate supports on the piping line needed to hold up and stabilize the process piping on the inlet and outlet side of the proposed location of the Atlantium unit.
 - Determination of support requirements and design should be made by an on-site mechanical engineer.
-

3.5 Flow Measurement/Detection

The Atlantium unit requires a flow signal to calculate the dose and operate properly. The flow signal is a measurement of the actual flow or simply a flow/no-flow indicator. The flow signal is collected from either a flow meter or a flow switch.

- A flow meter is required in facilities where the flow rate is variable for any reason.
- A Flow switch can be used in facilities where the flow is at a fixed, steady rate. In this situation the value of the known steady rate is entered manually into the system controller (see **Configuring the Flow Settings** on page 88).

The Flow meter or flow switch does not necessarily have to be installed in close proximity to the Atlantium Unit. It may be more remotely positioned, provided that it is located between the water inlet and the Atlantium Unit and there is **no** branching or splitting of the water flow.

ATTENTION!

The Atlantium system cannot be operated when there is no water or no water flow. Any damage caused due to operating the system without water or without water flow invalidates the Atlantium warranty.

3.5.1 Flow Meter

In most cases, a flow meter with a 4-20 mA output is required to measure the flow and automatically adjust the output of the UV system. The flow meter must be able to measure the expected maximum water flow of the specified Atlantium unit. The power source for the flow meter must come from an external source according to the manufacturer's instructions.

ATTENTION!

Be sure to provide the power source for the flow meter as part of the preparations for installing the Atlantium Unit.

Install the flow meter in strict accordance with the instructions supplied by its manufacturer.

Examples of Flow Meters

Flow meters are available from Atlantium, such as:

- **KROHNE OPTIFLUX 6000** flow meter for high-purity water applications
- **KROHNE OPTIFLUX 2300** flow meter – OPTIFLUX 2000 flow meter, includes **KROHNE IFC 300** signal converter

Consult your Atlantium representative.

OPTIFLUX 6000



OPTIFLUX 2300



Figure 3-4: KROHNE OPTIFLUX Flow Meters

3.5.2 Flow Switch

The flow switch tells the Atlantium Unit when water is or is not flowing. The recommended flow switch type features a paddle connected to a Dry Contact micro-switch, with minimum flow sensing of 0.2m³/hr (1gpm), see Figure 3-5.

Install it in a vertical (12:00 o'clock) orientation on top of the pipe. Follow the manufacturer's instructions.



Figure 3-5: Example of Flow Switch

3.6 Sampling Valve Components and Kits

Sampling valve kits are available from Atlantium.

One Accessory kit is required for each Sampling point.

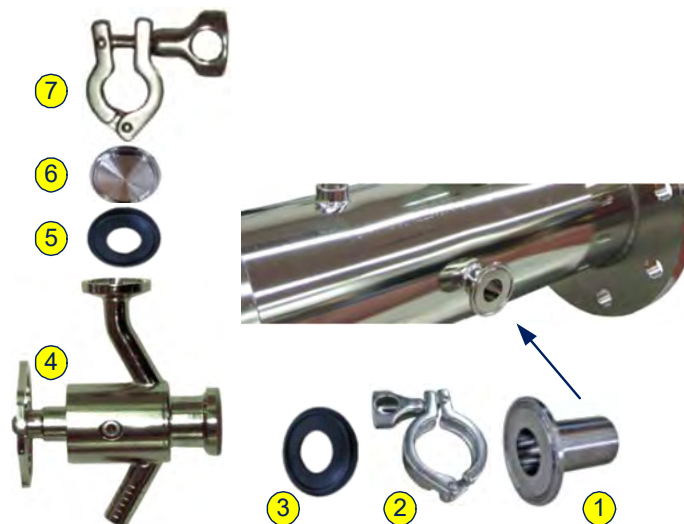


Figure 3-6: Sampling Valve Assembly

The table below details them. For information on installing the Sampling valves, see *Installing the Inlet/Outlet Sampling Points* on page 46.

Table 3-3: Sampling Valve Components and Kits

	Catalog number	Description	Purpose	Image	Kit for Stainless Steel Pipe KTB005700	Kit for Plastic Pipe KTB005750
1	FAC003700	Long welding ferrule 1" Adapter	For welding the tri-clamp port to the pipe		2 Pcs	-
2	FAB008100	Threaded Adapter 1/2" BSP	For connecting the tri-clamp port to the plastic pipe		-	2 Pcs
3	FA0000045	Clamp 1 1/2", ST.ST 304	For connecting the valve to the welded port		2 Pcs	2 Pcs
4	FA0000046	Ferrule gasket 1", FJ31.05-E	For sealing the valve connected to the pipe		2 Pcs	2 Pcs
5	COB000500	Aseptic sampling valve, ST.ST 316L	For taking water samples		2 Pcs	2 Pcs
6	FA0000048	Gasket 1/2", FJ31/25-E	For sealing the valve's flushing port		2 Pcs	2 Pcs
7	FA0000049	Solid End Cap, 1/2", ST.ST 304	For covering the valve's flushing port		2 Pcs	2 Pcs
8	FA00000047	Clamp 1/2", ST.ST 304	For sealing the flushing port of the valve		2 Pcs	2 Pcs
	FA0008300	Round Brush - 15/60/150	For cleaning the valve during the process		2 Pcs	2 Pcs

3.7 Draining Valves

It is important to plan for draining the system. Install one draining valve at the lowest point of the pipeline, before or after the Atlantium unit. If you plan to install CIP ports, one of them can double as a draining valve. If there is a Bypass line used occasionally to bypass the Unit in any circumstance, add an additional draining valve to assure that the bypass line does become a potential source of standing water. A bypass line must be empty when not in use.

3.8 CIP Ports and CIP Kits

The CIP (Cleaning-In-Place) recirculation system is used for the periodic cleaning and sterilization process of the Atlantium unit's inner surfaces and quartz sleeve. The CIP Cart includes a reservoir, a pump and supply and return hoses. See the diagram below and refer to **CIP Cart ICD drawing ICB012900** for further details.

3.8.1 CIP Cart

For systems with 400VAC: catalog number: SAB012900

For systems with 440/480VAC: catalog number: SAB012950

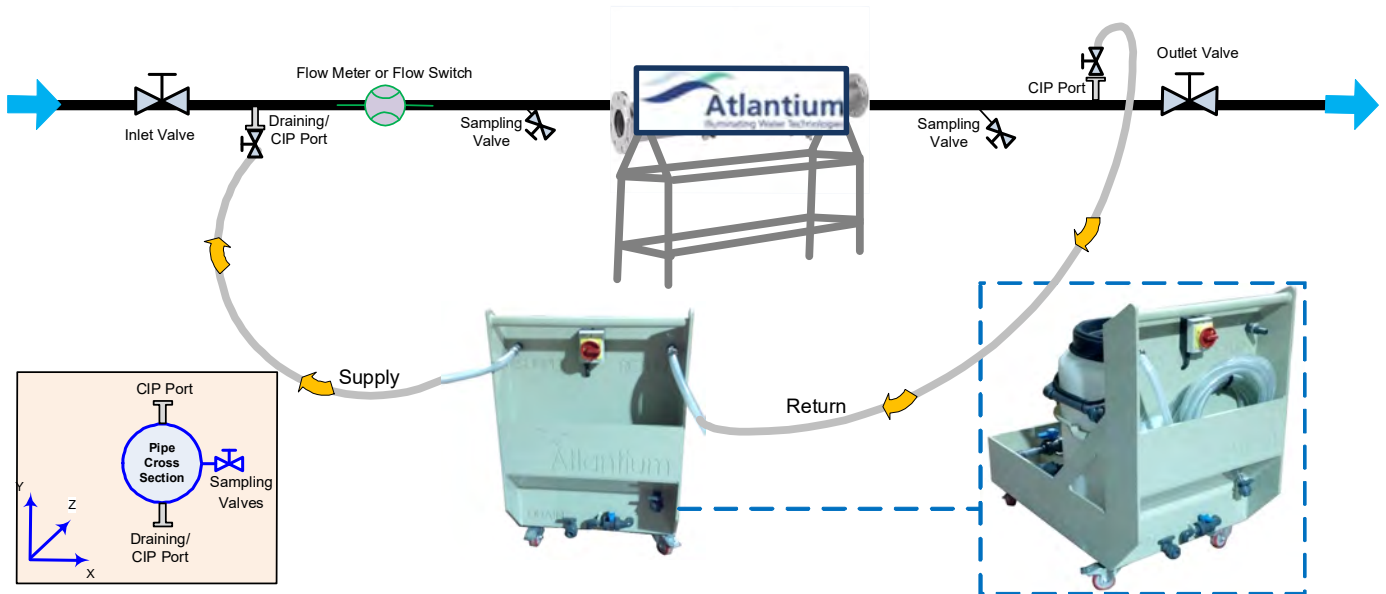


Figure 3-7: CIP Recirculation System Connections

3.9 CIP Accessories and CIP Kits

The CIP (Cleaning-In-Place) recirculation system is used for the periodic cleaning and sterilization process of the Atlantium unit's inner surfaces and quartz sleeve, see Figure 3-7.

Two Accessory kits are required, one for each CIP port.

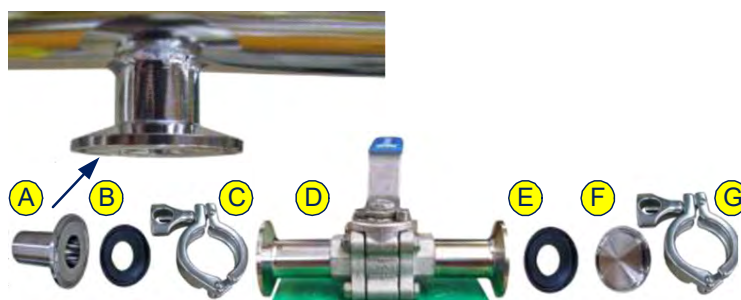


Figure 3-8: CIP Valve Kit

Table 3-4: CIP Accessory Kits







	Catalog number	Description	Purpose	Image	Kit for Stainless Steel Pipe KT0011600	Kit for Plastic Pipe KT0011500
A	FAC003700	Long welding ferrule 1" Adapter	For welding the tri-clamp port to the pipe		2 Pcs	-
A	FAB008100	Threaded Male Adapter 1/2" BSP	For connecting the tri clamp port to the plastic pipe		-	2 Pcs
B,E	FA0000046	Ferrule Gasket 1", FJ31.05-E	For sealing the valve connected to the pipe		2 Pcs	2 Pcs
C,G	FA0000045	Clamp 1.5", ST.ST 304	For connecting the valve to the welded port		2 Pcs	2 Pcs
F	FAC004100	Solid End Cap, 1 1/2", ST.ST 304, EG16A3A 1.54L	For covering the CIP port while not in use		2 Pcs	2 Pcs
D		Valves	Two high-purity chemical resistant brass ball valve (aseptic ball valves), 1 inch diameter, with tri-clamp fitting connection mechanism (A3 Standard) on both sides.		2 Pcs Not Included Purchased by Customer	2 Pcs Not Included Purchased by Customer

Table 3-4: CIP Accessory Kits

	Catalog number	Description	Purpose	Image	Kit for Stainless Steel Pipe KT0011600	Kit for Plastic Pipe KT0011500
	FAB005700	Hose Adaptor 1" to 3/4"	To attach the CIP hose		2 Pcs	2 Pcs

3.9.1 CIP Safety Equipment

Required but not included in Atlantium's CIP Kits: protective equipment such as goggles, clothing and (chemical-safe) gloves, according to the safety standards specified at your facility.

3.10 Connection to Facility Control

Options are available to set up control of the Atlantium system via your facility control system. Control setup can be made via any of the following:

- **Modbus** - RTU on RS485 (network) serial connection directly to the Facility control (Appendix A, **Modbus Communication Protocol** on page 173)
- **Signal control** - utilizing System Ready, External On/Off, and General Alarm functions, etc. (See **Connection Box** on page 57.)

With any of the above control options, you can still utilize the function of the **Control Module** of the Atlantium system. Whichever control facility is utilized, the system communicates to the other control systems such that the last command issued determines the current status.



4 Safety Overview

The Atlantium System has been designed according to the highest safety standards, assuring the safety of operating personnel, the environment and the treated water.

DANGER!

Improper use of controls or adjustments or performance of procedures other than those specified herein could result in significant hazards.

Therefore, personnel operating or servicing this system must be thoroughly familiar with all safety requirements and operating procedures and are to adhere to them during use of this system.



To guard against injury, observe basic safety precautions, including the following:

All persons operating the Atlantium system must be aware of proper use and the potential hazards of violating safeguards. Be certain that all personnel carefully review the safety information and the procedures specified in this manual. Only authorized individuals with appropriate training and knowledge, including local regulations, should operate, assist in the operation of or provide maintenance to the system.

All service and repair of the Atlantium system must be performed by Atlantium field service technicians or other factory-authorized personnel **ONLY.**

4.1 UV Lamp Safety



UV Exposure: The system generates ultraviolet (UV) light within the Unit, which can cause serious eye damage or blindness if you stare at it directly when it is operating. Use the Viewport only. Do not look directly into the lamp enclosure during system operation, examining, or servicing the system's internal components during operation, or when lamp's breather caps are open, or if energized testing is required.

The Viewport is specifically designed with a UV filter to prevent UV light from escaping so it is safe to look inside. Nevertheless, personnel should not stare at it or any other brilliant light source for any but short intervals to check on Unit operations. The Viewport cover should also be preserved intact.

If the viewport is broken, DO NOT look directly into it. Be sure to request a replacement part immediately. Do not open the viewport's metal cover until the replacement is installed.

Persons potentially subject to UV light exposure – technicians who are servicing the Unit – must wear appropriate eye protection whenever the system is operating.

During maintenance procedures that are conducted with the UV lamps turned on:

- Use Caution floor signs at a distance of 1m/40inch from the Atlantium Unit to warn passersby against possible UV light exposure and not to approach without proper eye and skin protection.
- Wear white cotton gloves.
- Wear long sleeves rolled down to your wrist.
- Wear appropriate eye protection, such as containing polycarbonate lens that meet EN1 ultrasonic, CAN/CSA-Z94.3-02 and/or Z87.1 standards.
- **DO NOT look directly into openings that emit UV light.**



Protect Hands: Do not touch the UV lamp with bare hands.

- Wait at least 10 minutes until the lamp is cooled down before touching the lamp or starting the replacement procedure.
- Use appropriate protective gloves both to protect your hands and to avoid skin oils that leave fingerprints and/or harm the UV lamp.
- Lamps can reach a temperature of 1,000C° under operating conditions.
- Wait ten minutes to allow the lamp to cool down fully before replacing it.
- Keep materials that are sensitive to heat, or which contain solvents, a safe distance away from the lamp, Unit, and electrical connections.



Electric Shock: Before replacing a UV lamp or other components, and during any maintenance requiring lamps to be turned off, make sure the the Connection Boxes of the relevant lamps are turned OFF and place a sign on the alerting others NOT to touch the during maintenance so that no one can inadvertently turn it on while maintenance is in progress.

ATTENTION!

Prevent Damage:

Handle the UV lamp assembly by holding only the contact housings (white ceramic casing).

When handling the UV lamp, always place it on a flat surface or table, so that it is not accidentally damaged.

If the body of the UV lamp is touched accidentally, clean the fingerprints off with alcohol (at least 70%) and wipe dry with a soft, clean, lint-free cloth (usually provided with the lamp). Do not use cleaning rags or materials that can leave a residue.

Do not use a UV lamp that shows any scratches, cracks, or other damage.



Mercury Poisoning:

Lamps contain mercury, which is a hazardous substance. Always wear gloves and safety glasses when handling or replacing a UV lamp.

Inhalation of vaporized mercury compounds can be harmful to the lungs, kidneys, and nervous system. Mercury that penetrates the skin or is ingested can also be harmful.

If mercury is inhaled, penetrates the skin, or is ingested accidentally, seek emergency medical treatment immediately.

If a UV lamp breaks during handling and releases mercury, the following precautions should be observed to minimize the risk of exposure to mercury:

- Always wear gloves and safety glasses when handling or replacing a UV lamp.
- Leave the area immediately to avoid inhalation of the mercury vapor.
- Thoroughly ventilate the area for at least 30 minutes or until the mercury vapor concentration is in compliance with applicable federal and local health and safety regulations.
- After handling a broken UV lamp, carefully remove gloves, and then wash hands thoroughly with soap and water. Follow all applicable federal and local health, safety, and environmental regulations.
- Do not turn on or operate the system until all mercury contamination has been cleaned up and removed.
- Establish a Hazard Response Plan to deal with all related hazards and provide it to all personnel associated with the Atlantium system.

Refer the Chemical Safety information for mercury at: <http://www.inchem.org/documents/icsc/icsc/eics0056.htm>

ATTENTION!

Lamp Compatibility:

Use original Atlantium UV lamps ONLY. Other lamps are incompatible. They void the warranty and may damage the system.

Proper Disposal of Lamps

Expired lamps are classified as hazardous waste and must be disposed of appropriately.

- A non-ruptured UV lamp that is no longer used must be disposed of according to specific local or federal environmental and hazardous waste regulations.
- Broken lamps and parts contaminated by the mercury have to be vacuum-packed and disposed of. Broken lamps, as well as contaminated packing material and other parts have to be considered as special waste, which may only be removed by authorized waste disposal companies.

4.2 Electrical Hazards and Safety Considerations

DANGER!

UNDER NO CIRCUMSTANCES

SHALL ELECTRICAL WORK BE CARRIED OUT WITHOUT VERIFYING THAT ALL MAIN CIRCUIT BREAKERS OF THE ELECTRICAL LINE FEEDING THE ATLANTIUM SYSTEM COMPONENTS ARE SET TO THE **OFF** POSITION AND THAT **NO** ELECTRICAL FEED IS LIVE.



DO NOT SET ANY MAIN CIRCUIT BREAKER OF THE ELECTRICAL LINES FEEDING THE ATLANTIUM SYSTEM COMPONENTS TO THE ON POSITION UNTIL **ALL** ELECTRICAL WIRING IS PROPERLY CONNECTED. UNCONNECTED WIRES/CABLES IN A LIVE ELECTRICAL FEED IS A HAZARDOUS SITUATION THAT CAN RESULT IN DEATH OR SERIOUS INJURY.



- **DO NOT DRILL INTO THE CONNECTION BOXES OR ALTER THEM IN ANY WAY!!!!**
- The Connection Box already contains entry glands for **ALL** of the cabling needs.
- Making holes in a Connection Box will destroy its waterproof seal, endangering the components inside.
- Do Not draw electricity from the Atlantium Unit's Connection Box as it will damage the Unit's electrical configuration.



The Atlantium Hydro-Optic Water Disinfection system incorporates high-voltage internal components, which can cause serious injury or fatal electrical shock if not used or serviced properly. High voltage components can retain a charge for some period of time even after the system has been turned off.



- Never attempt to remove any system covers or to dismantle any parts, except when performing the maintenance procedures detailed in **System Maintenance** on page 95.
- No portion of the Atlantium system is to be opened or removed by anyone other than a trained and authorized technician.
- Do not spray or pour any type of fluid directly into the Unit or electrical components. Moisture causes damage to the equipment and electrical shock may result.
- Do not operate the system if the power cables or harnesses are frayed or otherwise damaged.

CAUTION!



DO NOT enter **Technician Mode** in the **Control Module** unless instructed to do so by Atlantium certified personnel or by an Atlantium System User Manual, for a specific task.

If you are in Technician Mode, **DO NOT WALK AWAY!**



NEVER LEAVE THE ATLANTIUM SYSTEM WHEN IT IS OPERATING IN TECHNICIAN MODE!!

A SYSTEM LEFT IN TECHNICIAN MODE WITHOUT SUPERVISION CAN RESULT IN PERMANENT DAMAGE!!



Utilize best practices regarding electrostatic discharge (ESD).

Avoid direct contact with the electronic circuit boards of the **Control Module**, which is sensitive to electrostatic discharge (ESD).

Wear an electrostatic discharge (ESD) Wrist Strap when performing procedures where contact with a circuit board is possible.

4.3 Keep the Unit Full of Water

ATTENTION!

The Atlantium system cannot be operated when there is no water. Any damage caused due to operating the system without water invalidates the Atlantium warranty.

4.4 Chemical Use for Cleaning in Place (CIP)



ATTENTION!

- The chemicals selected and the concentrations used must be approved by Atlantium's Application staff, and the ship's quality assurance and safety officials. The CIP process must comply with the written protocols and procedures set in place by those departments. Refer to the section, **Selecting the Correct Chemicals for CIP** on page 96
- Use and handle all chemicals in strict accordance with their manufacturer's instructions, product information sheets, and Safety Data Sheets (SDS).
- NaOH (Caustic Soda) as it causes irreversible damage to quartz. It is strictly forbidden to use it without a specific analysis of temperatures, concentration, frequency and duration and written approval from Atlantium's application engineer.

Refer to the Chemical Safety information provided with the CIP chemicals which you choose to use, for example:

<https://portal.ecolab.com/servlet/PdfServlet?sid=915373&cntry=AU&langid=en-GB&langtype=RFC1766LangCode&locale=ja&pdfname=OXONIA+ACTIVE+150>

4.5 Anti-Corrosion Spray Safety

WARNING!

When using OKS 2101 Spray:

Refer to the OKS 2101 Safety Data Sheet according to Regulation (EC) No. 1907/2006 - GB.

Use the following protective gear:

- Safety glasses with side-shields conforming to EN166
- Protective gloves that satisfy the specifications of EU Directive 89/686/EEC and the standard EN 374 derived from it
- Respiratory protection mask with filter type A-P

Follow these precautions for safe handling:



- Do not use in areas without adequate ventilation.
- Do not breathe vapors or spray mist.
- In case of insufficient ventilation, wear suitable respiratory equipment.
- Avoid contact with skin and eyes.
- Keep away from fire, sparks and heated surfaces.
- Persons with a history of skin sensitization problems or asthma, allergies, chronic or recurrent respiratory disease should not be employed in any process in which this mixture is being used.
- Smoking, eating and drinking should be prohibited in the application area.
- Wash hands and face before breaks and immediately after handling the product.
- Do not get in eyes or mouth or on skin.
- Do not get on skin or clothing.
- Do not ingest.
- Do not use sparking tools.
- These safety instructions also apply to empty packaging which may still contain product residues.
- Pressurized container: protect from sunlight and do not expose to temperatures exceeding 50 °C. Do not pierce or burn, even after use.

4.6 System Safety Features

The Atlantium Hydro-Optic Water Disinfection system includes the following safety features:

4.6.1 UV Protective Seal



Each lamp is enclosed within a sealed lamp chamber that prevents the UV light from escaping. This means that with regular operation there is no ambient UV escaping from the Unit.

While servicing the UV Unit or checking the Intensity sensor, UV blocking safety glasses should be worn by service staff or others working in the area to prevent exposing the eyes to the UV light.

4.6.2 Software Safety Controls on Control Module



CAUTION!

When the system is started, the Atlantium software performs a series of internal self-testing routines prior to starting system operation.

If the system **does not** pass these tests satisfactorily, UV lamp operation is disabled until the problem is resolved.

If problems arise during normal operation, appropriate error messages with varying levels of severity are generated on the touch-screen of the Control Module.

Control Module screens that provide setup options and compliance reports are password protected.

ATTENTION!

Control Module has 3 levels of user permission hierarchy (**see Table 7-2**):

- **No User** - enables view of system status screens only
- **Operator** - enables general and maintenance actions
- **Manager** - enables full system settings

All changes in the system settings are logged and tracked in the Settings Report.

DO NOT leave the Control Module unattended, even for a short time, while setting change screens are accessible. An untrained person could damage the operation of the Atlantium system by making unauthorized setting changes.

4.7 Atlantium Training

As part of the Commissioning and Hand-Off process, Atlantium provides hands-on training on all aspects of the Atlantium system for your designated personnel. Should any component be replaced with upgraded features, Atlantium offers training as needed and is ready to provide additional training for new personnel or any other needs related to its systems.



5 Installing the Atlantium System

This section provides details about Installation the Atlantium system.



For preparing all electrical connections and mechanical installation, be sure to review the electrical and mechanical Interface Control Drawings (ICD) provided to you by Atlantium with this manual. If no electrical drawings were provided, please contact your Atlantium representative.

5.1 Installation Overview

Hardware setup to be implemented by your facility personnel:

- Phase 1** Unpacking and checking the contents of the Atlantium system packaging (See below)
- Phase 2** Installing Sampling valves and CIP ports (See page 45)
- Phase 3** Positioning the Atlantium Unit and connecting to the Piping Infrastructure (See page 49)
- Phase 4** Mounting the **Control Module(s)**, Ballast Module(s), etc. (See page 52)
- Phase 5** Cabling the **Control Module(s)**, Ballast Module(s), etc. (See page 56)

Commissioning to be implemented by Atlantium personnel:

- Phase 6** Starting up the system (See page 79)
- Phase 7** Configuring the **Control Module** (See page 69)
- Phase 8** Tuning the System (See page 120)
- Phase 9** Completing the System Setup and Testing (See page 104)

The Installation Process Flow diagram below maps out the installation process.

5.2 Installation Process Flow Diagram

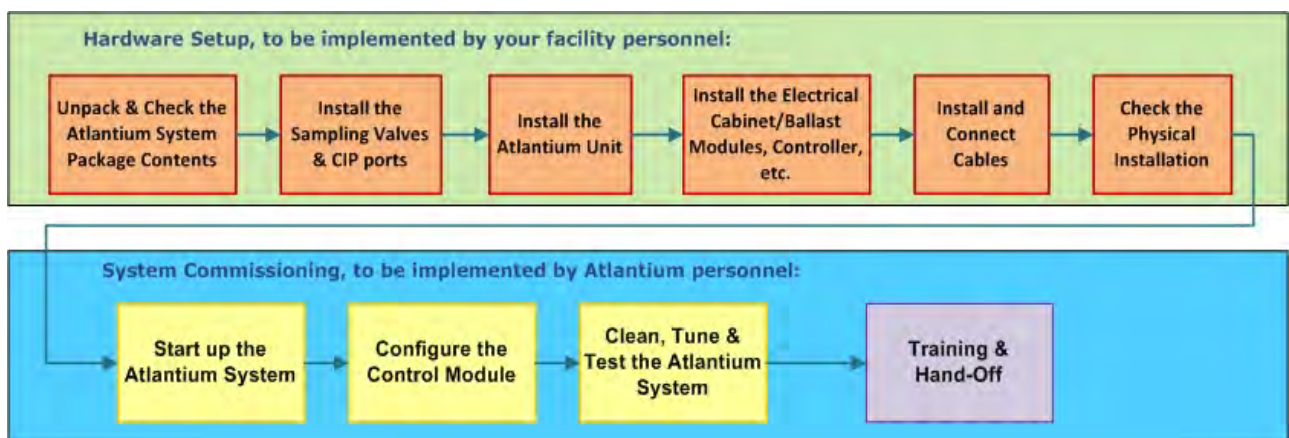


Figure 5-1: Installation Flow Diagram

5.3 Setting the Main Circuit Breakers to OFF Position

Before beginning work to connect the wires/cables of the Atlantium system components, turn the main circuit breakers of the electrical lines feeding

the Atlantium system components to the **OFF** position. **Verify that no electrical feed to the Atlantium system components is live.**



DANGER!

UNDER NO CIRCUMSTANCES

SHALL ELECTRICAL WORK BE CARRIED OUT WITHOUT VERIFYING THAT ALL MAIN CIRCUIT BREAKERS OF THE ELECTRICAL LINES FEEDING THE ATLANTIUM SYSTEM COMPONENTS ARE SET TO THE OFF POSITION AND THAT NO ELECTRICAL FEED IS LIVE.

DO NOT SET ANY MAIN CIRCUIT BREAKER OF THE ELECTRICAL LINES FEEDING THE ATLANTIUM SYSTEM COMPONENTS TO THE ON POSITION UNTIL ALL ELECTRICAL WIRING IS PROPERLY CONNECTED. UNCONNECTED WIRES/CABLES IN A LIVE ELECTRICAL FEED IS A HAZARDOUS SITUATION THAT CAN RESULT IN DEATH OR SERIOUS INJURY.

5.4 Unpacking and Checking Package Contents

The Atlantium system is packaged and shipped in specially packed crates that contain:

- The Atlantium UV Unit
- Ballast Module(s)
- Control ModuleUltrasonic Cleaning Module for Ultrasonic Cleaner
- Documentation
- Peripheral accessories as per your order and listed on your delivery documents are crated according to their size and weight. Small accessories may be crated together.

Each of the crates is connected to a forklift-friendly wooden pallet. The Atlantium crates must be lifted off the transport vehicle using a forklift or crane controlled by a qualified operator.

➡ **To unload and check the system:**

- Step 1.** Using the forklift or crane, lift each of the crates off the transport vehicle and lower them to a level ground surface.
- Step 2.** Walk around and inspect each crate for damage. Note if there is any separation in the joints or any other indication of any damage in transit. If there is any indication of damage, take a photograph of it and use extra caution when proceeding to the next step.
- Step 3.** Unclamp and remove the panels of the crates.
- Step 4.** As you remove the wrapping and shipping protections, verify that the contents of the crates are correct according to the delivery documents. The Atlantium Unit contains a plate with the model number and other product information. Verify that the correct product version is supplied.



- Immediately report to Atlantium and to the insurance carrier any damage to the crates or to the Atlantium system found before opening the crates or during every step of unpacking, installing or testing of the system.
- If you ordered more than one Atlantium system, check the serial numbers against the delivery documents to verify which components comprise each individual system.

5.5 Installing Sampling Points and CIP/Draining Ports

Both the Sampling Points and CIP/Draining Ports must be installed on the inlet and outlet sides of the Atlantium Unit.

5.5.1 Installing the Inlet/Outlet Sampling Points

Aseptic sampling valves are to be located indoors in clean environment without away from direct contact with fan or A/C air flow. They each must be a dedicated valve for sampling only and resistant to alcohol and flame. For information on the Sampling valve's components, see *Installing Sampling Points and CIP/Draining Ports* on page 45. See *Taking Microbial Samples* on page 92. for information on using the Sampling valves.

On the inlet and outlet sides of the water line, connect the aseptic sampling valves.

➔ To install an inlet/outlet sampling point:

Step 1. On the Inlet side, install the **Long welding ferrule or threaded male adapter (1)**.

- Position aseptic sampling valves (1 & 2 in Figure 5-6, on page 48) horizontally (90°) on the pipe center, within 50cm of the Unit.

■ For Stainless Steel Pipes:

- Weld the 1 inch **ferrule (1)** clamp fitting at a horizontal orientation (3 or 9 o'clock).

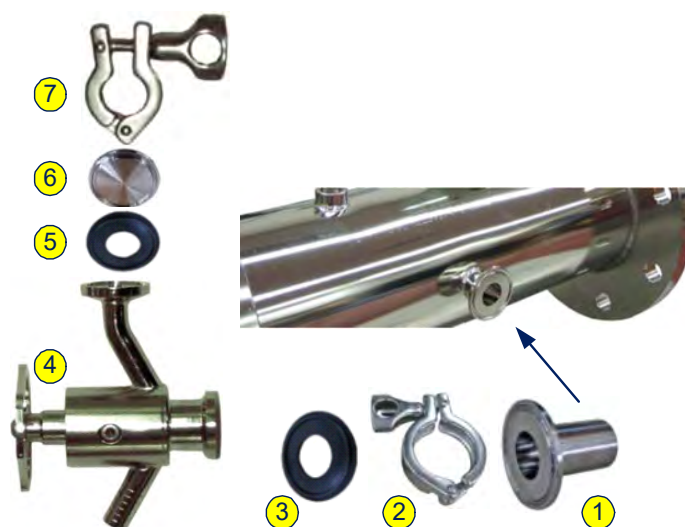


Figure 5-2: Sampling Valve Assembly

- Perform a polishing process to achieve a smooth area on the external and internal part of the pipes.
 - Passivate the pipes to avoid corrosion.
 - **For Plastic Pipes:**
 - Thread the **male adapter (1)** clamp fitting to the port.
 - Repeat for the Outlet side sampling point.
- Step 2.** Fit the gasket (3) into the **welding ferrule or threaded male adapter (1)**.
- Step 3.** Fit the aseptic **sampling valve (4)** on over the gasket (3).
- Step 4.** Fit the clamp (2) around the aseptic **sampling valve (4)/gasket (2)/welding ferrule or threaded male adapter (1)** and close and lock it.



Figure 5-3: The clamp is placed around the aseptic **sampling valve /gasket /welding ferrule or threaded male adapter**

Closing Off the Aseptic Sampling Valve When Not in Use

- Step 5.** Into the spout of the sampling valve, fit the 1/2" gasket (6) and fit the cap (7) over it.
- Step 6.** Fit the 1/2" clamp (5) around the sampling valve spout/gasket (6) /cap (7) and close and lock it.



Figure 5-4: The clamp is closed



Figure 5-5: The clamp is closed

5.5.2 Installing the CIP/Draining Ports

The CIP (Cleaning-In-Place) recirculation system is used for the periodic cleaning and sterilization process of the Atlantium unit's inner surfaces and quartz sleeve. For more information on performing CIP, see **Cleaning In Place (CIP)** on page 95.

A CIP KIT includes the CIP Cart with water reservoir and a pump, capable of pumping up to 4m³/hr (17.6gpm). It includes a supply hose and a return hose, both with ID 19mm (0.75") and length 5m (15 feet) stored in a convenient pocket. See the diagram below.

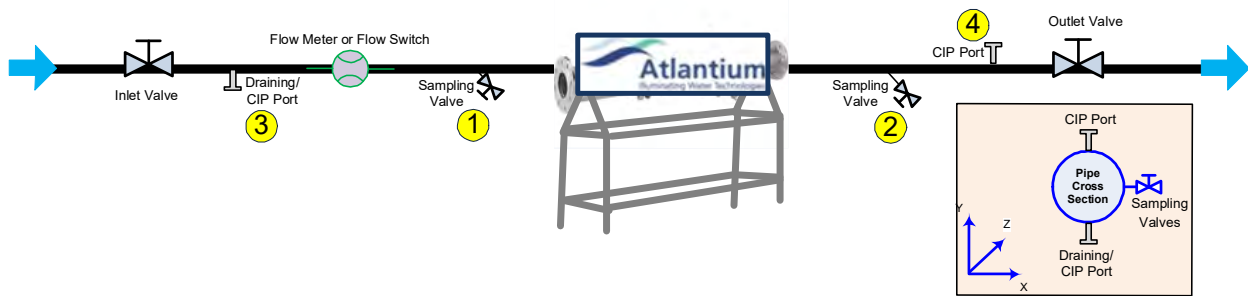


Figure 5-6: CIP Ports and Sampling Valves Orientation

Position the CIP/draining valves (**3 & 4**) on both the inlet and outlet sides of the Atlantium unit. To enable connection of the CIP kit, use high-quality, sanitary equipment, including a 1 inch tri-clamp/ferrule on both sides. A CIP/Draining valve is to be located 1D after the Inlet valve and 1D before the Outlet valve. When not using the CIP ports, close the valve outlet using the tri-clamp cover.

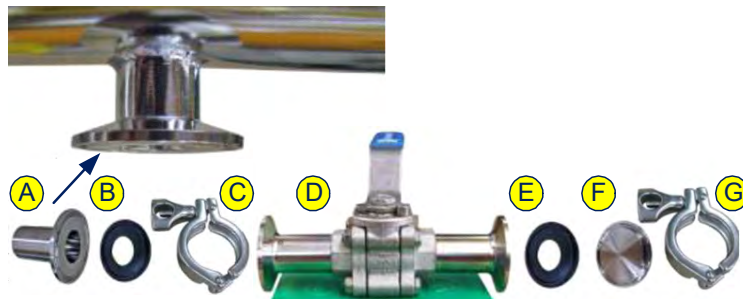


Figure 5-7: CIP Valve Kit



For preparing all electrical connections and mechanical installation, be sure to review the electrical and mechanical ICD drawings provided to you by Atlantium with this manual. If no electrical drawings were provided, please contact your Atlantium representative.

➡ To install the CIP ports:

Step 1. Weld or thread the 1" ferrule at a vertical orientation:

For municipal applications, prepare 1" screw ports for the valves and insert the valves:

- **Draining Valve:** at a 6:00 o'clock orientation on one side of the Atlantium unit.
- **CIP Valve:** at a 12:00 o'clock orientation on other side of the Unit.

For all application except municipal:

■ For Stainless Steel Pipes:

Weld the 1" clamp fittings:

- **Draining port:** at a 6:00 o'clock orientation on one side of the Atlantium unit.
- **CIP port:** at a 12:00 o'clock orientation on other side of the Unit.
- Perform a polishing process to achieve a smooth area on the external and internal part of the pipes.
- Passivate the pipes to avoid corrosion.

■ For Plastic Pipes:

- Thread the clamp the valve fittings to the port..

Attaching the Valve to the ferrule

Step 2. Fit the gasket (**B**) into the **welding ferrule** or **threaded male adapter (A)**.

Installing the Atlantium System

Step 3. Fit the aseptic **valve (D)** on over the gasket **(B)**.

Step 4. Fit the clamp **(C)** around the aseptic **valve (D)**/gasket **(B)**/welding ferrule or **threaded male adapter (A)** and close and lock it.

Closing Off the CIP/draining Ports When Not in Use

Step 5. Into the ferrule, fit the gasket **(E)** and fit the cap **(F)** over it.

Step 6. Fit the clamp **(G)** around the CIP port/gasket **(E)** /cap **(F)** and close and lock it.

Preparing the CIP Hoses

Step 7. On one end of a hose **(A)**, using an appropriate screwdriver, loosen the band **(C)**.

Step 8. Connect the hose to one of the adapters on the cart **(B)**. Push the hose up a far as you can.

Step 9. Using the screwdriver, tighten the band **(C)**.

Step 10. On the other end of a hose **(D)**, using an appropriate screwdriver, loosen the band **(F)**.

Step 11. Connect the hose to one of the hose adapters **(E)**. Push the hose up a far as you can.

Step 12. Using the screwdriver, tighten the band **(F)**.

Step 13. Repeat with the second hose to the adapter on the other side of the cart.

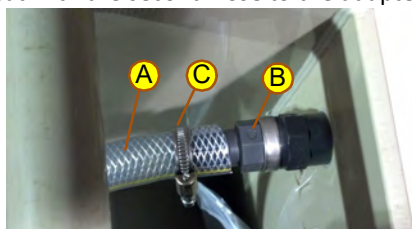


Figure 5-8: Hose Connection to One Side of Cart

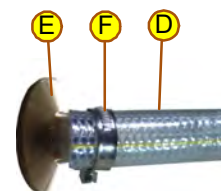


Figure 5-9: Hose Connection to Hose Adapter

5.6 Positioning the Atlantium Unit

Read through this typical installation section **before** you begin.

Make sure to use your installation drawing during this procedure. The Unit's triangle support brackets must rest on a strong, stable, level surface and anchor the Unit. Trace the path to be taken to position the Unit to its planned location and clear it of all obstacles.

In general, Atlantium systems can be installed horizontally or vertically in your piping system. Vertical installation of the Atlantium unit and piping, with an upwards direction of flow, is the preferred configuration for installation, where this is possible.

If mounting the unit in a horizontal configuration, a slope of at least 5 % is recommended to minimize the risk of air pockets developing or remaining trapped in the Atlantium unit. The Customer is to supply the mechanical means for ensuring this slope (see Figure 3-1 on page 24). For a vertical installation, the Atlantium Unit can be positioned against a wall or on skids.

5.6.1 Required Equipment

Supply the following tools and equipment:

- Lift or crane
- Lifting strap
- Bolts, washers & lock washers
- Supports for inlet/outlet piping and for the Unit as shown on your installation plan



The Atlantium unit is heavy - refer to Table 2-4, **Ballast Module Physical Details**, on page 16. Two people are required to get the Atlantium Unit to the designated installation location - a qualified lift or crane operator, at least one other person to guide the Unit as it is transported, and others as needed.

➤ To position the Atlantium unit:

- Step 1.** Note the direction of the water flow that is to occur in the piping process into which you intend to place the Atlantium Unit and the Flow indicator marked on the unit. Use this information to decide at which angle to lift the Unit for transport. This is to help you to prepare for placing the Unit at the location.
- Step 2.** To lift the Unit from its packing crate, securely attach lifting straps **(1&2)(2)** to around the end fittings **(1)** on each end of the Unit.
- Step 3.** Join the straps together **(1&2)** with a third central strap **(3)** that is secured to the lift or crane **(4)**. **(4)**--

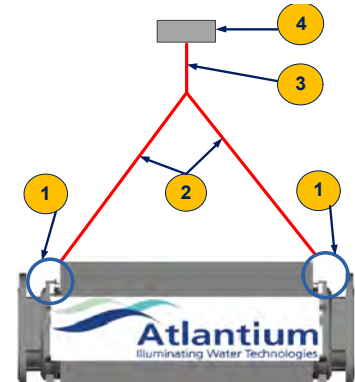


Figure 5-10: Lifting Strap Locations

- Step 4.** Ensure that all straps are connected securely to the Unit, to each other and to the lift/crane.
- Step 5.** Using the lift/crane, lift the Unit by the straps, out of the crate and position it for safe transport (near-ground level is preferred).
- Step 6.** Using the lift/crane and the designated person to guide, carry the Unit to its intended location.
- Step 7.** Install the Atlantium Unit:

Horizontal Installation

- At the designated location, check the installation plan, including the distances between the triangle support brackets.
- Position the customer-provided supports /surface so that the Unit's triangle support brackets are at least 750mm / 29.5 inch above the floor. (Refer to the **RZ163 series Interface Control Drawings** provided by Atlantium.)
- Carefully lower the Unit to its position.
- Using the appropriate bolts, washers and lock washers, bolt the triangle support brackets to the customer-provided corresponding supports.

For Vertical Installation

Position the Atlantium Unit vertically so that the Flow label is pointing upwards:

- At the designated location, check the installation plan.
- Position the vertical supports / skids so that the Unit is at least 750mm / 29.5 inch away from the wall, to enable maintenance from all sides (Refer to the **Interface Control Drawings** provided by Atlantium.)
- Carefully lower the Unit to its position.
- Using the appropriate bolts, washers and lock washers, bolt the triangle support brackets to the customer-provided corresponding supports.



Figura 5-11: Etiqueta Flow

5.6.2 Connecting to facility piping

- Step 1.** To connect the fitting on one side of the Unit to the fittings of the facility's pipes, insert an gasket between the Unit's and the facility's pipes. In some cases, a reducer or expander may be necessary.
- For systems with flange interface, on one side of the Unit to the flanged fittings of the facility's pipes with eight appropriate (8) sets of bolts/nuts/flat and lock washers - do not tighten the hardware.
 - For systems with Tri-Clamp fittings, on one side of the Unit, clamp the fittings together - do not tighten the hardware.
- Step 2.** Repeat the step above for the other side of the Unit.
- Step 3.** Tighten the fastening hardware so that the torque pressure around the fittings is even, and the Unit is firmly connected to the facility's water line.
- Step 4.** For installations with multiple units, repeat this procedure for the second unit.
- Step 5.** To check for any leakage, open the Inlet and Outlet valves to allow water to flow through the newly installed Unit and its surrounding process piping.
- Step 6.** If you find any leakage, tighten the connections.
- Step 7.** Close the Inlet and Outlet valves and use the Draining valve, drain the Atlantium system piping from Inlet valve to Outlet valve.



Figure 5-12: Generic Tri-Clamp Fitting

5.7 Installing Surge Protection

Verify that you have a protective device that prevents electrical surges and fluctuations from causing damage. You must install at least one of these two types of surge protection:

- UPS (Uninterrupted Power Supply) has an internal battery that allows the equipment plugged into it to continue to run in the event of a power outage until power is restored. It also has the benefit of performing the same functionality of surge protectors, protecting against spikes and surges. If needed, the UPS allows the system to be shut down cleanly if power is out for a lengthy period.
- Surge protection device that protects your equipment from variations in electrical current, such as surges and spikes.

The diagram to the right shows the generic wiring for a surge protection device. See the manufacturer's installation instructions with the surge protection device to be installed. For more information about surge protection devices available via Atlantium, see **Surge Protector Devices** on page 19.

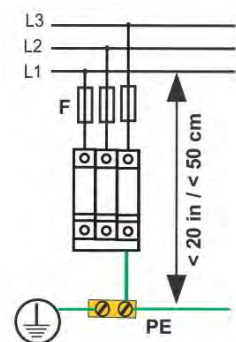


Figure 5-13: Surge protection device wiring - 440/480VAC

5.8 The Control Module

The **Control Module** contains a jumper marked **11** in the figure below.

Table 5-1: **Control Module** Components

#	Item
1	Mounting Holes
2	Data Cable + Gland
3	Electrical Cable + Gland
4	Electrical Connectors
5	Holes for Peripheral Component Connections
6	Various Component Connectors (See Table 5-8 on page 69)
7	Ethernet Connector
8	Circuit Breaker
9	Wireless Modem (optional item - factory installed)
10	Connector for Wireless Modem (optional item - factory connected)
11	Jumper
12	Gnd Wire
13	Connection to Screen Display
14	Two USB Ports (top side of the board)

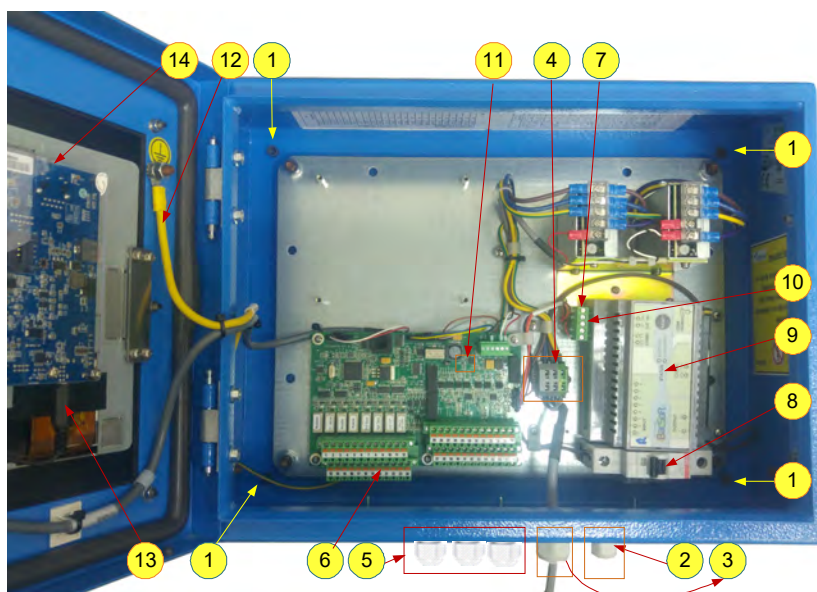


Figure 5-14: Control Module Interior

5.8.1 Mounting the Control Module

For exact physical dimensions of all units, be sure to consult the Mechanical ICD drawings provided to you by Atlantium with this manual.

The **Control Module** can be mounted on a wall or suitable anchoring point. The **Control Module** comes with an electrical 1.6M/ 5.25ft. long (1.5m/4.92ft. from the PG gland) and a Data cable (for length options, see the table below). However, it can be placed up to 50M/ 164.04 ft. from the Atlantium Unit, in a place that it is easy to reach the touch screen and read the monitoring information. A longer Data Cable can be ordered for this purpose.

ATTENTION!

- When mounting the **Control Module**, take into consideration the length of the cables.
- **Do not Stretch Electrical Cables - Avoid tension on the electrical cables. They are to be installed within conduits and must not be stretched.**



For preparing all electrical connections and mechanical installation, be sure to review the electrical and mechanical ICD drawings provided to you by Atlantium with this manual. If no electrical drawings were provided please contact your Atlantium representative.

Table 5-2: Control Module Data Cable Length Options

Catalog No.	Metric	US Units
HSL013400	2 m	3.28ft.
HSL013100	5 m	6.56ft.
HSL014500	10 m	32.81ft.
HSL014540	15 m	49.21ft.
HSL014541	20 m	62.17ft.
HSL014542	25 m	82.02ft.
HSL014550	30 m	98.43ft.
HSL014560	50 m	164.04ft.

➞ To mount the Control Module on the wall:

- Step 1.** On the wall space designated for the **Control Module**, make four marks according to the spacing measurements for mounting orientation on the ICD drawing accompanying the documentation.
- Step 2.** The mounting holes **(1)** are 8.5mm (0.33") in diameter. Using the appropriate drill bit, drill the four holes.
- Step 3.** In each hole, insert a plastic anchor.
- Step 4.** Uncrate the **Control Module** package and carefully lift it out.
- Step 5.** Open the door of the **Control Module** and remove the plastic covers on the four holes.
- Step 6.** Position the **Control Module** so that its four holes fit over the drilled holes.
- Step 7.** Using appropriate screws and with a screwdriver, screw in the four screws in a diagonal pattern (one corner, then the opposite corner).
- Step 8.** To secure the **Control Module** firmly, return to each screw in the diagonal pattern and tighten the screws securely.

➞ To mount the Control Module on skids:

- Step 1.** At the location designated for the **Control Module** set up the skids with spacing that matches the spacing measurements for mounting orientation on the ICD drawing accompanying the documentation.
- Step 2.** The mounting hole **(1)** are 8.5mm (0.33") in diameter. Using the appropriate bolts and nuts, with a screwdriver, screw in the four bolts and add the nuts leaving around 5.6mm (0.20-0.24") sticking out.
- Step 3.** Uncrate the **Control Module** package and carefully lift it out.
- Step 4.** Open the door of the **Control Module** and remove the plastic covers on the four holes.
- Step 5.** Position the **Control Module** so that its four holes fit over the corresponding holes on the skids.
- Step 6.** Using appropriate bolts and nuts and with a screwdriver, screw in the four bolts adding the nuts in a diagonal pattern (one corner, then the opposite corner).
- Step 7.** To secure the **Control Module** firmly, return to each bolt in the diagonal pattern and tighten them securely.

5.9 Installing the Ballast Module(s)*

Each UV lamp requires a corresponding Ballast Module. The location for mounting the Ballast Module(s) must take into account the length of the cables to be attached from the Atlantium Unit. If you need to calculate space-cooling requirements for the location in which you are installing the Ballast Module(s), refer to the table for heat load per Ballast Module, shown below:

	85W
Heat Load per Ballast Module:	115W
Standard Lamp:	151W
High Power Lamp:	
Ultra high power lamps	

ATTENTION!



- Do not Stretch Electrical Cables - Avoid tension on the electrical cables. They are to be installed within conduits or cable trays and must not be stretched.
- Install the Ballast Modules of the Atlantium system in an area where the air is clean and free of dirt particles in suspension (e.g. sand, dust, oil, food powders, etc.). This precaution protects the BM cooling fans/vents from blockage by dirt.

*For maintenance procedure and diagram of Ballast Module Types B/C, see **Checking & Cleaning the BM Cooling Fans** on page **123**

Ballast Modules must be installed vertically and positioned at least one meter above ground level. Ballast Modules must be at least 300mm (12") from each other or from any other object around them to allow proper ventilation. Ballast Modules must not be installed within closed cabinets.

You can mount them next to each other horizontally or one above another vertically. Atlantium recommends you arrange the Ballast Modules in consecutive order from left to right according to the number marked on the bottom of the Ballast Module.

Consult the **Ballast Module's ICD** accompanying this manual.

BALLAST MODULE C (Power Unit version).

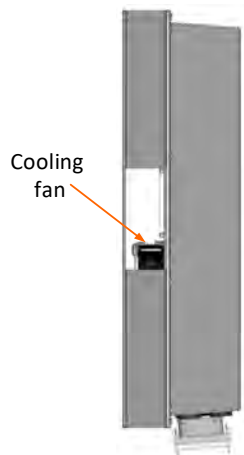


Figure 5-15: Ballast Module C side view

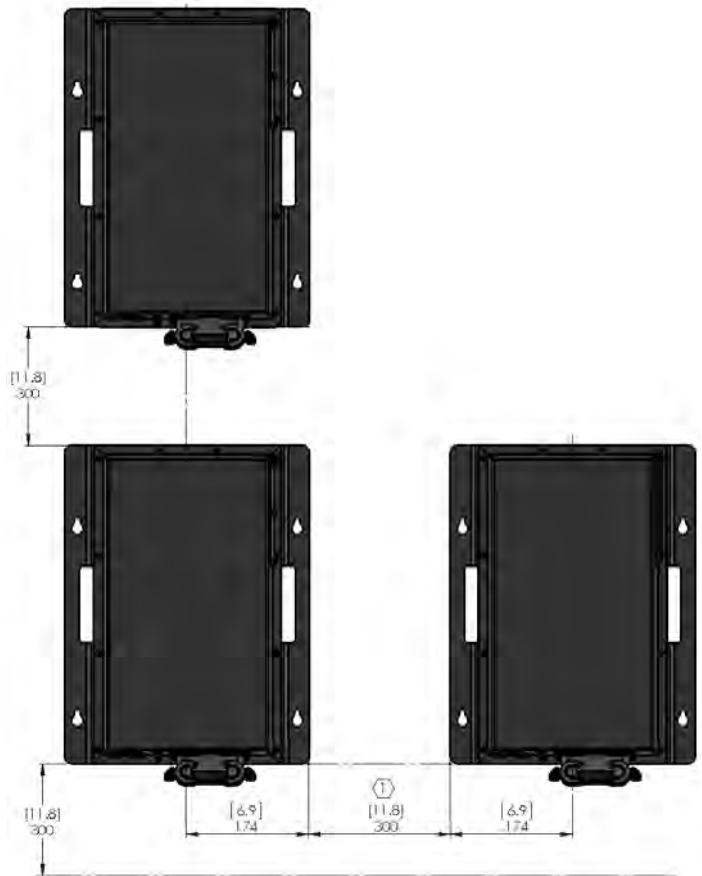


Figure 5-16: Multiple Ballast Module C Installation Diagram

➔ To mount a Ballast Module on the wall:



The Ballast Module is heavy! Be sure that the wall on which you intend to mount the Ballast Module is strong enough to carry its weight.

- Step 1.** On the wall space designated for the Ballast Modules, make four marks according to the spacing measurements for mounting orientation on the ICD drawing accompanying the documentation.
- Step 2.** The keyhole slots for mounting are 7mm (0.28") in diameter for screws size M6 OR 1/4" bolts. Using the appropriate drill bit, drill the four holes.
- Step 3.** In each hole, insert a plastic anchor and with the appropriate screwdriver, screw in the screw leaving around 5.6mm (0.20-0.24") sticking out of the wall.
- Step 4.** Uncrate the Ballast Module package and carefully lift out the Unit.
- Step 5.** Fit the keyhole slots onto the protruding screw heads and slide the Unit downward until the top of the keyhole slots rest on the screws.
- Step 6.** To secure the Unit firmly, tighten the four screws.

Installing the Atlantium System

➡ To mount a Ballast Module on skids:

- Step 1.** At the location designated for the Ballast Modules, set up the skids with spacing that matches the spacing measurements for mounting orientation on the ICD drawing accompanying the documentation.
- Step 2.** The keyhole slot for mounting is 7mm (0.28") in diameter for screws size M6 OR 1/4" bolts.
- Step 3.** Using the appropriate screwdriver, screw in the four bolts and add the nuts leaving around 5.6mm (0.20-0.24") sticking out.
- Step 4.** Uncrate the Ballast Module package and carefully lift out the Unit.
- Step 5.** Fit the keyhole slots onto the protruding bolt heads and slide the Unit downward until the top of the keyhole slots rest on the bolts.
- Step 6.** To secure the Unit firmly, tighten the four bolts and their nuts.

5.9.1 Connecting the Ballast Module Cables

One end of the **Cable Harness** is attached to the connection box of each lamp of the Atlantium Unit. Refer to the **Electrical ICD** drawing provided to you by Atlantium with this manual for the connection of the other end of the **Cable Harness** - .

➡ To connect the cable:

Table 5-3: Ballast Module Details

#	Item
A	Single Connector with lock latch
B	48VDC for Fan - 440/480VAC only
C	Pressure Relief
D	Fuse Housing (for Atlantium Technicians only)
E	Connector width 13.11cm / 5.159inch.



Figure 5-18: Connector Detail

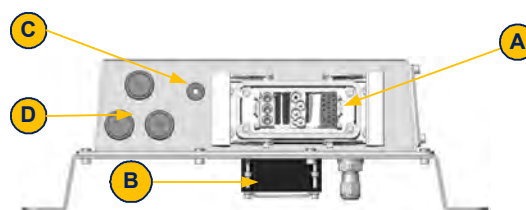


Figure 5-17: Ballast Module C-Waterproof Box (bottom view)

- Step 1.** According to the electrical drawing of the Installation plan, bring the **Cable Harness** attached to the Connection Box of Atlantium Unit up to the Ballast Module.
- Step 2.** On the Ballast Module, pull the lock latch of the connector to the open position and remove the protective cover.



Be sure to save the protective cover of the Ballast Module connector in an accessible location for the future in case you need to dismantle the Ballast Module for any reason.

- Step 3.** Connect the lamp cable lead to the Lamp connection port (**A** in the figures above) (the connector is keyed so it only matches in one position) and pull the lock latch closed to secure the connection.

5.10 Connection Box



- The Connection Boxes on top of the Atlantium unit are generally delivered to the customer pre-connected to the other system elements. This section describes connection that may need to be added or changed, according to customer requirements.
- On one side of the Connection box, there are 6 holes (marked **A** in the diagram Figure 5-19 on page 58) to be used to thread these cables, if required.
- The Connection Box Card contains terminals for connecting signal wiring, however, Atlantium recommends connecting the signal wiring for these on the **Control Module**. Consult your Atlantium technician to see if the **Control Module** software installed supports connection to Connection Box terminals.



WARNING!

DO NOT DRILL INTO THE CONNECTION BOXES OR ALTER THEM IN ANY WAY!!!!

The Connection Box already contains entry glands for ALL of the cabling needs.



Making holes in a Connection Box will destroy its waterproof seal, endangering the components inside. Do Not draw electricity from the Atlantium Unit's Connection Box as it will damage the Unit's electrical configuration.



Any person involved in handling the Connection Box card or its components is required to wear an electrostatic discharge (ESD) Wrist Strap.

Connect the ESD Wrist Strap to any bolt on the body of the Atlantium Unit or to the metal bracket under the Connection Box using a banana plug or an alligator clip.

Atlantium uses the following types of Connection Box (LM) cards:



- The first junction box is labeled with the number 1.
- If the first junction box is referenced and the system contains only one junction box, the only junction box is the first.

Table 5-4: Connection Box (LM) cards

Connection Box Card Type	P/N	For use in systems...:
700/750	AP0000700/ AP0000750	systems with Ultrasonic Cleaner
1300	AP0001300	RZ systems without Ultrasonic Cleaner
1350	AP0001350	RZB systems
1400	AP0001400	together with Card 1300 or 1350 for systems with DPM cleaner
1500	AP0001500	together with Card 1300 or 1350 for systems without DPM cleaner

5.10.1 Connecting the Ultrasonic Cleaning Cables

For systems with the Ultrasonic Cleaning system only, the cables must be connected between the Ultrasonic Cleaning Module and the Connection Box #1.



Do not alter any cable connection that is supplied from the factory. The Ultrasonic Cleaner cable is connected to a terminal in the Connection Box from the factory. The Data cable is connected in the Ultrasonic Cleaner Module from the factory.



Atlantium recommends connecting the signal components to the **Control Module**. However, connection to the LM card may be used as an alternative. You should consult your Atlantium technician about this.

The Ultrasonic Cleaner cable is connected to a terminal in the Connection Box from the factory. The Data cable is connected in the Ultrasonic Cleaner Module from the factory.

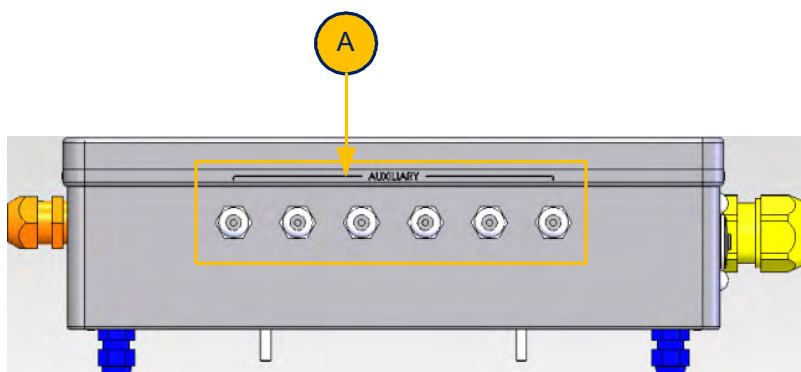
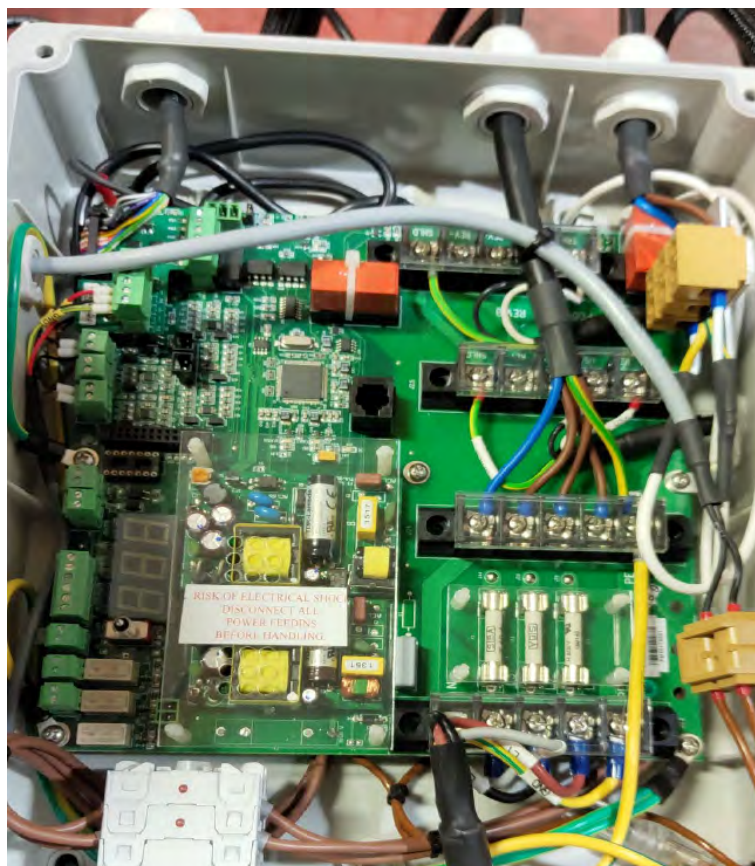


Figure 5-19: Connection box with cable insertion holes (A)



Connection Box with LM Card 700/750 (for system with ultrasonic cleaner)

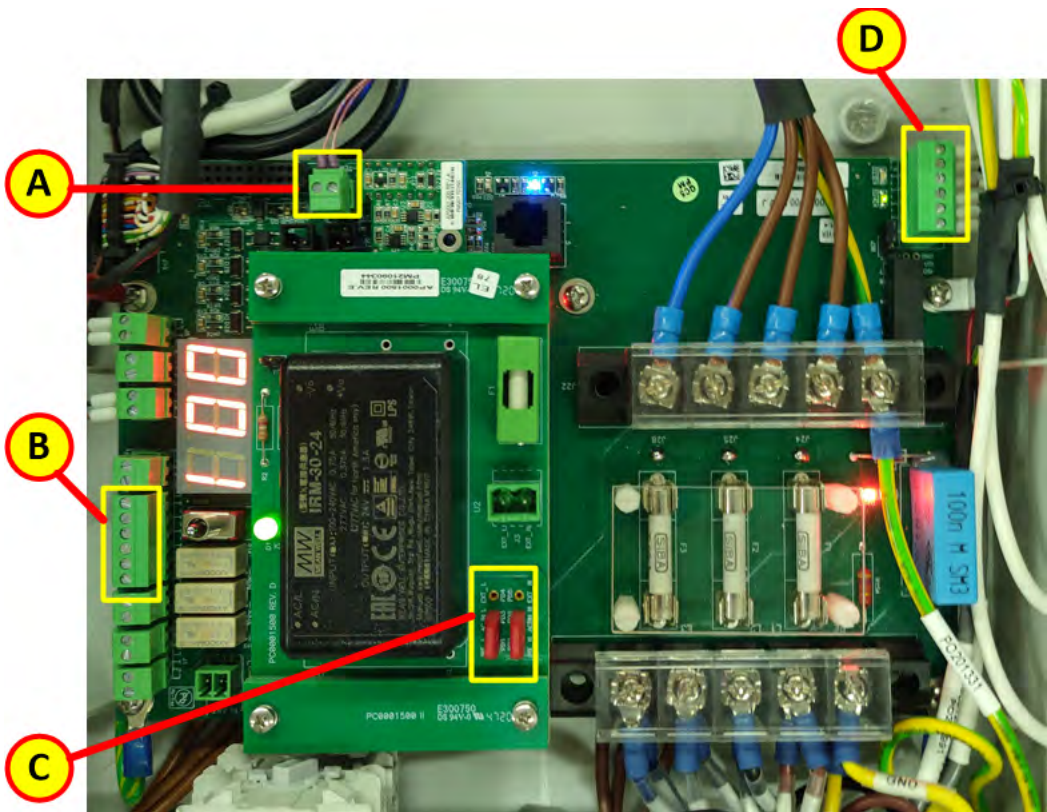


Figure 5-20: Connection Box LM Card 1300+1500 (for RZ system without cleaner)

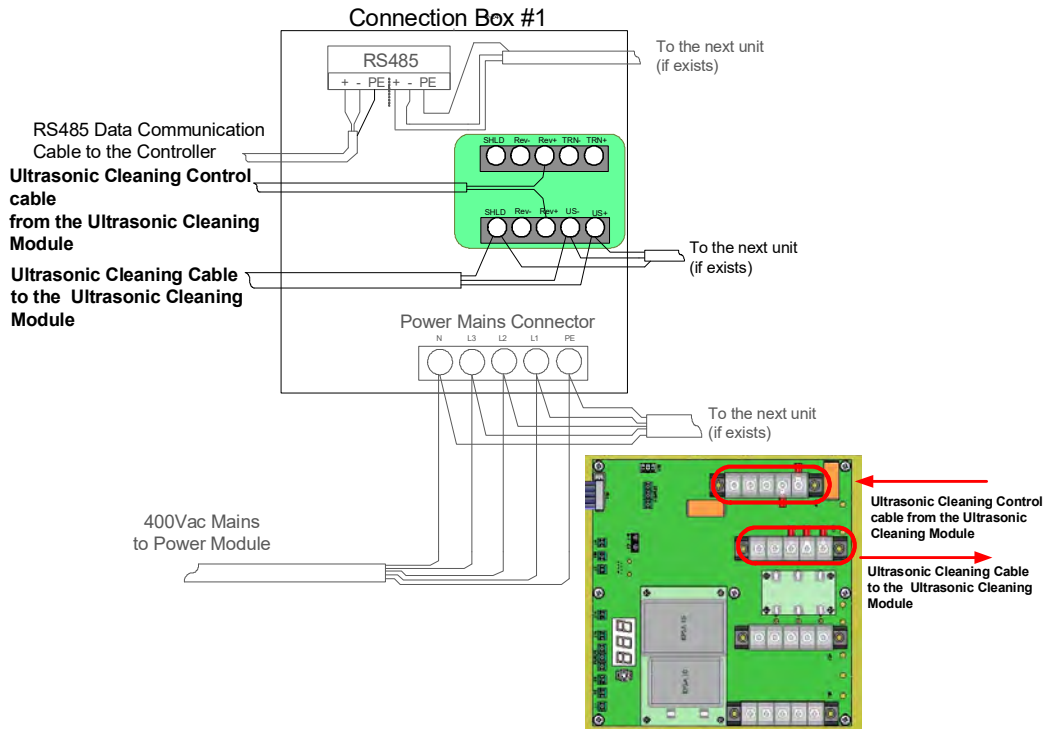


Figure 5-21: Cabling Schematic Diagram

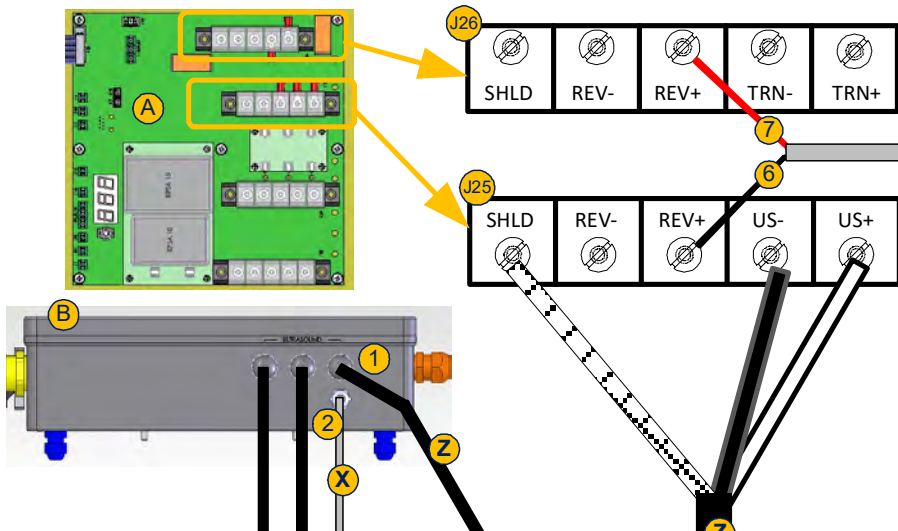


Figure 5-22: Ultrasonic Cleaner Cable Connections in the Connection Box

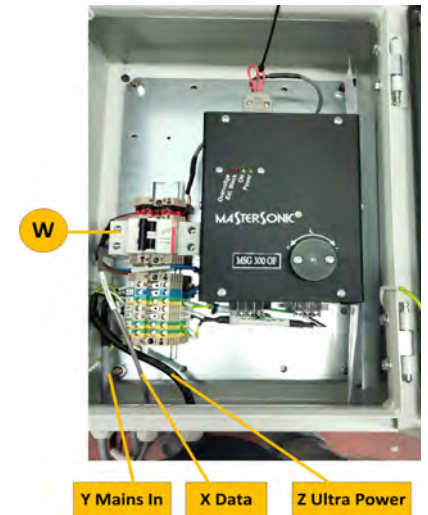


Figure 5-23: Ultrasonic Cleaner Module - Inside View

➤ To connect the ultrasonic Cleaning system cables:

- Step 1.** The Ultrasonic Cleaner cable (marked **(Z)** in Figure 5-22 above) is connected in the Connection Box #1 to terminal **(J25)** from the factory. From the Connection Box, extend the Ultrasonic Cleaner cable **(Z)** to the Ultrasonic Cleaner Module and thread it through gland in Figure 5-23 .
- Step 2.** Connect the Ultrasonic Cleaner (Z) cable's White wire to the **US+** port on the Ultrasonic Cleaner Module terminal in Figure 5-24.
- Step 3.** Connect the Ultrasonic Cleaner cable's Black wire to the **US-** port on the Ultrasonic Cleaner Module terminal in Figure 5-24 to the right.

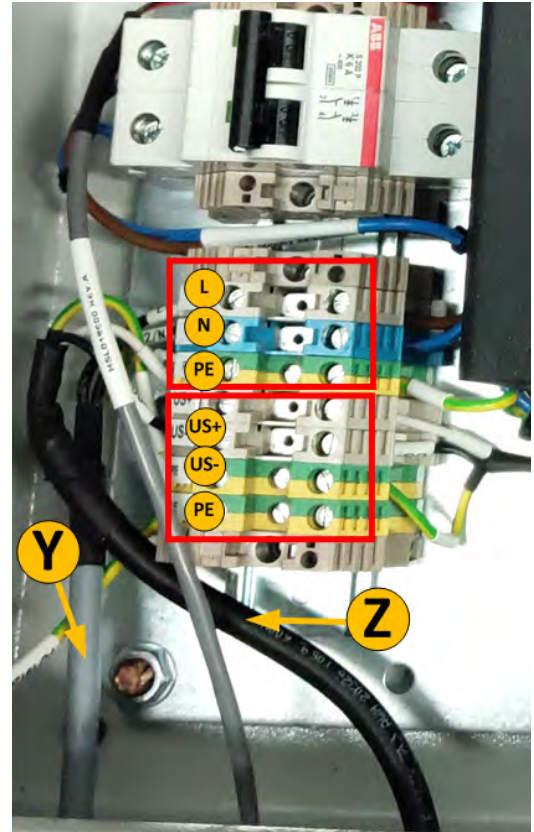


Figure 5-24: Ultrasonic Cleaner Module Terminals

- Step 4.** From the Ultrasonic Cleaner Module, extend the Control cable (marked **(X)** in Figure 5-22 above) to the Atlantium Unit and thread it through gland **(2)** on the Connection Box #1 **(B)**.
- Step 5.** Connect the Data cable's Black wire **(6)** to the REV+ port on the Ultrasonic Cleaner terminal **(J25)**.
- Step 6.** Connect the Data cable's Red wire to the **(7)** REV+ port on the Ultrasonic Cleaner terminal **(J26)**.

5.10.2 Connecting the Power Cable to the Ultrasonic Cleaning Module

For systems with the Ultrasonic Cleaning system only, the power cable to be connected to the mains must be connected to the Ultrasonic Cleaning Module.



Do not plug in the Ultrasonic Cleaner Module to an outlet until after the hardware installation is complete and the system is ready to be initialized.

Table 5-5: LM cards 1300 + 1500

#	Description
A	Temperature sensor input
B	Flow meter input
C	Jumpers for 380 V on 1500 card
D	Communications connector

➔ To connect the power cable to the Ultrasonic Cleaning Module:

Step 7. Thread the cable (Y) through the gland (Y) and connect it L - N - PE as shown as in the diagram

5.10.3 Connecting the Ultrasonic Cleaning Module and Power Module.

➔ To connect the Ultrasonic Cleaning Module to the Power Module:

- Step 1.** Open the door of the Power Module.
- Step 2.** Thread the Mains Power cable into the module through one of the glands [C] on the lower R side, and connect to terminal block [D] according to the relevant diagram supplied with the unit.
- Step 3.** Thread the cable from the Ultrasonic Module through the innermost gland [E#] and connect to [E], which is labeled CB2.
- Step 4.** Similarly, thread the cable from the Control Module through the gland [F#] and connect to [F], labeled CB3.
- Step 5.** Similarly, thread the cable from the Connection Box through the gland [G#] and connect to [G], labeled CB4.

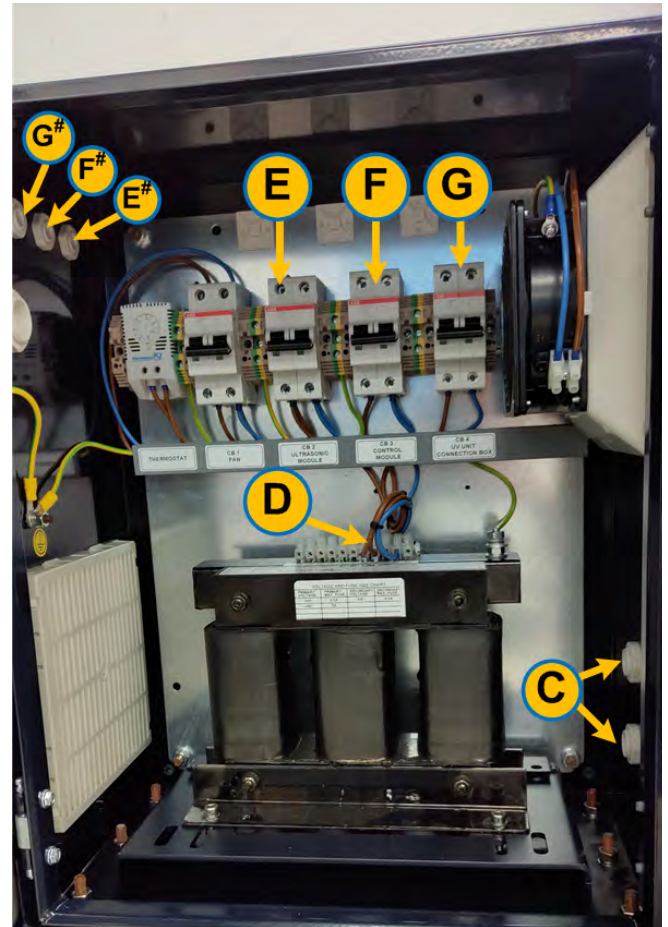


Figure 5-25: Power Module - connections

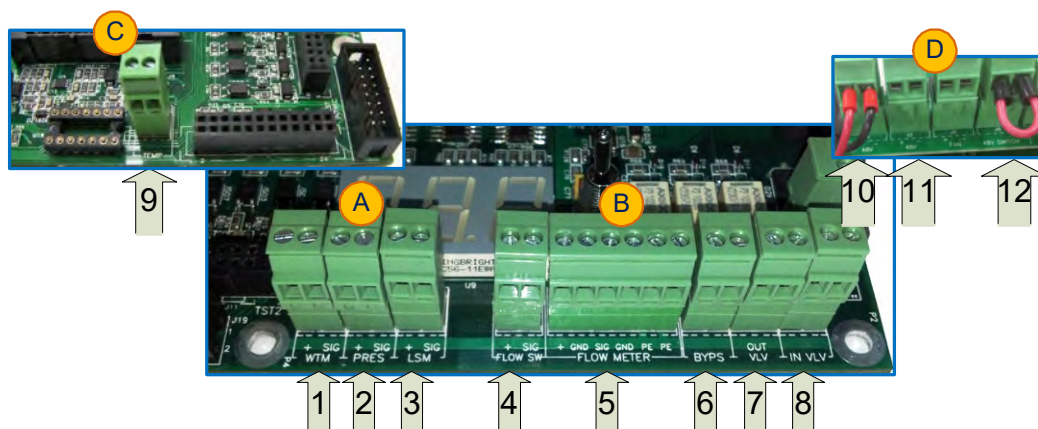


Figure 5-26: Connectors on Connection Box Card 1300+1400

Table 5-6: Connections Key - Connection Box Card 1300+1400

#	Text on the Circuit Board	Description	Signal type	Value	Notes
A					
1	WTM	UVT Analyzer input	Analog	4-20mA	already assembled
2	PRES*	Pressure Transmitter input (Optional)	Analog	4-20mA	Optional
3	LSM	UVIS Sensor input	Analog	4-20mA	already assembled
B					
4	FLOW SW*	Flow switch input	Digital	Dry contact / Open collector	Either Flow Switch or Flow Meter Optional *
5	FLOW METER*	Flow meter input	Analog	4-20mA	
6	BYPS STR*	Bypass valve output	Dry contact		Optional
7	OUT VLV*	Output valve output	Dry contact		Optional
8	IN VLV*	Inlet valve output	Dry contact		Optional
C					
9	TEMP	Temperature sensor input	Analog		already assembled
D					
10	48V	48V power connection for DPM			already assembled
11	48V	Daisy chain connector for additional lamps for 48V power connection for DPM			already assembled
12	48V Switch	Jumper			already assembled
E	Various	DPM connectors			already assembled

➡ To connect the Data cable:

Step 1. Extend the Data cable connected to Connection Box #1, out to the **Control Module** and connect it to the following terminals on the RS485 port of the Control Module (Figure 5-27).

Step 2. Note that the Data cable is connected to the **RS-485** terminal block marked [7] in Figure 5-14 on page 52, with the three wires connected to the available +, -, and PE ports (1,2+3) according to the diagram on the right. (The second port set is used to daisy-chain to an additional Connection box as relevant.)

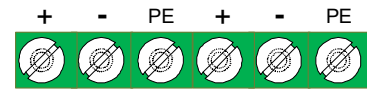


Figure 5-27: RS485 Data Cable Connector



Do not make alterations to or drill into the Ballast Modules, Control Module, or any other component of the Atlantium System. Such alterations void the Atlantium Warranty.

5.11 Connecting Peripheral Equipment

5.12 Modbus Communication Connections

Modbus is an application layer messaging protocol for client/server communication between devices connected on different types of buses or networks. Modbus is often used to connect a supervisory computer with a remote terminal unit (RTU) in supervisory control and data acquisition systems.

The Atlantium system can be controlled directly from your facility control system via Modbus - RTU on RS485 (network) serial connection.

To accomplish this:

The Modbus Settings must be configured in the **Control Module**. See **Configuring More Settings** on page 80.

5.12.1 Control Module Connections

You can connect signal wires for the following peripheral equipment to the **Control Module's** terminal block:

- | | |
|-------------------------------|-----------------------|
| ■ Atlantium Unit's Data Cable | ■ Inlet Valve Output |
| ■ System Ready/Outlet Valve | ■ Bypass Valve Output |
| ■ General Alarm | ■ Flow Meter Input |
| ■ Shutdown Warning | ■ Flow Switch Input |
| ■ High Temperature | ■ External On/Off |
| ■ UVT Out | ■ Dose Output |
| ■ Low UVT | ■ Modbus |
| ■ Low/Normal Mode | |

➤ To connect peripheral equipment:

- Step 1.** Using the attached key, open the screen panel of the **Control Module**.
- Step 2.** Use the holes, adding plastic glands as needed, on the bottom (**B**) to insert cables.
- Step 3.** Use the hole (**C**), adding plastic glands as needed, on the bottom to insert the data cable from the Atlantium Unit.
- Step 4.** Thread the cables to the appropriate connector (**A**) according to the table below.
- Step 5.** For connecting to an external facility control via Modbus, see Appendix A, **Modbus Communication Protocol** on page 173. Add jumpers to any unused pins as shown in the diagram below.

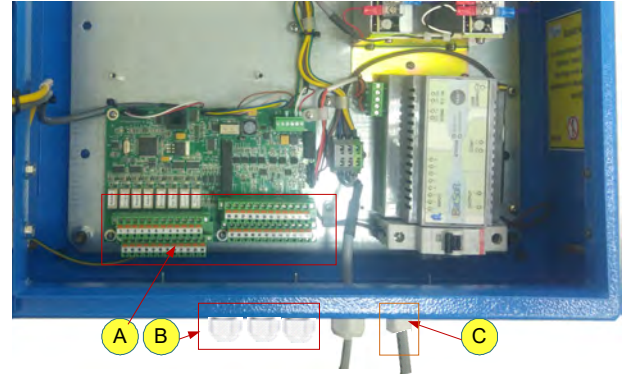


Figure 5-28: Control Module Interior Generic

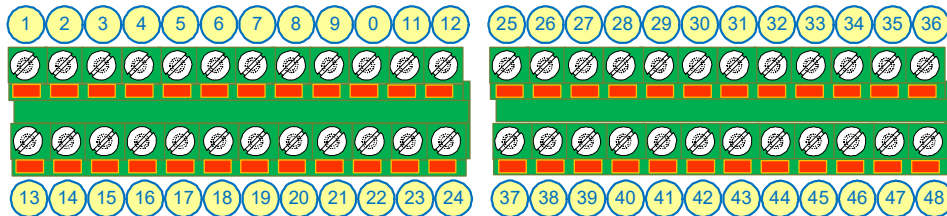


Figure 5-29: Control Module Terminal Connectors

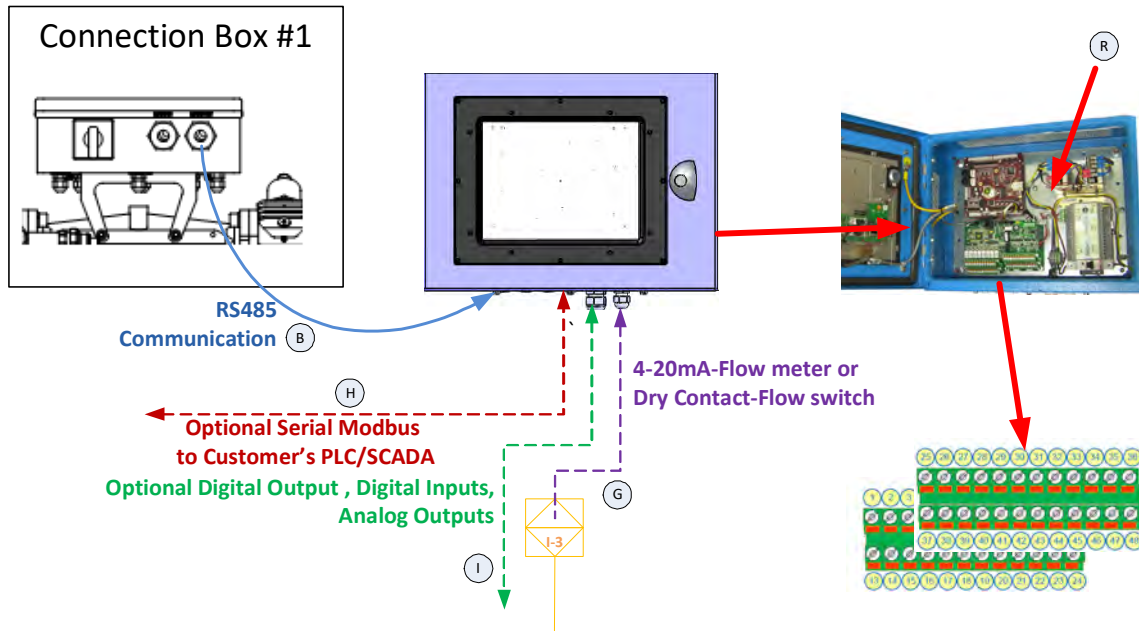


Figure 5-30: Digital and Analog Input and Output Connections-Schematic Diagram

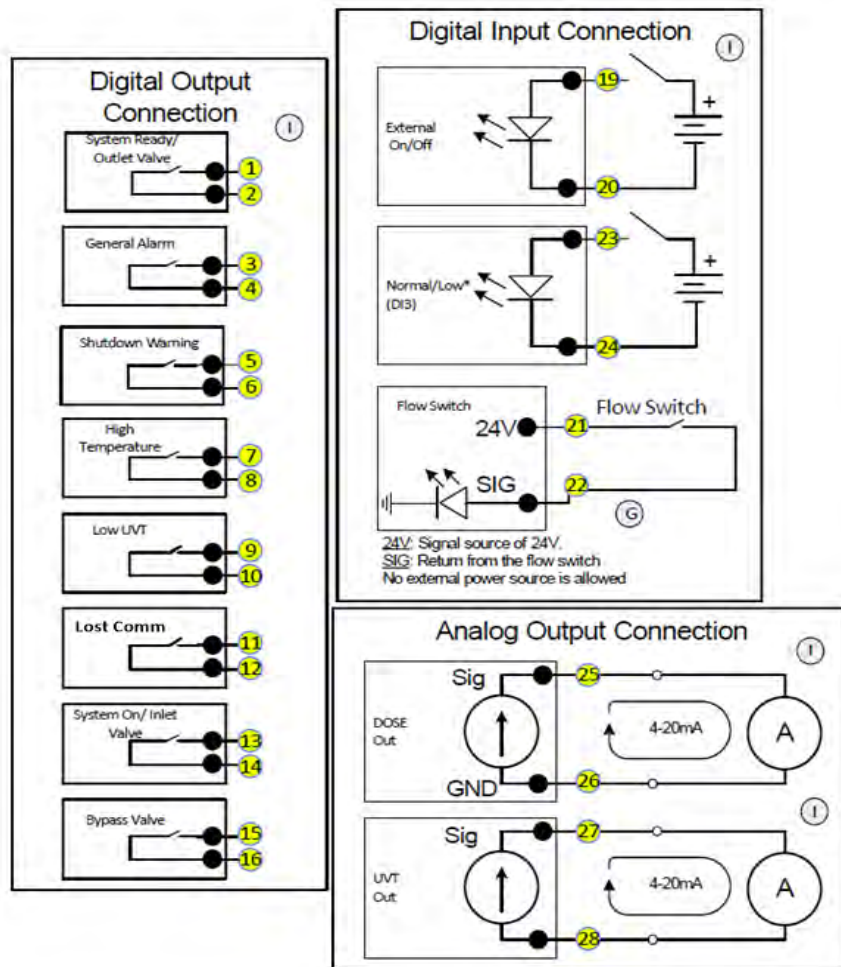


Figure 5-31: Digital and Analog Input and Output Connections

* **Low:** The system works at minimum power no matter if it is set to power mode or dose mode.

Normal: In power mode the power is as user defined and in dose mode the system regulates the power as necessary during regular operations.

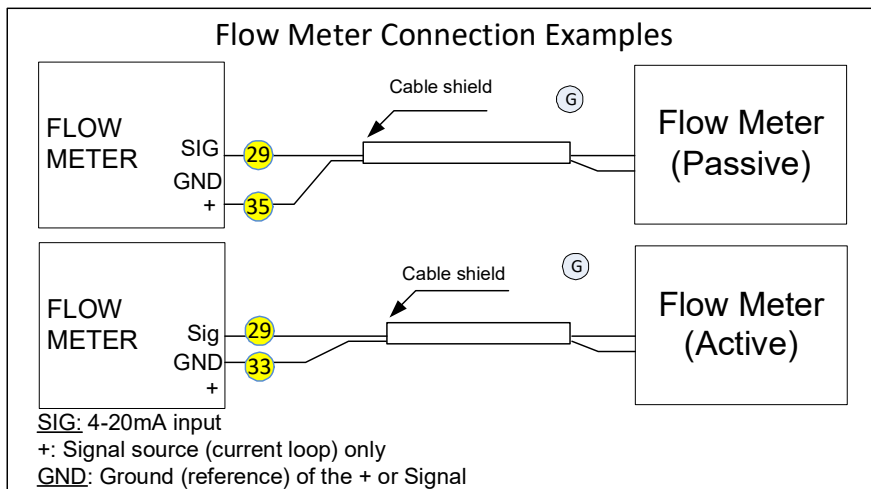


Figure 5-32: Flow Meter Connection Examples

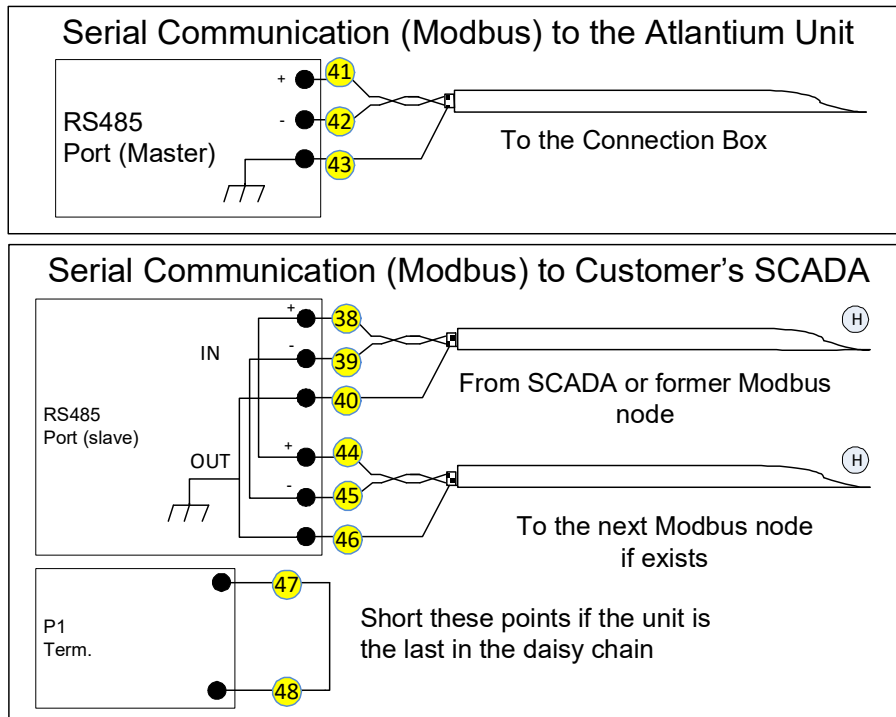


Figure 5-33: Serial Communication (Modbus) Connections



For incoming power to the **Control Module** and the Connection Box, see the power distribution diagram.

Table 5-7: Peripheral Equipment Cable Details

#	Item	Sizes	Cat. No.	Description	Diameter	Supplied by
B.	Control Module RS485 data communication cable	5m/16.4ft.	HSL013200	Shielded twisted pair, 22AWG, 300V(General cables C0720A)	0.25 inch	Atlantium
		10m/32.8ft.	HLS014500			
G.	Flow Meter 4-20mA or Flow Switch cable Dry contact	Customer defined	-	Connect to Connection Box no.1 through gland size 7. Wires size according to Flow Meter / Flow Switch manufacturer's instructions	0.25 inch	Customer

Table 5-7: Peripheral Equipment Cable Details

#	Item	Sizes	Cat. No.	Description	Diameter	Supplied by
H.	RS485 Data communication cable	Customer defined	-	Shielded twisted pair, 22AWG, 300V	0.25 inch	Customer
I.	Digital output , Digital inputs, Analog outputs	Customer defined	-	Shielded cable, pairs of 22AWG, 300V	According to the number of pairs	Customer
R.	Laptop Control Module interconnect	Customer defined	-	Standard ETHERNET cable	-	Customer

Table 5-8: Control Module Terminal Block Connector Pins J35 (J3+J5)

	Function	Pin's Number	Values
Digital Outputs	System Ready/Outlet Valve COM	1	Dry Contacts Max. Voltage: 24V max. Current: 2A max Max. switching capacity: 50W max
	System Ready/Outlet Valve N.O.	2	
	Alarm COM	3	
	Alarm N.O.	4	
	Shutdown Warning COM	5	
	Shutdown Warning N.O.	6	
	High Temperature COM	7	
	High Temperature N.O.	8	

Table 5-8: Control Module Terminal Block Connector Pins J35 (J3+J5)

	Function	Pin's Number	Values
Digital Outputs	Low UVT COM	9	
	Low UVT N.O.	10	
	Lost COM	11	
	Lost COM N.O.	12	
	System On/Inlet Valve COM	13	
	System On/Inlet Valve N.O.	14	
	Bypass Valve COM	15	
	Bypass Valve N.O.	16	
	Spare	17	
	Spare	18	
Digital Inputs	External On/Off (DI1) +	19	On: 10-48VDC Off: <1VDC See <i>External On/Off - Additional Notes</i> on page 72
	External On/Off (DI1) -	20	
	Flow Switch (DI2) 1	21	
	Flow Switch (DI2) 2	22	
	Low/Normal Mode(DI3)+	23	
	Low/Normal Mode (DI3)-	24	
Analog Output	Dose Out+	25	4-20mADC, Max. Rsens= 200R
	Dose Out- (GND)	26	
	UVT Out+	27	
	UVT Out - (GND)	28	

Table 5-8: Control Module Terminal Block Connector Pins J35 (J3+J5)

	Function	Pin's Number	Values
Analog Input	Flow Meter Return 4-20mA	29	4-20mA
	Analog Spare Return 4-20mA	30	
	Spare	31	
	Spare	32	
	GND for 4-20mA (for Flow Meter-option 1)	33	
	GND for 4-20mA (for Analog Spare Meter-option 1)	34	
	24V for 4-20mA (for Flow Meter-option 2)	35	
	24V for 4-20mA (for Analog Spare-option 2)	36	
	Spare	37	
Modbus Slave in	RS485 Rx / Tx+	38	Main Modbus connector. For RS485 physical connections, to make a Modbus daisy chain incoming connection from another Control Module. The jumper is required. For wireless modem connections, the jumper must be removed (LED is off).
	RS485 Rx / Tx-	39	
	RS485 PE	40	Earthing
Modbus Master	RS485 Rx / Tx+	41	Connector for the Atlantium Unit's Data Cable
	RS485 Rx / Tx-	42	
	RS485 PE	43	Earthing
Modbus Slave out	485 Rx / Tx+	44	To make a Modbus daisy chain outgoing connection to another Control Module
	485 Rx / Tx-	45	
	485 PE	46	Earthing
Slave RS485	Term 1	47	Termination connector
	Term 2	48	For the Control Module that is last in a daisy-chain, insert a jumper here

5.12.2 External On/Off - Additional Notes

For regular wiring:

- Positive voltage must be connected to pin 19 – IN+
- Negative (GND) must be connected to pin 20 – IN-

Table 5-9: External On/Off

Control Module Screen External On/Off	Physical Connection	Physical Connection	Lamp Control
	IN+	IN-	
Normally Open	0 VDC	0 VDC	Off
Normally Open	+24 VDC	0 VDC	On
Normally Closed	0 VDC	0 VDC	On
Normally Closed	+24 VDC	0 VDC	Off

-
- The Facility control system communication properties must be configured to match that of the Atlantium system, see Section 5.12.3.
- For the terminal block connectors for the Modbus in the **Control Module**, see Table 5-8 above.
- Signalling communication incoming to the facility control system is according to the Modbus Registers. Appendix A, **Modbus Communication Protocol** on page 173.

ATTENTION!

To ensure communications are operational, be sure to connect the cables **TX to RX** and **RZ to TX**.

5.12.3 Setting Up the Facility System Communication Properties

To properly configure communications between your Atlantium system and control network, set up the communication properties and **COM1** port settings at the facility control system as follows:

Node Address:	1 to 256 ***
Available Commands	Function codes
Function Codes: *	0x03
Supports IEEE Floating Point: **	NO (register/xxx)
Baud Rate:	4800, 9600, 19200, 38400, 57600, 115200 ***
2 Wire	
Parity:	None
# of Stop Bits:	1
# of Data Bits	8

(*) Read all the registers in the system at once with **0x03** (includes coils, discreet coils, holding registers and input registers).

(**) Divide the desired parameter by xxx to calculate the correct signal point. See the Divide column in the table in the section, **Modbus Communication Protocol** on page 173.

(***) Must be the same in the **Control Module** setting

To view the Modbus Registers, which govern the signaling communication from the Atlantium system to the facility control system, see Table A-1 on page 173.

5.13 Connecting the Atlantium System to the Mains



DANGER!

ALL MAIN CIRCUIT BREAKERS OF THE ELECTRICAL LINE FEEDING THE ATLANTIUM SYSTEM COMPONENT MUST BE SET TO THE OFF POSITION AND LOCKED WITH AN APPROPRIATE LOCK TO PREVENT ACCIDENTAL CHANGE TO THE ON POSITION.

DO NOT REMOVE THE LOCK OR SET ANY MAIN CIRCUIT BREAKER TO THE ON POSITION UNTIL ALL ELECTRICAL WIRING IS PROPERLY CONNECTED.

UNCONNECTED WIRES/CABLES IN A LIVE ELECTRICAL FEED IS A HAZARDOUS SITUATION THAT CAN RESULT IN DEATH OR SERIOUS INJURY.

The infrastructure of the electrical connections is to have been prepared according to the **Electrical ICD** drawing provided to you by Atlantium with this manual.

For installations that require the Power Module 440-480VAC only, the customer must provide the Power cable to the mains.

5.13.1 Mains Connection Phases

Phase 1 Connect the **Control Module** to the mains.

Phase 2 Connect the Power Module to the mains (if exists).

Phase 3 Connect the Atlantium Unit's Power cable to the mains

ATTENTION!

- Do not Stretch Electrical Cables - Avoid tension on the electrical cables. They are to be installed within conduits and must not be stretched.

5.13.2 Connecting the Control Module's Power Cable

The **Control Module** comes with a power cable of 2m/6.5ft. length. For the electrical specifications, See **The Control Module** on page 19. Prepare the appropriate plug for the electrical standards of your region. Considering the distance between the **Control Module** and your electrical box, you may want to replace the electrical cable with a longer one.

➡ To connect the Control Module's power cable:

Step 1. Connect the appropriate plug for the electrical standards of your region.

Step 2. Do not plug in the **Control Module** to an outlet until after the hardware installation is complete and the system is ready to be initialized. (See **Initializing the Atlantium System** on page 79.)

Replacing the Control Module's Power Cable

You can order a longer cable from Atlantium or acquire one that conforms to the specifications, from a local source.



Avoid direct contact with the electronic circuit board which is sensitive to electrostatic discharge (ESD). Utilize best practices regarding ESD when replacing the power cable.

5.13.3 For Shipboard Installations

When the Atlantium Unit is installed shipboard, all metal components must be grounded to the nearest possible grounding point on the ship's metal structure. Be sure to prepare a ground point next to the designated location for the Atlantium Unit.



ATTENTION!

Please follow the electrical ICD drawings provided with your system.

5.13.4 Connecting the Atlantium Unit's Power Cable

The Atlantium Unit comes with a power cable of (5m/15ft.) or 10m/30ft (according to you order.) Prepare the appropriate cables and plugs for the facility mains connection according to the electrical standards of your region. Considering the distance between the Atlantium Unit and your electrical box, you may want to replace the electrical cable with a longer one.



- **A certified electrician is required to perform these procedures. Follow your local regulations.**
- **Do not** connect the Unit's Power cable to an outlet until after the hardware installation is complete and the system is ready to be initialized. (See *Initializing the Atlantium System* on page 79.)
- **Do not** connect the Unit's Power cable to an outlet until after the hardware installation is complete and the system is ready to be initialized. (See *Initializing the Atlantium System* on page 79.)

➤ To connect the Atlantium Unit's power cable:

- If your system configuration requires a Power Module, see *Connecting the Control Module's Power Cable* on page 73
- If none of the above, Connect the appropriate plug for the electrical standards of your region and connect it to a mains outlet.

5.13.5 Replacing the Atlantium Unit's Power Cable



WARNING!

If you are replacing the electrical Power cable (to connect to the mains) with a longer cable, be sure to use the correct cable type (The Atlantium- supplied cable is 5-wire flexible cable of 4mm² each, 600V, HO7 RN-F 5G4 (Lapp, P/N 16001303)) and be sure to connect the wires of the cables according to the requirement of your local power distribution system as follows:

- **400 VAC:** 5-wire system that contains 3 phases, Neutral and Ground (**The Neutral and Ground are mandatory**)

- **440/480 VAC:** 4-wire system that contains 3 phases and Ground

Ground must be wired to proper grounding in the same phase circuit.

Any person involved in handling the Connection Box card or its components is required to wear an electrostatic discharge (ESD) Wrist Strap.

Connect the ESD Wrist Strap to any bolt on the body of the Atlantium Unit or to the metal bracket under the Connection Box using a banana plug or an alligator clip.



Prepare the following:

- Replacement Connection Box card
- #5 Allen wrench
- #1 Phillips screwdriver

➔ Replacing the Power Cable

- Step 1.** Ensure that the system is switched off and all power cables are disconnected from the mains.
- Step 2.** Using the appropriate Allen wrench, on the first Connection Box, open the Connection Box cover.



The power cables supplied with the unit has 5 wires: 3 Phases (L1, L2, L3), Neutral (N) and Ground (PE). However, for the 440/480V installation, the Neutral wire is redundant and is not to be connected on either side of the cable.

- Step 3.** Using the appropriate screwdriver, remove the Switch knob (D) from the switch plate (E).
- Step 4.** Using the appropriate screwdriver, unfasten the screws of the switch holder (F).
- Step 5.** Pull out the terminal block (B) and detach the 3 power phase cable leads (G, H, I).
- Step 6.** Remove the plastic cover (J) from the Power terminal.
- Step 7.** Using the appropriate screwdriver, carefully disconnect the N & PE power leads (K) and (L) from Power terminal.
- Step 8.** Loosen the plastic nut of the Power cable's gland (C) from underneath the connection box and pull out the power cable.
- Step 9.** Thread the replacement power cable into the gland.
- Step 10.** Using the appropriate screwdriver, connect the replacement Power cable leads (G, H, I).
- Step 11.** Return the switch to its place and refasten the Switch holder (F).
- Step 12.** Return the Switch place (E) to the correct position and reattach the Switch knob (D).
- Step 13.** Using the appropriate screwdriver, on the terminal block (B), connect the replacement Power cable leads (G, H, I).
- Step 14.** Connect the power leads (K) and (L) to Power terminal and return the cover (J).
- Step 15.** Tighten the plastic nut of the gland (B) from the underneath.
- Step 16.** Using the appropriate Allen wrench, close the Connection Box cover.

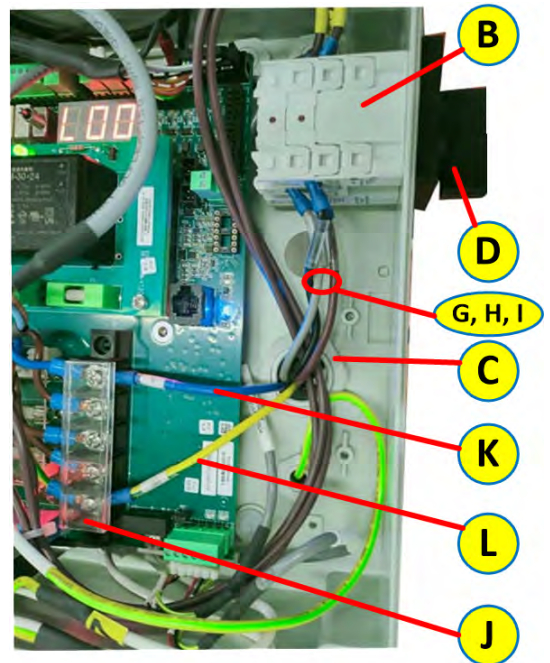


Figure 5-34: Power cable connections to connection box

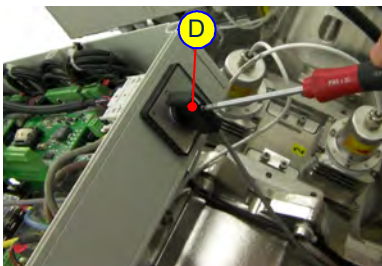


Figure 5-35: Replacing the Power Cable 1

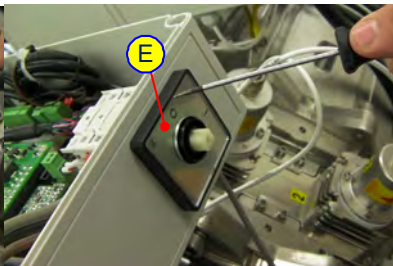


Figure 5-36: Replacing the Power Cable 2

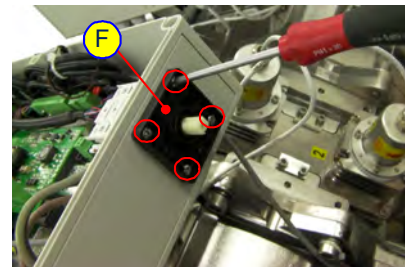


Figure 5-37: Replacing the Power Cable 3

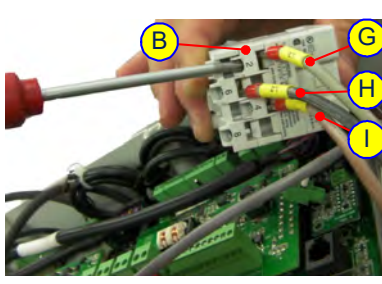


Figure 5-38: Replacing the Power Cable 4

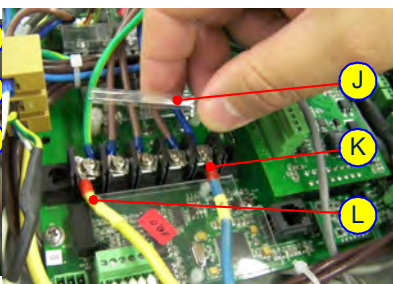


Figure 5-39: Replacing the Power Cable 5

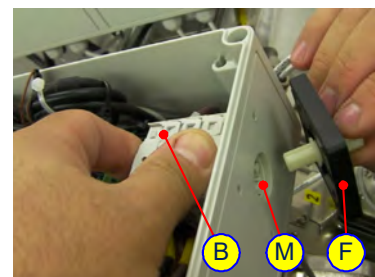


Figure 5-40: Replacing the Power Cable 6

5.14 Installation Check List

When you are ready to schedule the Atlantium technician to commission the Atlantium system, complete the check list below, based on Atlantium's **Commissioning Requirement Specifications**.

Send this check list together with digital photos of every angle of the installed system to your Atlantium representative. It generally requires at least 2 weeks after the check list has been completed to schedule the Atlantium commissioning.

Table 5-10: Atlantium System Installation Check List

Item	
System Serial Number	S.N: _____
System Orientation and Positioning The Atlantium Unit is installed: <input type="checkbox"/> Vertically - Water is flowing upward <input type="checkbox"/> Horizontally, with slope The following Modules are correctly and securely mounted and located in their final position: <input type="checkbox"/> Ballast Module <input type="checkbox"/> Control Module <input type="checkbox"/> Ultrasound Module (if purchased) <input type="checkbox"/> Transformer Module <input type="checkbox"/> All other purchased components are securely installed and have sufficient service clearance on all sides (according to the ICDs). <input type="checkbox"/> The Atlantium Unit and all of its components are not located where they may be in contact with direct water or chemical dripping. <input type="checkbox"/> Cable from system is connected to the Electrical Cabinet(s) Ballast Module(s) according to installation manual. The electrical cables between components are not stretched.	
Power Connections <input type="checkbox"/> Power cable is connected to the Electrical Cabinet(s) Ballast Module(s) Voltage rate _____ Number of phases _____ <input type="checkbox"/> Correct voltage was measured at entrance to Ballast Module Connection boxes You are scheduling an electrician to be on site and available on day and time of System commissioning - a MUST or the installation cannot be completed!.	
Water Flow <input type="checkbox"/> The Atlantium Unit is connected to the water pipes, according to the Installation plan developed by facility engineers and Atlantium personnel. <input type="checkbox"/> Proper pipe lengths (Inlet - 10D, Outlet - 5D) are installed. <input type="checkbox"/> The Unit has been checked while full of water and no bubbles or leaks exist in the system. The system is balanced, supported and pressure stable (no vibration, etc.). <input type="checkbox"/> No detected water hammers or pressure above 7 bars are on the line.	

Table 5-10: Atlantium System Installation Check List

Item
Flow Measurement Device (only one option is required) A flow meter or flow switch is installed and the electrical and data connection are complete. <input type="checkbox"/> If flow meter: 4 - 20 mA signal and Com wires are connected as instructed in this guide. <input type="checkbox"/> If flow switch: 2 wires from the flow switch are connected as instructed in this guide.
Accessories The following accessories are installed on the line and in accordance to Atlantium instructions <input type="checkbox"/> Sampling Valves <input type="checkbox"/> Draining Valves <input type="checkbox"/> CIP Ports <input type="checkbox"/> Air Release Valves
Inputs/Outputs required by the customer (require hard wiring): <input type="checkbox"/> Dose out <input type="checkbox"/> Ready Signal <input type="checkbox"/> General Alarm <input type="checkbox"/> Shutdown Warning <input type="checkbox"/> High Temperature <input type="checkbox"/> UVT Out <input type="checkbox"/> Low UVT <input type="checkbox"/> Low Status <input type="checkbox"/> Remote On/Off <input type="checkbox"/> Outlet Valve Output <input type="checkbox"/> Inlet Valve Output <input type="checkbox"/> Bypass Valve Output <input type="checkbox"/> Lamp/Ballast Failure
To be sent to Atlantium , attach photos of the following with this Checklist <input type="checkbox"/> Atlantium Unit <input type="checkbox"/> Ballast Module(s), Control Module and other components <input type="checkbox"/> Accessories (Flow meter or flow switch, CIP ports, Sampling valves, etc.)
Customer Approval <i>By signing, I hereby declare that the above filled information is correct and nothing prevents the arrival of Atlantium engineer on the designated/agreed date to perform the activation and commissioning.</i> <i>I am aware that lack of water flow or electricity, or any delay providing it and/or major deviation from above filled information, shall incur additional costs and a fully paid additional visit.</i> Name of Customer's authorized representative: _____ Position: _____ Signature of Customer's authorized representative: _____ Date: _____
Atlantium Commissioning Document Atlantium Commissioning Document <input type="checkbox"/> Received



6 Initializing the Atlantium System

As indicated above in Figure 5-1 on page 44, Phases 6-9 are considered commissioning and are to be implemented by Atlantium personnel. The Atlantium system starts up with the initialization of the **Control Module**.

➔ To start up the Atlantium system:

- Step 1.** Check that the power cables of the Ballast Modules are all connected to the mains power source.
- Step 2.** Connect the power cable of the **Control Module** to the main power source.
- Step 3.** Using the attached key, open the screen panel of the **Control Module**.
- Step 4.** Locate the circuit breaker [A] in Figure 6-1 and switch it to the **On** position.

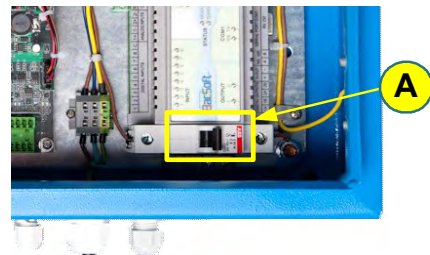


Figure 6-1: Control Module

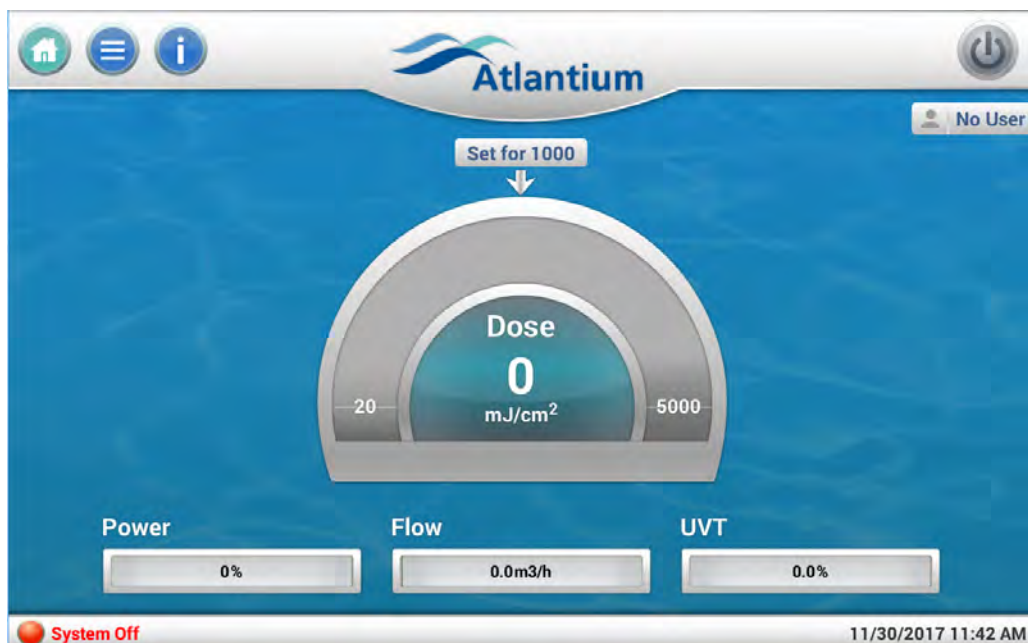



Figure 6-2: Main Operation screen

- Step 5.** Press the Lamp Power button 



7 Configuring the Control Module

7.1 The Control Module HMI

The **Control Module** provides the Human Machine Interface (HMI) for control of operations and dose measurements of the Atlantium system.

The regulations applying to the type of application determine sizing as well as software defaults and operational control options. This is set up at the original manufacturing facility and completed on site by the Atlantium technician.

The **Control Module** provides a real-time display of operational data. A Ready indicator turns green when the system is ready for operation.

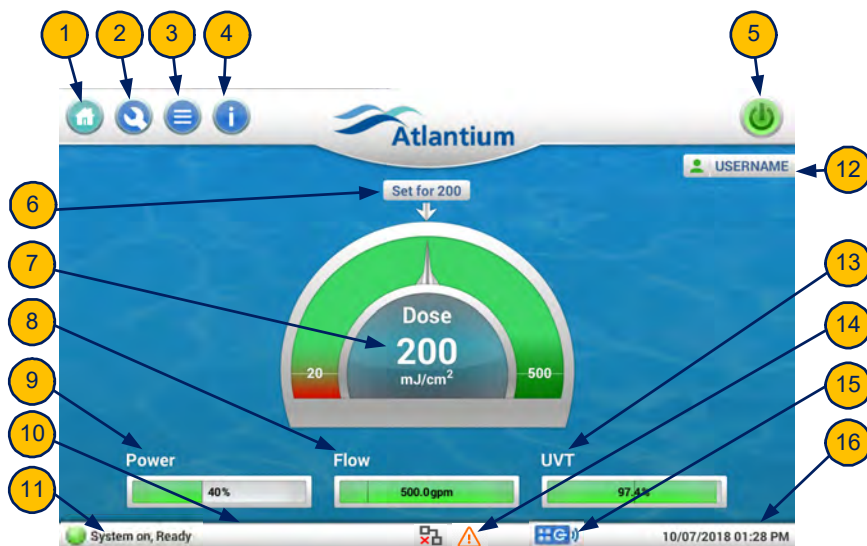


Figure 7-1: Initial Main Operation Screen*

Table 7-1: Control Module Main Screen Details

#	Item	Icon	Description
1	Return to Main screen		To return to the Main screen.
2	Settings Screen Access		To access the Settings screen
3	Event Log Access		To the Events screen.
4	System information Screen Access		Includes the Generic Info tab that displays general system information and lamp status and the Info Monitor tab that displays a summary of system status information.

Table 7-1: Control Module Main Screen Details




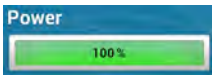
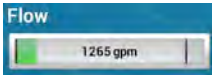

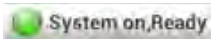
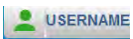



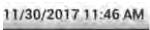

#	Item	Icon	Description
5	Main Unit Operation Button		ON/Off toggle button turns on/off the Atlantium unit components (lamp(s), UV power, etc.) in an orderly sequence.
6	Set For		The user should adjust the Set for dose to the desired operating dose. Confer with your Atlantium Representative, per the original sizing specifications. In some cases, this is 10-20% over the regulated or required dose. In other cases it depends on the variability of local conditions and the best strategy to ensure reliable and effective operation.
7	Dose Gauge		Represents the system dose range. The red area of the gauge represents off-spec low dose. The dark green area represents the user's set maximum allowable dose. The current dose (mJ/cm ²) is displayed in the middle of the gauge. The minimum and maximum allowable dosage levels are user-defined.
8	Power		Scale shows the current Power level.
9	Water Flow		Scale shows the current rate of water flowing through the Unit The scale color changes to red when the flow is either less than minimum flow setting or above the maximum flow setting. When there is no flow the scale goes gray.
10	Bottom Footer		Displays certain system events for a short period of time.
11	Ready LED		Displays the basic system status. When the system is ready for operation (all the lamps are ignited and the dose is above the minimum settings, the system displays the green Ready icon. If the system startup fails or the system is no longer working at or above the minimum dose, the system displays the red icon.
12	User Login		The Login button enables access to the login dialog box and User Management. See Adding Users on page 101.
13	UVT (Transmittance)		Scale shows the amount of UV light transmitted through the water. If the UVT percentage factor is high, the transparency of the water to UV light is high, and vice versa. When there are several UVT sensors in one system, this Scale displays the average of the UVT values measured by each sensor. The Scale color becomes red when the UVT is lower than minimum UVT setting. The color changes even if the UVT alarm is set to None.
14	Event Icons		A relevant icon appears when a critical event occurs. It disappears after the event has been acknowledged in the log.

Table 7-1: Control Module Main Screen Details

#	Item	Icon	Description
15	Remote On/Off indicator		The Remote-On/Off indicator appears if marked in the Signals tab settings.
16	Date and Time		Date and time* are displayed according USA or European conventions <i>*Time may require resetting if the Control Module is disconnected for a week or more and the internal battery runs low (see General Settings on page 97).</i>
17	Lost Network Communications Indicator		This Icon appears when communication is lost.



The specific configuration for your Atlantium system is based on the Application type set for your industry and according to the parameters required for your facility's process.

Configuring the **Control Module** begins with logging in and accessing the Settings screen and follows the general order of the screen components.

7.2 Log In and Password Change


Users may log in, change their password, and reset their password if they forget it.

Users can login to the **Control Module** to access screens according to the permission level assigned to them. When logging on as the Facility Administrator for the first time, use the user name and initial password assigned to you during system commissioning.

Atlantium recommends that the initial Facility Administrator log on with this initial password, then change the password and make a record of the new password in a secure location, in the event that it is forgotten. The Facility Administrator can then define additional users according to facility needs.

For information on adding additional Users and permission levels, see **Adding Users** on page 101.

➔ To login:


- Step 1.** Tap the User Indicator . The Log In dialog box appears.
- Step 2.** From the **User Name** list, select your user name (for first-time use, the user name assigned to you during system commissioning).
- Step 3.** Tap the **Password** field and from the virtual keyboard that is displayed, enter your password (for first-time use, the password assigned to you during system commissioning).
- Step 4.** Tap **Log In**. Your user name appears in the User Indicator box on the upper-right of the main screen.



The Log In dialog box has a title bar with "Log In" and a close button (X). It contains a "User Name" section with a "Select User" dropdown menu, a "Password" text field, a "Forgot Password?" link, and a "Log In" button at the bottom.

Figure 7-2: Login Dialog Box


➔ To change your password:

- Step 1.** Tap the User Indicator . The User Administration Tasks dialog box appears.
- Step 2.** Tap **Change Password**. The Change Password dialog box appears.
- Step 3.** In the **Password** field, enter your current password.
- Step 4.** In the **New Password** and **Confirm New Password** fields, enter the new password.
- Step 5.** Tap **Save New Password**. The password is changed.



The User Administration dialog box has a title bar with "USERNAME" and a close button (X). It contains four buttons: "Log Out", "Change Password", and "Manage Users".

Figure 7-3: UserAdministration Dialog Box



The Change Password dialog box has a title bar with "Change Password" and a close button (X). It contains three text fields: "Password", "New Password", and "Confirm New Password", and a "Save New Password" button at the bottom.

Figure 7-4: Change Password Dialog Box

7.2.1 Login Timeout

To prevent unauthorized system changes, the Control Unit reverts automatically to No User mode 10 minutes after the last tap on the screen by the current user. In the No User mode, system information may be viewed but no changes can be made (see Table 7-2). To make any changes, an authorized user must login again.

7.2.2 If You Forget Your Password

Generally, users with Manager Profile may configure other users and their passwords. If no user with Manager Profile is available, Atlantium Customer Support can help using the following procedure:

➔ To reset your password

- Step 1.** In the Login dialog box, tap **Forgot Password?**. The **Forgot Password** dialog box appears.
- Step 2.** In the **User Name** field, enter your user name.
- Step 3.** Tap **Generate Code**. A code appears in the field below.
- Step 4.** Send the User Name and Code to Atlantium Customer Support.
- Step 5.** In the **Confirmation Password** field, enter the **Confirm Password code** received from Atlantium Customer Support.
- Step 6.** Tap **Reset Password to Default**. The password is reset to the default **1234**. The user should then change it to a secure password.



Figure 7-5: Forgot Password Dialog Box

7.3 The Settings Configuration Screen

The settings screen and individual tabs are visible according to the permission level of the User and are usually accessed during the installation and setup of the Atlantium system and when there are hardware changes made in peripheral equipment.

During normal operations, an authorized facility technician may need to access certain functions, or view certain information, that appears on some of these tabs. For information on which tabs are visible according to permission levels, see **Adding Users** on page 101.



WARNING!

Take care to ensure that the system configuration made via the Settings screen is not tampered with! Unauthorized changes may have a serious impact on the function of the Atlantium system. **Only trained and authorized** facility technicians are to access the Settings screen.



- The Control Module screen images shown in this User Manual are generic. The content of your system screens will vary according to the type of system, the number of lamps, cleaner type etc.
- Screens display values in metric or US units, according to customer localization.
- On completion of each screen, Tap Save to save settings.

- ➔ To access the **Settings** screen: at the top of the screen, tap 

Step 1. The main Settings screen is displayed with the Monitor tab open:

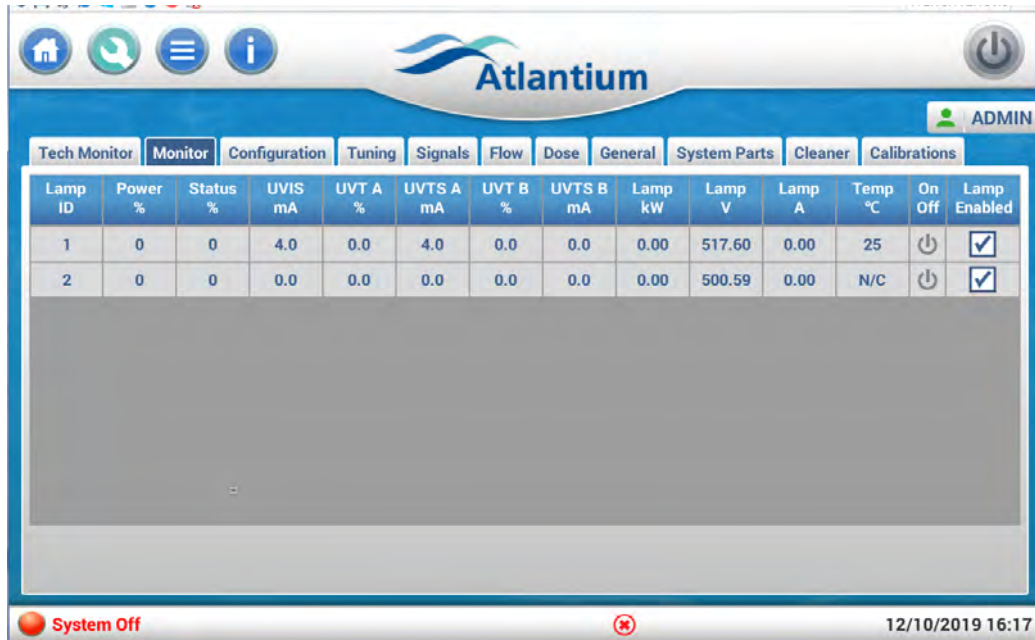


Figure 7-6: Settings Screen, showing Monitor Tab (generic example with 2 lamps)

Step 2. Tap the **Configuration** tab to open it.



Figure 7-7: Settings Screen, showing Configuration Tab

Step 3. To enable the External On/Off, mark the **External On/Of Enabled** (see **Signal Inputs**: on page 87) checkbox on the R side (**Advanced** Settings).

- **System Auto Restore** - You can also set the Atlantium system to restart automatically when power is restored after a facility-wide power failure, so that it reactivates according to the configured **Auto Power On** settings.

Step 4. To enable System auto restore, mark the System auto restore checkbox.



The **System Configuration** panel on the Left side of the **Configuration** tab is used by the Atlantium technician during system setup to establish basic system parameters, such as Model, number of Lamps, Cleaner type etc. Most of the settings in this tab are not accessible with regular user or administrator privileges, and should **NOT** be changed.

- **Maximum temperature** enables the setup technician to set the maximum permitted temperature for the water in the UV chamber.
- **Length factor** enables the setup technician to set the distance between the UV lamp sleeve and the UVT sensor, through the water.

Step 5. Tap the **Signals tab**. The **Signals Tab** appears.



Figure 7-8: Signals Tab on Settings Screen

7.3.1 Configuring the Signal Settings

The Signals tab displays the settings for the system's dry-contact Input and Output connections: either **Normally Closed (NC)** or **Normally Open (NO)** see Figure 7-8 on page 86.

The following is an explanation of Input and Output signals.

7.3.1.1 Signal Outputs

Inlet valve/System on - The facility's electronically-controlled **Inlet** and **Outlet valves**, that control the water supply to the Atlantium unit, as well as the **Bypass valve** (if a bypass is implemented), must each be configured to receive control signals from the **Control Module**. These valves affect to various facility processes relevant to the Atlantium system, such as:

- Managing high flow conditions
- Bypassing and streaming the water to a different place if the water quality has degraded
- Bypassing for cleaning chemicals that are not compatible with the quartz chambers
- When the system is activated (either manually via pressing the **Operation** button on the **Control Module's** main screen, or via an external signal utilizing the **External On/Off**), the **Control Module** sends a signal, within 10 seconds, that opens the **Inlet valve**. This signal can also be used to provide feedback that the system is activated.
- When the all the lamps are ignited and ready to use, the **Control Module** sends a signal to the **Outlet valve** to open. This signal can also be used to notify that the system is **ready**. The **Control Module** also sends a signal to the **Bypass valve** to close.
- Similarly, when the system is deactivated, (either manually via pressing the **Operation** button on the **Control Module's**, or via an external signal utilizing the **External On/Off**), the **Control Module** sends a signal that closes the **Inlet** and **Outlet valves**, and also opens the **Bypass valve**.

Signals to Alarms - To set off a General Alarm mechanism, such as a flashing light, alarm, bell, or a call or message to a telephone, a system alarm signal must be connected to a SCADA control system. See

General Alarm - requires connection of a General Alarm mechanism to receive a signal from the **Control Module**. Once configured, the alarm is triggered by the signal.

- **High Temperature** - requires connection of a General Alarm mechanism to receive a To connect a mechanism to receive a signal when system temperature has exceeded the configured maximum.
- **Low UVT** - To connect a mechanism to receive a signal when the system's UVT has fallen below the configured minimum.
- **Lost Comm** - When the **Control Module** AIO lost communication with UV unit (all cards disconnected).
- **Shutdown** - To connect a mechanism to receive a signal when an event causes the system to shutdown.

7.3.1.2 Signal Inputs:

- **Flow Switch** - If your system utilizes a Flow Switch, you must configure its electrical polarity in the **Control Module**. For the Flow Meter, see **Configuring the Flow Settings** on page 88.
- **External On/Off** - A switching mechanism to synchronize the Unit with the facility processes. This remote PLC turns the Atlantium Unit on/off. For details about the External On/Off signal wiring, see on page 173. For example, the facility's SCADA (supervisory control and data acquisition) control system can send a signal to the Unit to start or stop its operation as needed. Using this setting, the Atlantium system recognizes this signal and turn the Unit on or off, as appropriate, without the need for manual intervention.



When the **External On/Off** sends a signal to activate the system, the Atlantium **Control Module** sends a response within **10 seconds** that the command was received. If no response is received, it is likely that the **External Operation Button** on the **Control Module** main screen is manually set to the **Off** position. Check this button and if needed manually tap it to reinstate the **On** position, so that the **External On/Off** can control the system activation.

For regular wiring, set according to the table in **External On/Off - Additional Notes** on page 54:

- For **IN+** select **Normally Closed**
- For **IN-** select **Normally Open**
- **Low/Normal Mode** - for systems with an external signal for switching to Low Flow mode.

7.3.1.3 Other Settings

- **Maximum Temperature Warning** - The System shuts down automatically if the water temperature exceeds the maximum set value. You can set the maximum temperature threshold for sending a warning notification that alerts you to take action to prevent the water from reaching the maximum temperature that triggers shutdown. It is recommended to set this threshold to 5% below the maximum water temperature allowed for your system.

- **System Auto Power On** - You can also set the Atlantium system to restart automatically when power is restored after a facility-wide power failure, so that it reactivates according to the configured **Auto Power On** settings.

➔ To configure the Signals settings:

Step 1. At the top of the screen, tap . The **Monitor Tab** is displayed.

The states of the **Outputs** and **Inputs** are set via toggle switches that by default are set to **NC (Normally Closed)**. To change any of them to **NO (Normally Open)**, tap the corresponding toggle switch. It changes to **NO**. Tap again to change it back to **NC**.

Step 2. Under **Output**, set the electrical polarity for:

- **Inlet valve/System On**
- **Bypass Valve**
- **Outlet valve/Ready**
- **General Alarm**
- **High Temperature**
- **Low UVT**
- **Lost Communication** (not implemented in this version)
- **Shutdown**

Step 3. Under **Input**, set the electrical polarity for:

- **Flow Switch** (if installed)
- **External On/Off**

Step 4. To enable the External On/Off, mark the **External On/Of Enabled** checkbox on the Configuration tab (see 7.3. The Settings Configuration Screen, [Step 3.](#)).

Step 5. Tap **Save** to save settings.

7.4 Configuring the Flow Settings

If a flow meter is utilized, the **Control Module** data must be configured to match the flow meter at the time the system is originally commissioned, but may need to be changed if a flow meter is changed, etc. The Max Flow setting provides a threshold to compare to the actual flow rate. If the actual flow rate exceeds this set Max Flow value, the system sends notification and triggers an alarm.

■ About the Low Flow Mode

Set the Atlantium system's response to a low water flow situation via the Low Flow mode. This unique Atlantium feature minimizes the on/off cycles by allowing the system to operate at an extremely low flow value. The Atlantium Application Engineer defines this value according to the specific application. In some cases, this value can be zero flow for a predefined period of time. The **Low Flow Mode** options are:

- ◆ Restart
- ◆ Shutdown

- **Restart** – (Default) This option assumes that low flow is not necessarily a sign of a fault and ensures that the system is ready to come up to full dose or power immediately when the flow rises.

Atlantium allows the system to continue operating at a low or even zero flow rate up to a max time interval, the **Flow Delay**, as defined by the Atlantium application engineer. With this setting, we reduce the amount of on/off and maintain the integrity of the UV operation, while preventing the flow of non-disinfected water into the line.


- As long as the flow rate stays below the **Min Flow** for less than the amount of time set in **Flow Delay**, the Unit continues to operate in standby mode, generally at the lowest possible power.
- However, if the water flow rate drops below the set **Min Flow** rate for a time that is **longer** than the **Flow Delay**, then:
 - ◆ The **Low Water Flow** warning is triggered

- ◆ The lamps are automatically shut down
- ◆ An event notification is written to the event screen and log file
- The **Restart** mode causes the system automatically restart when the water flow rate returns to a level above the **Min Flow**. The Unit automatically and instantly returns to full operation, without any operator intervention or connection to a higher control level, and without any delay or cool down/ warm up period.

The default values for the minimum flow rate and maximum flow delay appropriate for **Restart** mode are preset by Atlantium. These values may be changed based on local site requirements and conditions, but **be sure to coordinate** with the Atlantium representative.

- **Shutdown** – In this mode, in the event of low flow, which may be a sign of an upstream malfunction, the system shuts itself down in an orderly fashion, but operator intervention is required to start it up again.
 - As long as the flow rate stays below the **Min Flow** for less than the amount of time set in **Flow Delay**, the Unit continues to operate in standby mode, generally at the lowest possible power.
 - However, if the water flow rate drops below the set **Min Flow** rate for a time that is **longer** than the **Flow Delay**, then:
 - ◆ The **Low Water Flow** warning is triggered
 - ◆ The lamps are automatically shut down
 - ◆ An event notification is written to the event screen and log file
- In the **Shutdown mode**, the operator is required to turn on the Atlantium system, once the water is back to the proper Flow rate.

➔ To configure the Flow Meter settings:

- Step 1.** At the top of the screen, tap . The **Monitor Tab** is displayed.
- Step 2.** Tap the **Flow tab**. The **Flow Settings** tab appears. The **Current Flow** indicator displays the current rate of water flowing through the Atlantium system in **GPM** (gal/min) or **M3H (M³H)** units. The **Main Flow Input** indicator displays the **Flow Meter (FM)** or **Flow Switch (FS)** in **GPM** or **M3H (M³H)** units.

For Flow Meter:

- **Flow Meter** appears as the **Main flow input** source,
 - The **Current flow** is displayed on the left.
- Step 3.** Tap **Calibrate** to open the **Flow meter** calibration window



The screenshot shows the 'Flow meter' calibration window. It has a title bar 'Flow meter' and three input fields with numeric spinners. The first field is 'mA at 0 flow' with a value of 4.00. The second field is 'Flow x100 at 20mA' with a value of 3.00. The third field is 'Current flow' with a value of 140.3 gpm. At the bottom right, there are 'Cancel' and 'Save' buttons.

Figure 7-9: Flow meter calibration window



Figure 7-10: Flow Setting Screen - Flow Meter

- Step 4.** For **mA at 0 Flow (Flow Factor)**, to check the calibration of the flow meter, turn off the flow and then check the value for Current Flow. If it is not zero, adjust the value, by using the **-/+** buttons, until the Current Flow value is zero. Then resume the water flow.
 - Step 5.** For **Flow x 100 at 20mA (Offset)**, on the flow meter's datasheet, find the meter's maximum-allowed flow rate.
 - Step 6.** In the **Flow x 100 at 20mA** field, using the **-/+** buttons, enter the meter's maximum-allowed flow rate divided by 100. (e.g. If the value given is 100 m³/h, enter the value 1). Convert GPM values into m³/h values to make this calculation¹.
 - Step 7.** Tap **Save** to return to the **Flow meter** tab.
 - Step 8.** For **Minimum flow**, using the **-/+** buttons, enter a value for the minimum water flow rate threshold. Below this threshold, the system enters **Low Flow Mode**.
 - Step 9.** For **Flow delay**, using the **-/+** buttons, enter a value, in seconds.
- When the flow rate falls below **Minimum flow**. The system then waits for the **Flow delay** period before entering **Low Flow Mode**.
- Step 10.** For **Low flow mode**, tap the arrow and from the drop-down list, select either **Restart** or **Shutdown**.
 - Step 11.** The default value for maximum **Flow Delay** appropriate for **Restart** mode are preset by Atlantium. These values may be changed based on local site requirements and conditions, but be sure to coordinate with the Atlantium representative. If you need to change this value, set the desired value using the **-/+** buttons.
 - Step 12.** For **Maximum flow**, using the **-/+** buttons, enter a value for the maximum water flow rate threshold. If the actual flow rate exceeds this threshold, the system delivers a notification message and triggers an alarm.

1. If the meter's maximum-allowed flow rate is set to gpm (US units), multiply this value in gpm by 0.227 to get the flow rate in m³/h

- Step 13.** To set the action to be performed if the water flow rate exceeds the value set in the **Maximum Flow** field. The options are:
- **None** - The event is not considered an error, so no corrective action is taken. No warning message is issued.
 - **Caution** - One or more caution messages are issued.
 - **Warning** - One or more warning messages are issued.
 - **Shut-Down** - In case of a serious error or dangerous condition, the system shuts down and triggers a pop-up window message and a General Alarm.
- Step 14.** Tap **Save** to save settings.

For Flow Switch:

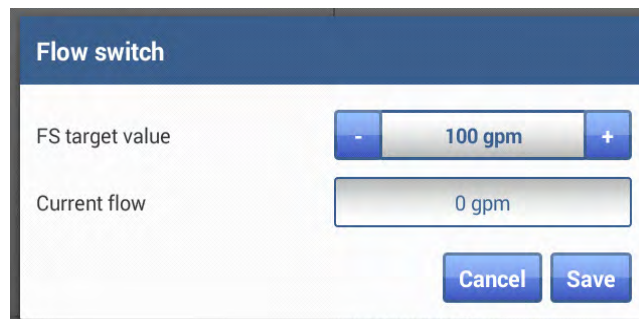
Flow Switch appears as the **Main Flow Input**.

The current flow is displayed on the left.



- A flow switch is used to determine when water flow goes above (Flow) or below (No Flow) a set value.
- Only install a flow switch (instead of a flow meter) in applications where the water flow through the Atlantium system is known to be constant, without significant fluctuations.
- Install a flow switch of recommended type (see **Flow Switch** on page 32).
- These adjustments are to be performed by a qualified Atlantium technician during installation and set-up

- Step 15.** Tap **Calibrate** to open the **Flow switch** calibration window



The screenshot shows a window titled "Flow switch". It contains two input fields: "FS target value" with a value of "100 gpm" and "Current flow" with a value of "0 gpm". The "FS target value" field has minus and plus buttons on either side. At the bottom right, there are "Cancel" and "Save" buttons.

Figure 7-11: Flow switch calibration window

- Step 16.** For FS Target Val, using the -/+ buttons, enter the maximum (and steady) value expected for the flow.
- Step 17.** Tap **Save** to return to the **Flow switch** tab.



Figure 7-12: Flow Setting Screen - Flow Switch

- Step 18.** For **Min Flow**, using the **-/+** buttons, enter a value for the minimum water flow rate threshold, which trips the flow switch mechanism so that it shows “closed”. Below this threshold, the system enters **Low Flow Mode**.
- Step 19.** For **Low Flow Mode**, tap the arrow and from the dropdown list, select either **Restart** or **Shutdown**.
- Step 20.** The default value for flow delay appropriate for **Restart** mode are preset by Atlantium. These values may be changed based on local site requirements and conditions, but be sure to coordinate with the Atlantium representative. If you require changing this value, for **Flow Delay**, using the **-/+** buttons, set the desired value.
- Step 21.** Tap **Save** to save settings.

7.5 Configuring Dose Settings

The system is set at a particular dose. The Atlantium system maintains the designated dose as conditions allow.

➔ To configure the Dose settings:

- Step 1.** At the top of the screen, tap . The **Monitor Tab** is displayed.
- Step 2.** Tap the **Dose Settings tab**. The **Dose Settings** screen appears.

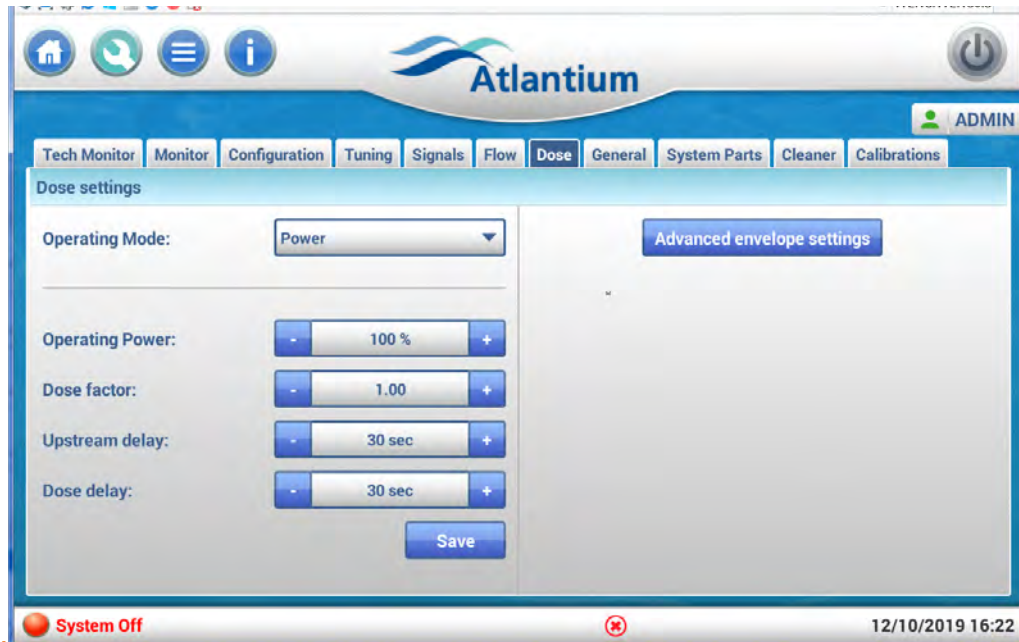


Figure 7-13: Dose Settings Screen - Power Mode

- Step 3.** For **Operation Mode**, tap the arrow and from the dropdown list, select the desired mode:
- **Power mode**
 - **Dose mode**
- Step 4.** In Power mode, use the **-/+** buttons to set the desired power level. The system is set to operate at this power level as a constant. Most operational settings used in Power mode provide information or shut-down the system under specified conditions. The system operates at the prescribed power level and does not change power level to achieve dose settings.
- Step 5.** Tap **Save** to save settings.
- In **Dose mode**, continue with the rest of the settings:

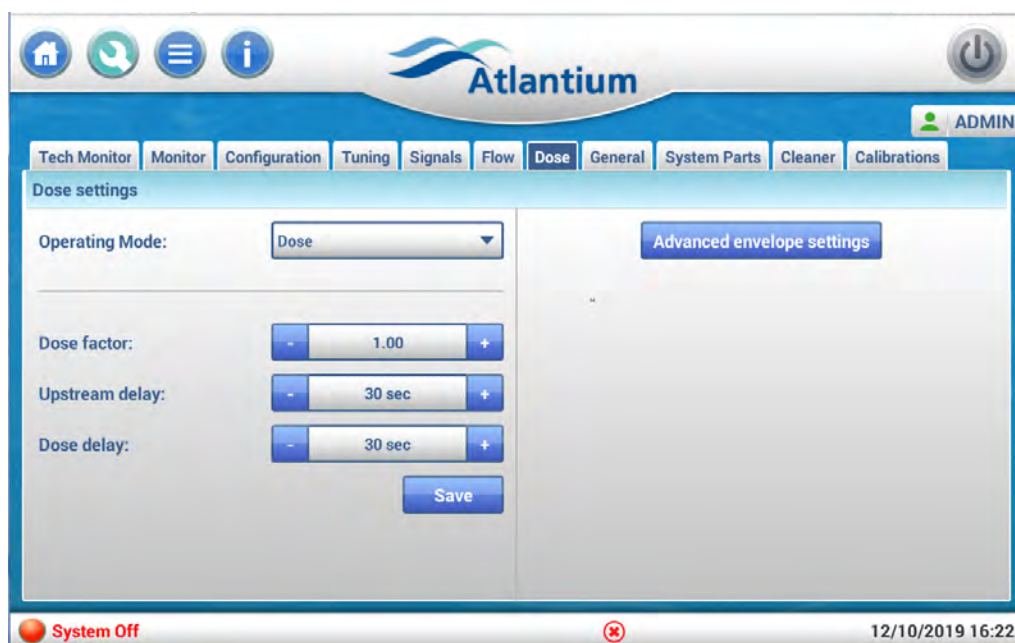


Figure 7-14: Dose Settings Tab- Dose Mode

- Step 6.** For **Minimum Dose Val**, using the **-/+** buttons, set the lowest dose in **mJ/cm²** units under which you want the needle to move to the red zone to send a warning or shut down.
- Step 7.** For **UV Dose Set for**, using the **-/+** buttons, set the general operating dose in **mJ/cm²** units. When the system is operating in that dose range the needle is in the center of the green zone.
- Step 8.** For **Maximum Dose**, using the **-/+** buttons, set the maximum UV dose limit in **mJ/cm²** units, above which you want the system to send a warning or take other action. When the system operates above the maximum dose, the needle is in the dark-green zone.
- Step 9.** For **Action** corresponding to each of the above settings, tap the arrow and from the dropdown list, select the desired corresponding system response in the event that the set power level pushes the dose above or below the set values. The options are:
- **None** - The event is not considered an error, so no corrective action is taken. No warning message is issued.
 - **Caution**- One or more caution messages are issued.
 - **Shut-Down** - In case of a serious error or dangerous condition, the system shuts down and triggers a pop-up window message and a General Alarm.
- The system responds as designated here when, under the current operating conditions and required power level, the dose exceeds or falls below the set values.
- Step 10.** For systems with bypass valve, for **Upstream Delay**, using the **-/+** buttons, set the maximum time it takes for water to pass between the Atlantium system and the bypass valve + 20%. For systems with no bypass valve, set this value to 0.

7.5.1 Calibrations tab

The **Calibrations** screen is used for calibration of UVIS and UVT sensors.

- Step 1.** Tap the **Calibrations** tab. **UVT calibration** and **UVIS calibration** buttons appear.
- Step 2.** Tap either button to start the corresponding calibration procedure. The **Calibrations** tab opens
- Step 3.** Select the check box for each sensor you want to calibrate.

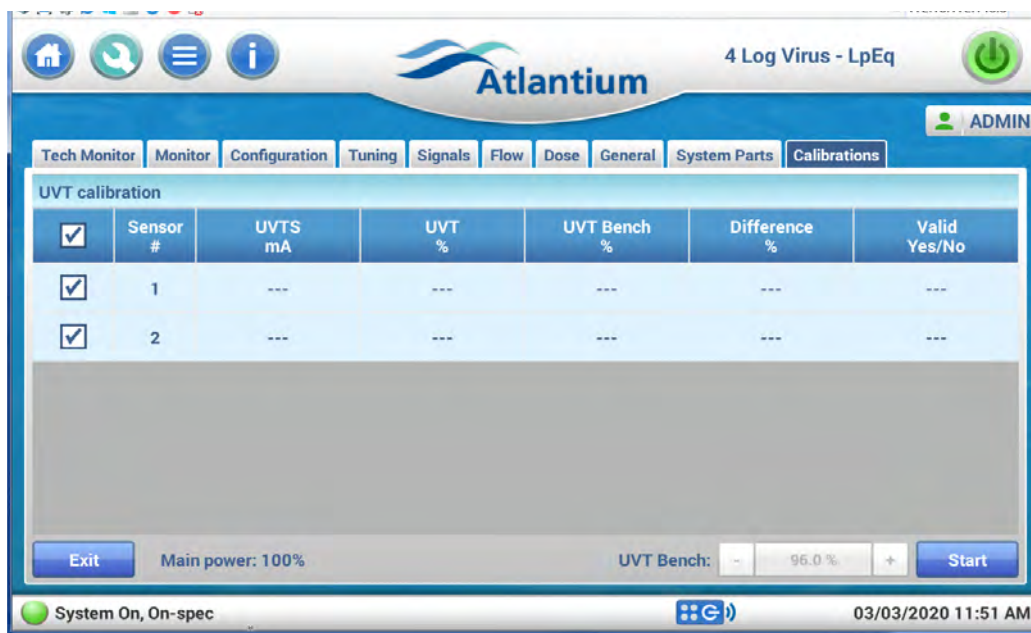


Figure 7-15: Calibrations tab

- Step 4.** For **UVT Bench**, enter the reading from the external calibration sensor (see *Checking/Replacing UVIS Sensors* on page 141 for these maintenance tasks)
- Step 5.** Press Start to start the automatic calibration procedure.
- A time line displays the state of the calibration procedure
- Once calibration is complete, results are displayed in the Calibrations tab.



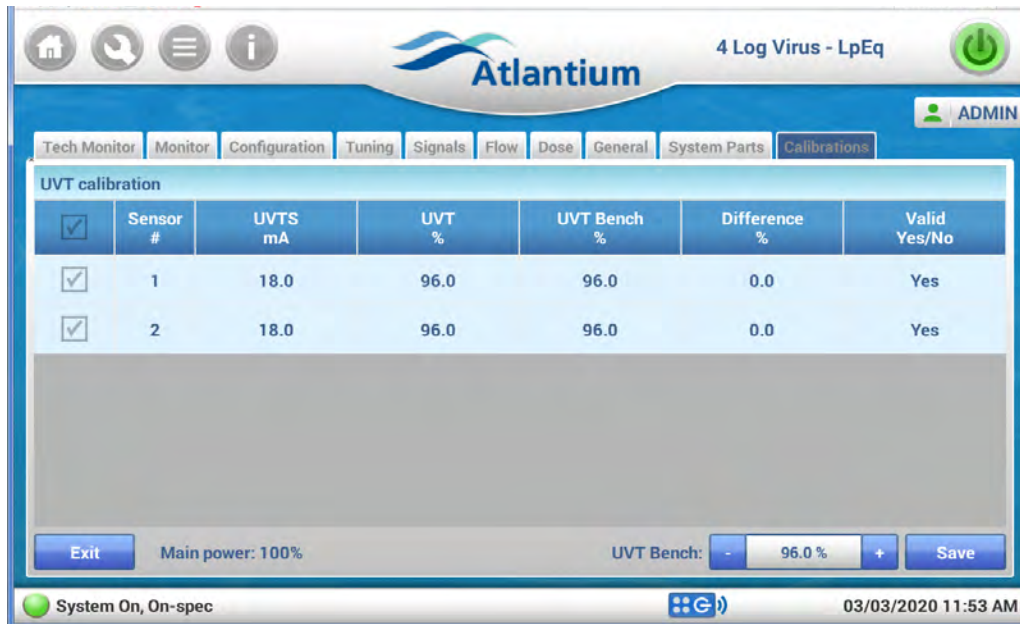


Figure 7-16: Calibrations results tab

7.6 Configuring the General & Connection Settings

You can set a number of general settings, as well as the connection settings, via the General tab.

The following General Settings are to be configured:

- Date and Time
- Format for units of measurement (US or Metric)
- Maximum Temperature Warning - Since the System shuts down automatically if the water temperature reaches the maximum allowed. You can set the maximum temperature threshold for sending a warning notification so that you can take action to prevent the water from reaching the maximum temperature that triggers shutdown. It is recommended to set this threshold to 5% under the maximum temperature allowed for your system.
- Automatic System Auto Power On in the event of restored power after power failure.
- Assign System Unit identification (PWSID (Public Water System IDentification), Plant, and Train)
- Minimum UVT threshold value for the UV transmission below which the system is to issue an alarm, warning of UVT degradation and the action to be taken accordingly.

The Connection Settings consist of the Modbus node address assigned to this system is configured in the **Control Module**, as well as the appropriate baud rate for this system.


➔ To configure the General & Connection settings:

- Step 1.** At the top of the screen, tap . The **Monitor Tab** is displayed.
- Step 2.** Tap the **General tab**. The **General Settings** screen appears.



Figure 7-17: General tabtab

General Settings

- Step 3.** To set the date and time*, tap . The **Set Date And Time** dialog box appears.
- Step 4.** Swipe the date and time elements to toggle to the correct settings.
- Step 5.** Tap **Set**. The correct time appears on the **Output/Input** Tab and is set for the system.

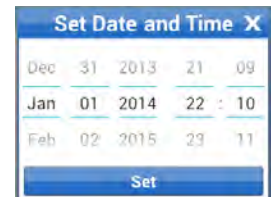


Figure 7-18: Set date And Time Dialog Box

Depending on the format selected (see below) the Metric format is day first and a 24-hour clock and the US format is month first AM/PM.

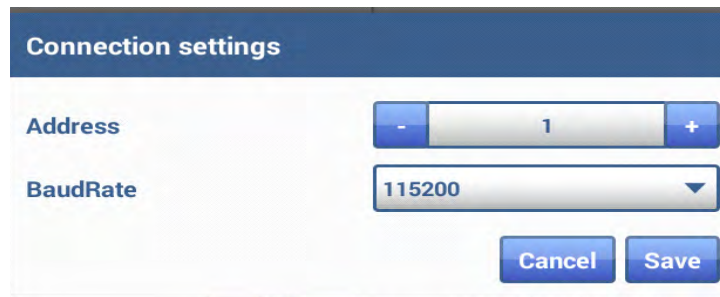
**Time may require resetting if the Control Module is disconnected for a week or more and the internal battery runs low.*

- Step 6.** To select the **Units format**, tap the arrow and from the dropdown list and select the desired format, imperial for **US** units or **Metric** for metric units.
- Step 7.** When the maximum temperature threshold is reached, a warning notification is sent so that you can take action to prevent the water from reaching the temperature that triggers shutdown. For setting the maximum temperature:
- Set the system water flow to the minimum possible.
 - Wait a few minutes for the system to stabilize.
 - Check the **Control Module's** Monitor screen's temperature reading.
- Step 8.** Under **Maximum temperature**, using the **-/+** buttons, set the maximum temperature threshold to the temperature reading in **Step 7/c** above plus **5°C/41°F**. When this threshold is reached, a warning notification is sent.
- Step 9.** To enable the system to restart automatically when power is restored, mark **System auto restore On** checkbox.

- Step 10.** For each Unit defined in you system configuration, you can assign the PWSID, Plant, and Train identification. From the **Unit Number** dropdown list, select the Unit number to be identified.
- Step 11.** For **PWSID**, **Plant**, and **Train**, tap the field. A virtual keyboard appears. Use it to enter the appropriate identification.

Connection Settings

- Step 12.** Tap Connection settings to open a settings window:

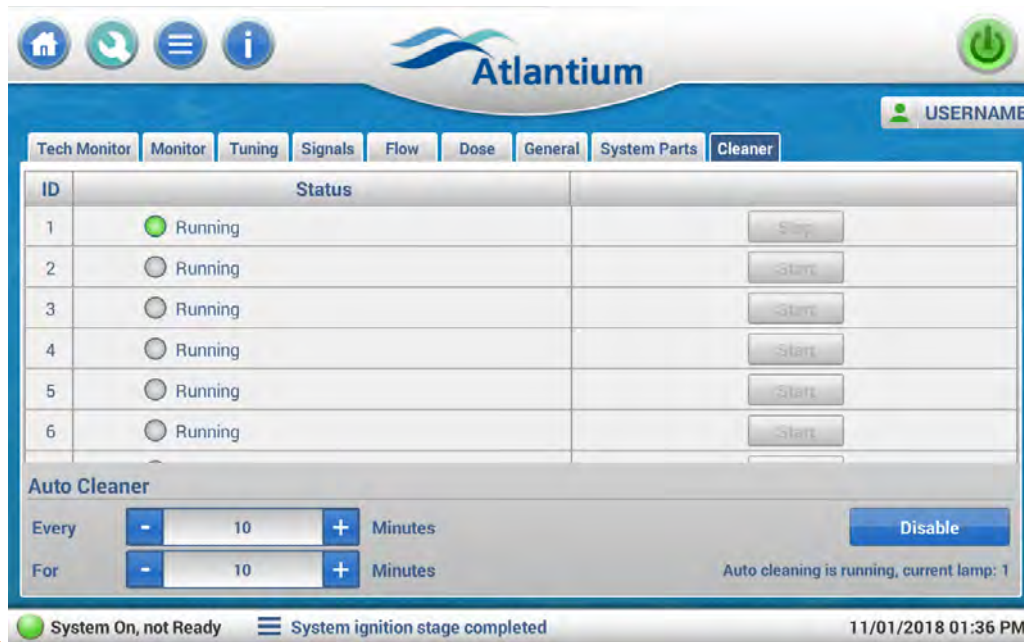


The image shows a 'Connection settings' dialog box. It has a title bar 'Connection settings'. Below it, there are two settings: 'Address' and 'BaudRate'. The 'Address' field has a numeric input with '-' and '+' buttons, showing the value '1'. The 'BaudRate' field is a dropdown menu showing '115200'. At the bottom right, there are 'Cancel' and 'Save' buttons.

- Step 13.** For **Address**, using the **-/+** buttons, set the Modbus address node assigned to this system as a slave while the remote PLC is the Master.
- Step 14.** For **Baudrate**, select the appropriate baud rate for this system. The options are:
- 115200
 - 57600
 - 38400
 - 19200
 - 9600

Minimum UVT

- Step 15.** For **Minimum UVT**, using the **-/+** buttons, set the threshold value for the UV transmission below which the system is to issue an alarm, warning of UVT degradation.
- Step 16.** For **Action**, from the dropdown list, select the action to be performed if the factor falls below the Min UVT and becomes off-spec. The options are:
- **None** - The event is not considered an error, so no corrective action is taken. No warning message is issued.
 - **Caution** - The caution alerts you to an anomaly based on the user preferences.
 - **Warning** - One or more warning messages are issued. \
 - **Shut-Down** - In case of a serious error or dangerous condition, the system shuts down and triggers a pop-up window message and a General Alarm.



Step 17. To set the duration of the cleaning process, for **For**, using the **-/+** buttons, set the duration in minutes.

7.6.1 Disabling the Cleaner

If needed, you can disable the cleaner.

➔ To disable the cleaner:

Step 18. At the bottom-right of the screen, tap **Disable**, the cleaner is disabled.

7.7 Importing/Exporting a System Configuration

After setting up a system configuration in the **Control Module**, you can export it to save as a backup or to use for configuring additional **Control Modules** by importing a saved system configuration.


7.7.1 Exporting a System Configuration

You can export a system configuration.

Prepare the following:

- USB Drive

➔ To export a system configuration:

Step 1. At the top of the screen, tap . The **Monitor Tab** is displayed.

Step 2. Tap the **General tab**. The **General Settings** tab appears.



Figure 7-19: General tab

- Step 3.** Open the **Control Module** and on the back of the door, insert the USB drive into one of the USB ports at the top of the circuit board, as shown in the figure below.



Figure 7-20: Control Module USB Port Location

- Step 4.** On the **General tab**, tap **Export Configuration**. The system configuration is copied to the USB drive. confirmation appears.
- Step 5.** Remove the USB drive and keep it in a safe place.


7.7.2 Importing a System Configuration

You can import a system configuration.

Prepare the following:

- USB Drive containing a saved system configuration

➔ To import a system configuration:




- Step 1.** At the top of the screen, tap . The **Monitor Tab** is displayed.
- Step 2.** Tap the **General tab**. The **General Settings** tab appears.
- Step 3.** Open the **Control Module** and on the back of the door, insert the USB drive (containing the saved system configuration) into one of the USB ports at the top of the circuit board, as shown in Figure 7-20 above.
- Step 4.** On the **General tab**, tap **Import Configuration**. A popup appears asking you select the source.
- Step 5.** Tap **USB Flash**. The system configuration is copied to the **Control Module**.
- Step 6.** You are prompted to restart the **Control Module**. Tap **Yes**. The **Control Module** restarts with the imported system configuration.

7.8 Adding Users


Typically, the designated facility manager defines user names for the relevant personnel. However, each User can add addition Users with the same authorization type or in the hierarchy under him/her.

All-In-One screen access is according to the table below.

Table 7-2: User Hierarchy and Permissions

Section	Screen	Manager	Operator	No User Logged On
	Event Log	X	X	X
	System Info	X	X	X
	Monitor	X	X	X
	Lamps	X	X	
	Monitor	X	X	
	General	X	X	
	Cleaner	X	X	
	Tech Monitor	X		
	Tuning	X		
	Signals	X		
	Flow Setting	X		
	Dose Settings			
	Settings System Parts	X		

➔ To add a User:

- Step 1.** Tap the User Indicator . The User Administration Tasks dialog box appears.

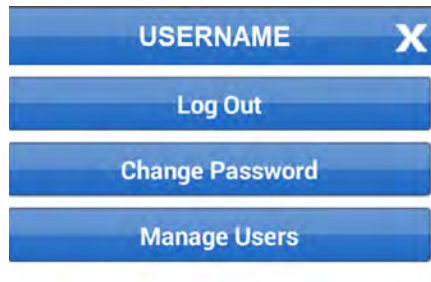


Figure 7-21: User Administration Tasks Dialog Box

Step 2. Tap **Manage Users**. The Manage Users dialog box appears.



Figure 7-22: Manage User Dialog Box

Step 3. Tap **Add User**. The Add User dialog box appears.

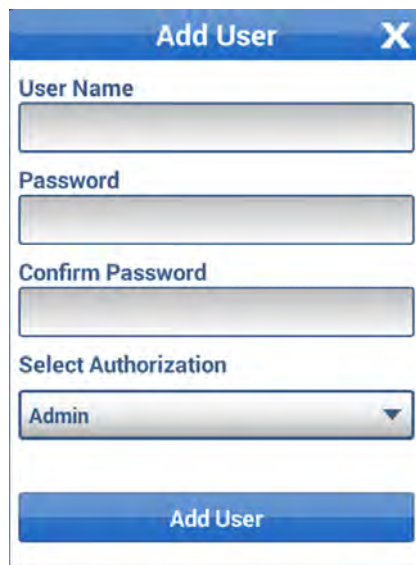



Figure 7-23: Add a User Dialog Box

- Step 4.** Tap the **User Name** field. A virtual keyboard appears. Type in the user name.
- Step 5.** Tap the **Password** field. A virtual keyboard appears. Type in the password.
- Step 6.** Tap the **Confirm Password** field. A virtual keyboard appears. Type in the same password to confirm it.
- Step 7.** From the **Select Authorization** dropdown list, select the desired User type
- Step 8.** Tap **Add User**. The new User is added to the system and appears on the list of Users.

7.9 Editing/Deleting Users

Each User can reset the password to the default password **1234** of Users with the same authorization type or in the hierarchy under him/her or delete any of those Users.

➔ To edit/delete a User:

Step 1. Tap the User Indicator . The User Administration Tasks dialog box appears.

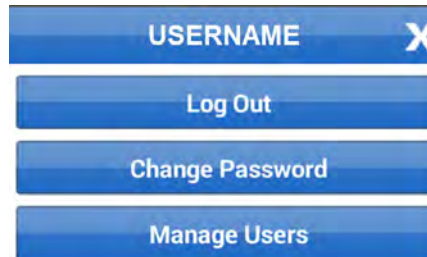


Figure 7-24: User Administration Dialog Box

Step 2. Tap **Manage Users**. The Manage Users dialog box appears.



Figure 7-25: Manage User Dialog Box

Step 3. From the **Select User** dropdown list, select the desired User. The Manage User dialog box appears displaying additional options.



Figure 7-26: Add a User Dialog Box

Step 4. To Reset the password of the selected User, tap **Reset Password To Default**. The password is reset to **1234**.

Step 5. To delete a User, tap **Delete User**. The User is deleted.



8 First Time System Activation

Following **Control Module** configuration, completing the system commissioning includes the following major steps:

- Cleaning the Atlantium Unit (See below)
- Filling unit with water (See below)
- Igniting the UV Lamps (See below)
- Initiating the Water Flow (See page 106)
- Adjusting the Auxiliary Equipment (See page 106)
- System Tuning (See page 106)
- Installation QA (See page 106)

8.1 Cleaning the Atlantium Unit

The inner surfaces of the Atlantium Unit are to be cleaned via the CIP process at installation, before starting up and proceeding with the commissioning phase. Follow the directions in **Cleaning In Place (CIP)** on page 96.

8.2 Filling unit with water

The unit must be filled with water before full activation.

Water hammer can cause damage to any hydraulic system, including the Atlantium Unit. **Make sure that water hammer is NOT present in your facility's water line.**



To prevent water hammer, consult your system engineer and check your facility system procedures, including:

- When starting the water flow when the lines are empty, keep valves open so that the air in the pipes has a simple release pathway.
 - Sudden valve closures can cause water hammer. Make sure that valves close gradually enough to avoid this problem.
 - Ensure that all pumps used with the Atlantium system employ soft start-up procedures.
-

⇒ To introduce water:

Step 1. Open the **Inlet valve** and, using the **Viewport** on the Unit, check that the quartz chamber fills with water completely.


8.3 Igniting the Lamps

The lamps of the Atlantium Unit are ignited to commence live system operation.



- **Temporarily, the breather caps on the lamps must be left open to allow any condensation water to evaporate. During this time, set up Caution floor signs at a distance of 1m/40inch from the Atlantium Unit to warn passersby against possible UV light exposure and not to approach without proper eye and skin protection.**
 - Wear white cotton gloves.
 - Wear long sleeves rolled down to your wrist.
 - Where appropriate eye protection, such as containing polycarbonate lens that meet EN166, CAN/CSA-Z94.3-02 and/or Z87.1 standards.
 - **DO NOT look directly into openings that emit UV light.**
-

➔ To ignite the lamps:

Step 2. In the **Control Module**, log in and at the top of the screen, tap . The **Monitor Tab** is displayed.



The screenshot shows the Atlantium Monitor Screen. At the top, there's a header with the Atlantium logo and a power button icon. Below the header is a navigation bar with tabs: Tech Monitor, Monitor (selected), Tuning, Signals, Flow, Dose, General, System Parts, and Cleaner. The main area displays a table with 8 columns: Lamp ID, Power %, Status %, UVT %, UVIS mA, UVTS mA, Lamp kW, Lamp V, Lamp A, Temp °F, On Off, and Lamp Enabled. The table contains 8 rows of data for lamps 1 through 8. At the bottom, there's a status bar showing 'System On, Ready' and the date/time '10/07/2018 01:25 PM'.

Lamp ID	Power %	Status %	UVT %	UVIS mA	UVTS mA	Lamp kW	Lamp V	Lamp A	Temp °F	On Off	Lamp Enabled
1	100	100	97.0	17.8	18.0	1.70	220.00	7.72	77		<input checked="" type="checkbox"/>
2	100	99	97.1	17.8	18.0	1.70	220.00	7.72	77		<input checked="" type="checkbox"/>
3	100	99	0.0	17.8	0.0	1.70	220.00	7.72	77		<input checked="" type="checkbox"/>
4	100	99	97.1	17.8	18.0	1.70	220.00	7.72	77		<input checked="" type="checkbox"/>
5	100	99	0.0	17.8	0.0	1.70	220.00	7.72	N/C		<input checked="" type="checkbox"/>
6	100	100	0.0	17.8	0.0	1.70	220.00	7.72	N/C		<input checked="" type="checkbox"/>
7	100	99	0.0	17.8	0.0	1.70	220.00	7.72	N/C		<input checked="" type="checkbox"/>
8	100	99	0.0	17.8	0.0	1.70	220.00	7.72	N/C		<input checked="" type="checkbox"/>



Figure 8-1: Monitor Screen*

** This screen (as well as all screens shown in this manual) is a generic example. The number of lamps shown on the actual screen are configured according to the number of lamps in your Atlantium Unit.*

Verify that all of the lamps in your system are enabled - check box appears filled .

Step 3. Post temporary Caution signs on the ground 1 m away from the Atlantium unit to warn bystanders of possible UV light exposure and require the use of appropriate skin and eye protection to approach.

Step 4. Open each of the lamp vent caps (2 on each side of the lamp). For the location of the lamp vent caps, see Figure 10-13 on page 136.

Step 5. Tap  to return to Home Monitor screen, tap  and wait approximately 3 minutes for the **Ready Lamps On** signal to transmit.

Step 6. Check that the Main screen shows that system is working properly according to spec (see Figure 8-2)

Step 7. Let the system operate for at least one hour.

Step 8. Continue with Section 8.5 and Section 8.5 below while the lamps complete the first hour of operation.

Step 9. After that first hour, close all of the lamps' breather caps and remove the Caution floor signs.

8.4 Initiating the Water Flow

When initiating the water flow, the water may be set to drain out or collect in a tank until the system is fully operational. Once the entire installation and QA testing is complete, the water is set to flow normally as part of the facility operation.

➔ To initiate the water flow:

Step 1. Open the relevant valve that allows water to flow through the Atlantium unit. This may be the draining valve or bypass valve.

Step 2. Open the viewport and verify that the Unit is completely filled with water and that no air gaps and no air bubbles exist.

On the **Control Module**, verify that the Flow reading on the right is within normal range. If it is not, check the connections between the Atlantium system and the Flow meter. See **Control Module Connections** on page 51.

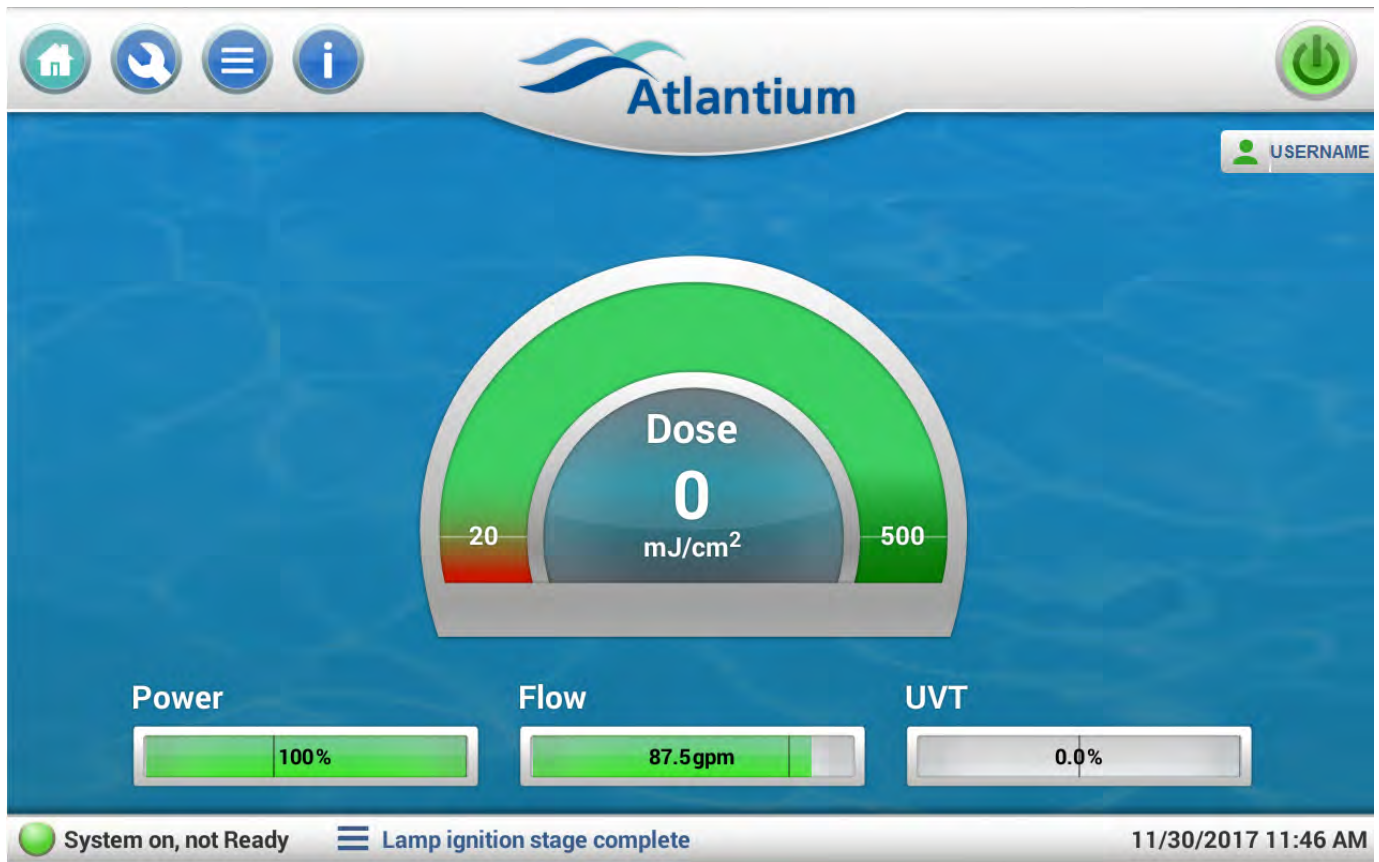


Figure 8-2: Main screen showing on-spec system (generic)

8.5 Adjusting the Auxiliary Equipment

All relevant auxiliary equipment, i.e., flow meter, automatic valves, PLC, etc., must be adjusted at this time. Refer to the manufacturers' user documentation of the relevant equipment.

If your configuration includes a flow meter, check that the value of the flow displayed on the **Control Module** matches the reading on the flow meter. For flow meter calibration, see **Configuring the Flow Settings** on page 88.

8.6 System Tuning

The Atlantium system must be tuned via the **Control Module**. Follow the instructions in **Replacing/Checking a UVT Analyzer or UVIS Sensor** on page 111.

8.7 Installation QA

Atlantium personnel performs a quality assurance procedure (see **Installation Check List** on page 77) following which the Atlantium system is ready for regular facility operation.



9 Operating the Atlantium System

This section details how to operate the system and handle basic and periodic routines to be carried out by Atlantium trained local staff.

For system without **Ultrasonic Cleaning system**, disregard the irrelevant sections.



WARNING!

- Unauthorized servicing or modification of this system in a manner not specified in this manual could expose personnel to potential electrical or other hazards.
- Improper use or adjustment of this system may invalidate the service warranty agreement.

9.1 Operational Guidelines

Follow these guidelines for smooth Atlantium System operations:

- **Incoming Water Supply** - Be alert about incoming water supply. If you do not have pre-treatment, be alert to reports of contamination by upstream slugs of mud, particles, oil, etc.
If the water source was not previously in operation or the line is new, - flush the line prior to introducing water into the Atlantium system
- **Avoid chemicals that are harmful to UV systems** - Avoid caustic soda and other corrosive chemicals that can degrade gaskets and O-rings. For information on approved chemicals for CIP use, see **Selecting the Correct Chemicals for CIP** on page [117](#)
- **Prevent Water Hammer** - Water hammer can cause damage to any hydraulic system, including the Atlantium unit. Take steps to ensure that this phenomenon does not occur in your facility's water line. To prevent water hammer, consult your system engineer and check you facility system procedures for following:
 - Avoid filling empty lines with water without keeping valves open for releasing the air from the pipes and the system.
 - Avoid rapid closure of water lines by sudden closure of valves.
 - Before introducing the water, ensure that all pumps that impact the Atlantium system employ soft start-up procedures.
- **Avoid vibrations on upstream and downstream piping** - Make sure that the piping to be attached to the Atlantium Unit is reinforced to protect the Unit against vibration.
 - A high vibration level can cause damage to any hydraulic system, including the Atlantium unit.
 - High vibration can be caused by an unbalanced pump or by sudden valve close.
- Do not leave the Atlantium Unit filled with stagnant seawater for a long time. Either rinse with fresh water and leave the Atlantium Unit standing with fresh water, or empty. Leaving the Unit empty is a less preferable option, since when refilling the system you must avoid air collection in the Unit and avoid water hammer, as mentioned above.


9.2 Basic Operational Tasks

- Shutting down the Atlantium system - See below
- Starting up the Atlantium system - See page [108](#)
- Taking microbial samples - See page [114](#)

9.2.1 Shutting Down the Atlantium System

You can shut down the Atlantium system via the **Control Module**.


➔ To shut down the Atlantium system:

- Step 1.** In the **Control Module**, on the top of the screen, tap . The button turns grey . . Wait approximately three minutes for the **Lamps Off** signal to transmit.
- Step 2.** Check the **Main Operations** screen and verify that the system parameter for **Power** is **0%**.
- Step 3.** Using the viewport on the Atlantium Unit, check that the lamps are indeed turned off.

9.2.2 Starting up the Atlantium System

You can start up the Atlantium system via the **Control Module** and then check the water and system parameters.

➔ To start up the Atlantium system:

- Step 1.** Check that the power cable of the Ballast Modules is connected to the main power source.
- Step 2.** Connect the power cable of the **Control Module** to the main power source.
- Step 3.** Using the attached key, open the screen panel of the **Control Module**.
- Step 4.** Locate the circuit breaker and turn it to the **On** position.
- Step 5.** In the **Control Module**, on the top of the screen, tap . The button turns green. Wait 10 minutes for lamps to turn on and the system to stabilize.
- Step 6.** Open the viewport and check that there are no air bubbles in the water flow. If necessary, release all air bubbles from within the system.
- Step 7.** Check the **Control Module** Screens (See *Configuring the Control Module* on page 72.) and verify that the Atlantium system parameters for **Power**, **Flow**, and **UVT** are within wanted acceptable range (see the table below to enter your expected values).

Notify the executive maintenance engineer in case the values are out of range.

Table 9-1: Abbreviation of Table in Appendix B. Checking the System Parameters

	Parameter	Expected Value	
		Minimum	Maximum
1	Power		
2	Flow Rate		
3	UVT		
4	UV Dose		
5	Lamp Status		




For periodic checks on Atlantium system parameters, a convenient check list is supplied in Appendix B, *Checking the System Parameters* on page 181.

9.2.3 Viewing System Information

You can view general information about the system in the **System Info** screen.

➔ To view generic System information:

At the top of the screen, tap . The **System Info** screen is displayed, containing the following information:

- Power in % of maximum power
- Status in % (Average lamp status, relative to output of a new lamp)
- UVT in %
- Flow in m³/h
- Temperature
- Dose in gpm or h³/m
- Software version (of the **Control Module**)
- ISO version (of the **Control Module** card)
- IP Address (Optional for connecting to the Control Module via remote PC to generate history Excel files)
- External Storage (SD card for backing up system data, i.e., event log, system configuration, system parts info, history)

Total Space GB

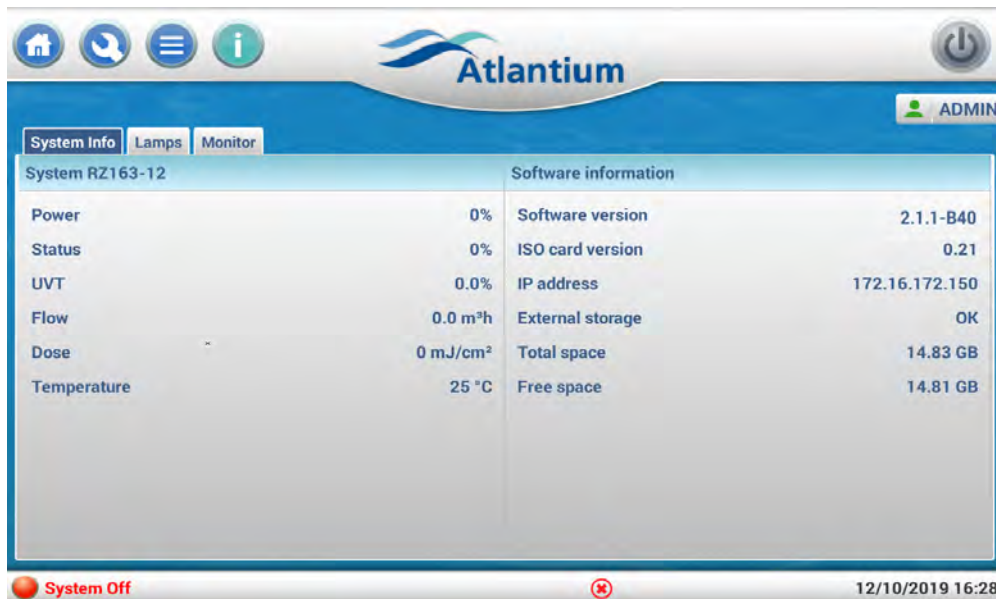



Figure 9-1: System Info Screen

9.3 Viewing Lamp Information

You can view information about the lamps in the **Lamps** screen.

➔ To view information about the Lamps:

- Step 1.** At the top of the screen, tap . The **System Info** screen.
- Step 2.** Tap the **Lamps** tab. The Lamps screen is displayed, containing the following information:

- ◆ Lamp ID
- ◆ Status in % (lamp status, relative to output of a new lamp)
- ◆ Age in hours
- ◆ Number of ignitions
- ◆ State: On, Ignition, or Off

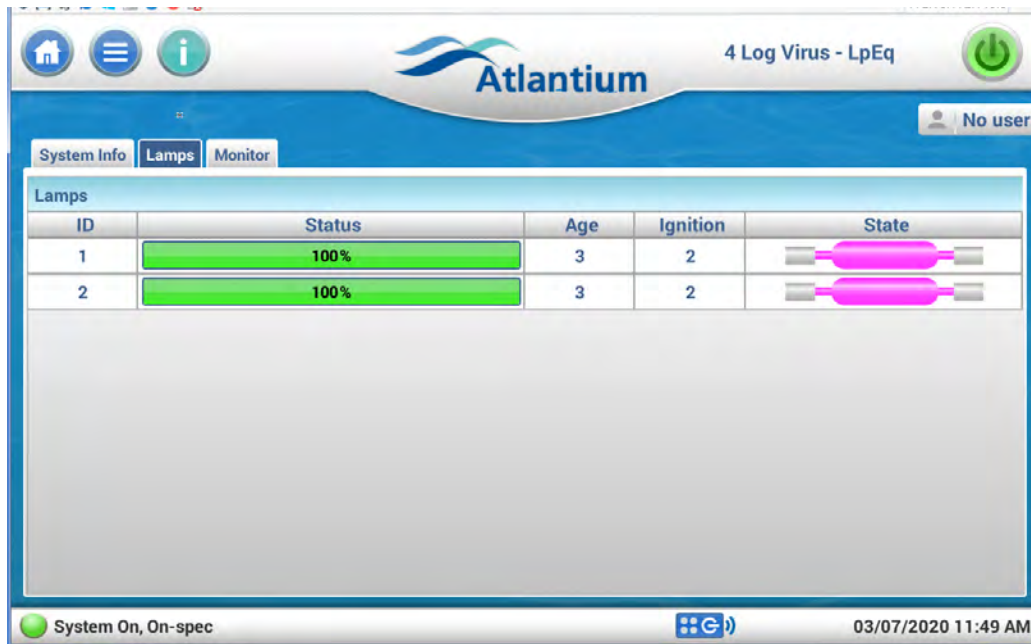



Figure 9-2: Lamps Screen

9.4 Viewing the System Monitor

You can view information about the system status in the **Monitor** screen.

➔ To view the System Monitor:

- Step 1.** At the top of the screen, tap . The **System Info** screen.
- Step 2.** Tap the **Monitor** tab. The Monitor screen is displayed, containing the following information:
- Lamp ID - The ID number of the lamp.
 - LM Card SW - The software version of the Connection Box card to which the lamp is connected.
 - Power % - The Power supply's power in percentage.
 - Status % - The Real time efficiency status of the lamp in percentage.
 - UVT% - The quality of the UV transmittance through the water in percentage.
 - UVIS mA - The output current of the UV Intensity Sensor adjacent to the lamp
 - UVTS mA - The output current of the UV transmittance sensor through the water
 - UVT A, UVT B % - Quality of transmittance measured by two separate sensors (RZM or EPA systems)
- UVTS A, UVTS B mA - The output current of the 2 separate UV transmittance sensors (RZM or EPA systems)
- Lamp kW -
 - Lamp V -
 - Lamp A -
 - Temp - The lamp's temperature reading in either °C or °F.

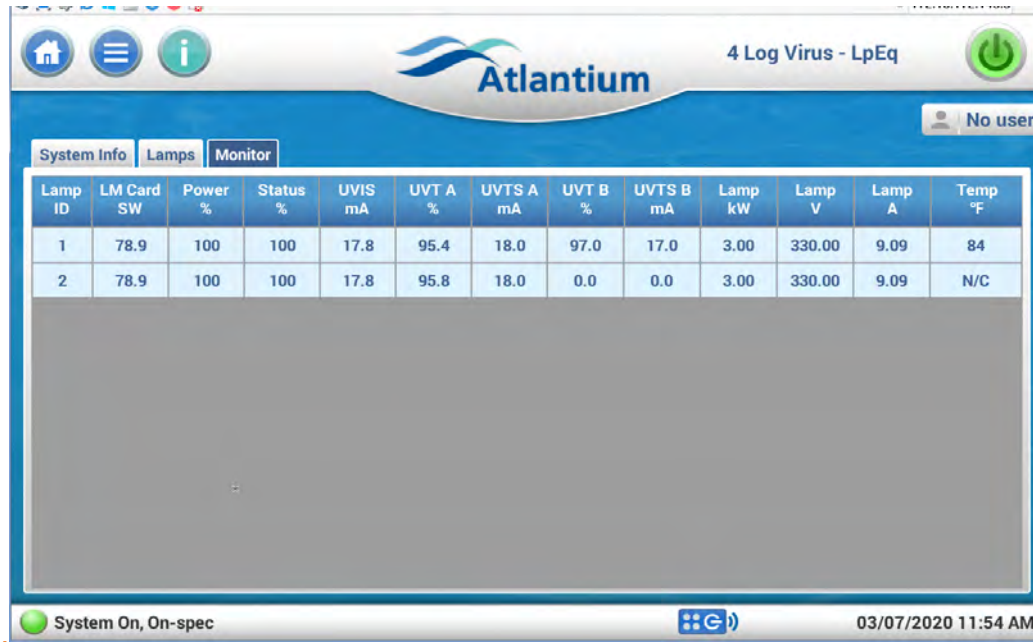


Figure 9-3: Monitor Screen

9.5 Viewing the Alarm Log

Every defined event /alarm is written to the Alarm Log of the **Control Module**. alarms with alerts also trigger an alert icon at the bottom of the screen. You are can acknowledge each alarm or acknowledge all together.

➔ To view the alarm log and acknowledging alarms:

- Step 1.** At the top of the screen, tap  the **Alarm Log** screen is displayed.
- Step 2.** To navigate through the log, swipe down the Event list.

ID	Event Topic	Date	Time
1	⚠ Dose is above the maximum [29]	30/11/2017	12:10:05
20	☰ Lamp ignition stage complete [28]	30/11/2017	12:09:36
61	☰ System ready [27]	30/11/2017	12:09:35
62	☰ System turned on manually [26]	30/11/2017	12:09:13
62	☰ System turned on manually [25]	30/11/2017	12:08:57
66	☰ System turned on externally [24]	30/11/2017	12:08:55
66	☰ System turned on externally [23]	30/11/2017	12:08:52

System on, Ready 30/11/2017 12:11

Figure 9-4: Event Log Screen

- Step 3.** To view more information about a single alarm, tap the alarm. The alarm item expands to display the full information, including reading for System Power, Dose, Flow, Status, UVT, and Temperature at the time the alarm occurred. When expanding an alarm with an alert, the alert is acknowledged, and relevant icons at the bottom of the screen disappear.
- Step 4.** To acknowledge all alerts, tap the **Acknowledge all** button. The relevant icons at the bottom of the screen disappear.

ID	Event Topic	Date	Time
1	⚠ Dose is above the maximum [121]	30/11/2017	12:21:49
5	⚠ Temperature is critically high! [32] The lamp's temperature is above the maximum defined in the system settings. The system is shutting down. System power: [0], System dose: [0], System flow: [100.0], System status: [0.0], System UVT: [0.0], System temperature: [25.0]	30/11/2017	12:15:26
4	⚠ Temperature is too high! [31] The lamp's temperature is too high – check the water flow. System power: [0], System dose: [0], System flow: [100.0], System status: [0.0], System UVT: [0.0], System temperature: [25.0]	30/11/2017	12:15:26
1	⚠ Dose is above the maximum [29]	30/11/2017	12:10:05
5	⚠ Temperature is critically high! [18]	30/11/2017	12:08:30
4	⚠ Temperature is too high! [17]	30/11/2017	12:08:30

System on, Ready 30/11/2017 12:22

Figure 9-5: Event Log Screen - Event Information Examples

9.6 Taking Microbial Samples

The designated aseptic sampling valves (i.e., EGMO ESV valves) are the **Inlet** and **Outlet Sampling Points** located on the sides of the Atlantium Unit. Before taking a microbial sample, a valve is sterilized internally with Ethanol 70%, as well as with flame.

Required Equipment

- Sampling containers that are clean, laboratory-grade, sampling bottles with a volume no less than 100ml (3.38oz).
- Ethanol 100-70%
- Bunsen Burner and lighter
- Permanent marker
- Sterile gloves
- Proper Sampler attire according to local laboratory protocol



CAUTION!



- Use gloves during sampling and treat them with Ethanol 70%.
- Use **sterile disposable** sampling containers.
- Prevent contact between the sampling containers and the valves' surfaces.
- Be sure that no foreign matter or liquids fall into the sampling containers.
- Perform the sample collection as fast as possible to minimize environmental contamination of the sample.
- **Use open flame to treat the surrounding air while sampling.**

➔ To take a microbial sampling:

- Step 1.** Open the Sampling valve and allow water to flow for 2-3 minutes. Then close the valve.
- Step 2.** If the sampling valve contains a cover at the top, open its cover and place it in a clean place.
- Step 3.** Spray all over the Sampling valve and inside it thoroughly with Ethanol 70%.
- Step 4.** Using a Bunsen burner, apply the flame comprehensively over the entire Sampling valve surface from its connection to the main pipe to its spout.
- Step 5.** Spray the cap thoroughly with Ethanol 70% and place it on the Sampling valve.
- Step 6.** Open the valve and allow the water to flow for 2 minutes. If you have applied the flame properly, vapor emerges from the spout. (If there is no vapor, application of the flame was insufficient. Repeat the previous step.)



Figure 9-6: Cleaning the Sampling Valve with Ethanol

ATTENTION!

Make sure never to touch the opening at the Sampling container's neck.
While the Sampling container is open, do not turn the cap upside down.

- Step 7.** On the Sampling container, with one hand, remove its cap carefully, avoiding touching the inside of the cap with fingers or any other object. **Do not turn the cap upside down.**
- Step 8.** With your other hand position the Sampling valve under the water stream and take a water sample. Make sure never to touch the valve's opening or the opening at the container's neck. Fill the sampling container, leaving ample air space in bottle (at least 2.5 cm).
- Step 9.** Carefully replace the container's cap and tighten it to avoid cross contamination.



Figure 9-7: Taking a Sample

- Step 10.** Label the Sampling container with the following data:
- Sampling site
 - Sampling point
 - Sampler name
- Step 11.** Close the Sampling valve.
- Step 12.** Spray the sampling container thoroughly with Ethanol 70%.
- Step 13.** Store the water samples in a dark, refrigeration unit at a temperature of 2-8°C (35.6-46.4°F) until they are examined.

9.6.1 Microbial Analysis Guidelines

The microbial analysis is to be conducted according to the company guidelines which are used in the local microbiology laboratory.

- Atlantium's recommendation is to use the microbial filtration method for the testing.
- If a number of consecutive anomalous microbiological results are obtained in one of the sampling points, take the samples only after performing CIP with a disinfection chemical (peracetic acid is recommended). It is important to let the chemicals clean and sanitize the aseptic valves, by letting the cleaning solution flow through them. See **Cleaning In Place (CIP)** on page 117.
- In the event that system outlet counts are higher than the inlet counts, the results are to be considered as a sampling error.
- In the event that the microbial counts are not proportional in different dilutions, the results are to be considered as a laboratory error.

For further guidance regarding microbial sampling and analysis, contact the Atlantium Application department

9.7 Ultrasonic Cleaning (Optional)

For systems with the optional Ultrasonic Cleaning System, for whatever reason, you may want to manually disable the Ultrasonic Cleaner. Using the manual control temporarily overrides the configured settings. Manually reenabling resumes the ongoing automatic Ultrasonic Cleaning cycles as pre-configured in the settings.

➡ **To run the Ultrasonic Cleaner from the Controller:**

- On the **Control Module** main screen, press the cleaner icon . The Ultrasonic Cleaner is activated/deactivated. Activation is for the duration set for this function.



10 System Maintenance

To keep the Atlantium system in peak form, preventive and periodic routine maintenance is essential. During commissioning, Atlantium trains your local staff how to do the tasks on a prescribed schedule or as needed.



WARNING!

- Unauthorized servicing or modification of this system in a manner not specified in this manual could expose personnel to potential electrical or other hazards.
- Improper use or adjustment of this system may invalidate the service warranty agreement.



Before you begin a procedure, carefully read through it so that you can anticipate the steps efficiently.

The periodic routine maintenance schedule includes:

- Weekly Maintenance Tasks:
 - Walk-Around Inspection Tour - see below
- Monthly Maintenance Tasks:
 - Checking the Ballast Module Cooling Fans (if relevant)
 - Checking the Temperature Sensor Reading (See page 128)
- Yearly Maintenance Tasks:
 - Cleaning the Quartz Sleeve (or Replacing as needed) and Replacing the Quartz Sleeve O-rings (See page 139)
 - Anti-Corrosion Maintenance (***Anti-Corrosion Spray Safety*** on page 42)
- Maintenance Tasks Performed as Needed:
 - Cleaning In Place (CIP) (See page 117)
 - Replacing a Lamp (See page 129)
 - Checking/Replacing a Sensor (See page 141)
 - Testing System Lamps (See page 146)
 - Tuning the Atlantium System (See page 147)
 - Checking/Replacing the Quartz Sleeve (See page 139)
 - Cleaning/Replacing a UVIS Wave Guide (See page 136)
 - Replacing/Editing System Parts in the **Control Module** (See page 133)
 - Temperature Sensor Maintenance
 - ◆ Replacing the Temperature Sensor (See page 150)

10.1 Walk-Around Inspection Tour



Walk-Around and inspect the Atlantium system once a month to check for water leaks, visible damage to the cables and harnesses, or any other part of the system. Report any problem you find to an authorized technician.

➔ To perform a Walk-Around inspections:

- Step 1.** Walk around the Atlantium unit and inspect it. Look for leakage at the incoming and outgoing pipes.
- Step 2.** Inspect the **Cable Harness** and cables running between the Unit and the Ballast Module(s) and **Control Module** for signs of fraying and any other visible damage.
- Step 3.** Inspect the Ballast Module(s) and **Control Module** for any signs of damage.
- Step 4.** Report any leakage or damage to an authorized technician immediately.

10.2 Cleaning In Place (CIP)



The CIP procedure consists of two parts:

- Cleaning to remove the accumulated deposit (particles) that collect on the quartz sleeve over time
- Disinfectant cleaning to sterilize the quartz sleeve (not applicable to some Municipal installations)

Clean the Atlantium Unit's inner surfaces and quartz sleeve generally on a periodic basis that is determined by observing that the performance is on target and the UVT Sensor readings are stable. You can clean using this process less frequently, depending on the specific chemistry of your water.

A CIP recirculation system is available from Atlantium as an optional CIP Kit. Connect the recirculation system to the CIP ports to create a closed-loop flow line that pumps a diluted solution through the Unit.



- In facilities where CIP is performed on the plant level, circulating through all piping, the CIP process is the same for the Atlantium System. The inlet and outlet valves referred to in these sections are irrelevant.
- If the Atlantium Unit(s) is/are integrated into the facility's CIP loop, ensure that the water flow rate through the Unit is at least 60 m³ per hour.
- In facilities with plant-wide CIP, perform CIP with the Atlantium System running.
- In facilities that utilized sea water, sea water may be used in the CIP process provided that the chemical manufacturer of the cleaning/disinfectant solution approves.

The estimated time for a CIP process is 1.5 hours.

Prepare the following:

- Protective chemical-safe goggles, clothing and gloves
- An external pump-driven recirculation system with a built-in 100 liter reservoir (26.5 US gallons) or Atlantium's CIP Kit including its accessories (See **Sampling Valve Components and Kits** on page 32.)
- Scalant cleaning solution
- Disinfectant cleaning solution (if disinfection is planned)

10.2.1 Selecting the Correct Chemicals for CIP

It is **critically important** to select the correct cleaning and disinfecting chemical for the CIP process. It must be powerful enough to clean the inner surfaces of the Atlantium unit, while at the same time:

- Does not harm the components of the Unit that it comes into contact with (stainless steel 316/super-duplex stainless steel UNS S32750, quartz and Viton® O-rings).
- Does not contaminate the product for which the water being treated by the system is used.

WARNING!



- The cleaning/disinfectant solution selected and the concentrations used must be approved for use by the facility's quality assurance and safety officials, and must comply with the written protocols and procedures set in place by those departments.
- It is the responsibility of the owner/operator of the Atlantium system, as applicable, to ensure that the cleaning/disinfectant solution to be used in the CIP process shall be of a type that is permitted for this use in the country/jurisdiction where the CIP process is to be performed.
- Use and handle in strict accordance with their manufacturer's instructions, product information sheets, and material safety data sheets (SDS).
- Use of NaOH (Caustic Soda) may cause irreversible damage to the quartz. Use of this material requires an analysis of temperatures, concentration, frequency and duration and written approval from Atlantium's application engineer.



- All chemicals must be obtained locally.
- Atlantium does not supply chemicals - get them locally from commercial chemical suppliers.

Recommended Scalant Cleaning Solutions

The following chemicals have been tested and found to be very effective for cleaning and are recommended for use when cleaning the Atlantium system:

- Phosphoric acid (H_3PO_4) 2% diluted solution
- Nitric acid (HNO_3) 2% diluted solution
- HCl 2% diluted solution - recommended for metal based (rust-colored) deposits
- Sulfamic acid (H_3NSO_3) 1.5% diluted solution - recommended for calcium based deposits

Recommended Disinfectant Solutions (not applicable to some Municipal installations)

(The Disinfectant CIP process is not applicable to some Municipal installations)

The following have been tested and found to be very effective for disinfection and are recommended for use when disinfecting the Atlantium system:

- Peracetic acid-based chemicals - 30 min. contact time, for example:
 - P-3 Oxonia Active 150 - 0.5% diluted solution according to manufacturer's recommendation
 - Divosan Forte - 0.5% diluted solution according to manufacturer's recommendation
- Hot water at 85°C (185°F) for 30 min.



WARNING!



- It is the responsibility of the Atlantium system's owner/operator to use and apply the correct chemicals.
- The use of any other cleaning and disinfection chemicals requires Atlantium's approval.

10.2.2 Preparing the Chemical Solution

For both cleaning and disinfecting, the liquid in the reservoir must contain the desired percentage of the chemical additive (see above). Therefore, the purchased chemical solution must be diluted and added to the reservoir. Calculate the correct amount of chemical solution to be used for the CIP process.



Protect yourself from the ill-effects of chemicals with protective chemical-safe goggles, clothing and gloves.



- The concentrations refer to room temperature.
- The diluted solution values denote the required dilution of the chemical circulating through the Atlantium Unit.
- While calculating the diluted volumes, consider all volumes including the Unit, pipes and the recirculation reservoir.

➔ To calculate the correct amount of chemical solution:

Step 1. Calculate the total volume you need for the CIP* by adding the water volumes in:

- The Atlantium Unit volume (measurements in liters/gallons) - Refer to the **Physical Specifications** Table in **Atlantium System Footprint** on page 14
- The pipes between the Atlantium Unit and the **Inlet** and **Outlet Valves**
- The CIP recirculation system
- The hoses between the Unit and the recirculation system

Step 2. Calculate the amount of chemical additive to be added to the reservoir to achieve the desired dilution. Use this formula:

$$C = \frac{A * V_t}{B}$$

A - The target concentration for the liquid (chemical substance + water) in %

B - The concentration of the chemical substance to be added in %

C - Volume of the chemical substance to be added in liters/gallons

V_t - Volume of the water in the Unit + piping + CIP Reservoir (as described above*) in liters/gallons

OR:

Assume that you need a 2% diluted solution in the CIP process and assume that your purchased solution is of a 35% concentration in a 4-liter container.

Calculate according to this calculation: [200 liter X 2%] / [35% X 4 liter] = [400] / [140] = 2.9 = 3 containers.

CAUTION!



* If you intend to collect the solution into the CIP reservoir or other container, the total volume of the cleaning solution must not exceed the volume of the CIP reservoir or container.

Be sure to obtain from an engineer the correct calculation for the amount of chemicals to be used for the process you intend to use.

10.2.3 Performing CIP

CAUTION!



The anti-scaling procedure is performed only if necessary. Atlantium recommends that anti-scaling always be followed by disinfection.

The CIP process is performed utilizing fresh water. For systems with sea water, drain the system and rinse before performing CIP.



- In facilities where CIP is performed on the plant level, circulating through all piping, the CIP process is the same for the Atlantium System. The inlet and outlet valves referred to in these sections are irrelevant.
- If the Atlantium Unit(s) is/are integrated into the facility's CIP loop, ensure that the water flow rate through the Unit is at least 60 m³ per hour.
- In facilities with plant-wide CIP, perform CIP with the Atlantium System running.

This section details the CIP process with recommended steps for carrying it out. The procedure is to be adapted according to the specific circumstances of your installation.

The CIP process is to follow these major steps:

(Refer to the next section for the detailed description on the CIP process.)

- Step 1.** Close the inlet and outlet valves and immediately shut down the Atlantium system
- Step 2.** For systems with sea water, if needed, drain the system
- Step 3.** Remove the caps covering the CIP ports
- Step 4.** Connect the supply hose to the bottom CIP port and connect the return hose to the top CIP port
- Step 5.** Fill the CIP reservoir with fresh water or sea water
- Step 6.** Starting the circulation
- Step 7.** Adding the cleaning solution (See *Selecting the Correct Chemicals for CIP* on page 117.)
- Step 8.** Running the CIP circulation for at least 30 minutes or as specified according to the chemical manufacturer
- Step 9.** Rinsing the system and the CIP cart
- Step 10.** Performing CIP Disinfection with the disinfection solution
- Step 11.** Ending CIP

The CIP diagram below is followed by the full recommended CIP procedure.

CIP Setup

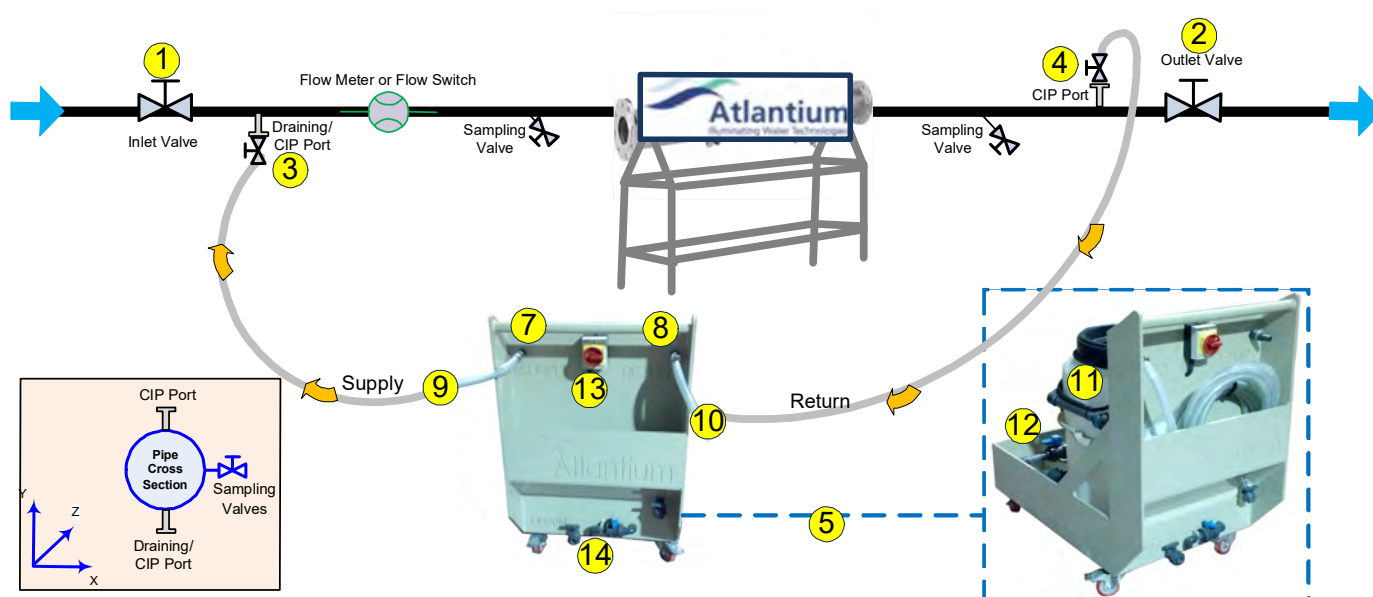


Figure 10-1: Recommended CIP Setup



If the installation is vertical, the water flow is from bottom to top. The Draining/CIP port (3) is on the bottom, under the Atlantium Unit and the CIP port (4) is above the Atlantium Unit.

➔ To Perform CIP:

ATTENTION!

If you are only performing disinfection: Follow Steps 1 through 20. Then resume with Step 22.

If you are performing both procedures: Follow all of the steps below.

Shutting Down the System

- Step 1.** Close the Unit's inlet isolating valve (1) and outlet isolating valve (2). Immediately proceed to the next step.
- Step 2.** Shut down the Atlantium system, on the **Control Module**, by pressing the **Main Unit Operation Button Operation** button in the upper-right corner.
- Step 3.** On each CIP port, remove the cap's clamp and remove the caps covering the CIP ports (3 & 4). Place the caps in a safe place for reuse later. Verify that the gasket is still inserted into the ferrule.

ATTENTION!

Make sure that the hose fittings are secure and tight.

Water must fill the entire path through the piping on both sides of the Atlantium Unit and the Unit itself, as well as the Supply and Return hoses and the CIP Kit's reservoir.

Connecting the CIP Hoses

- Step 4.** Remove the hoses from their pocket on the Cart.
- Step 5.** Using the CIP cap's clamp, connect the CIP Kit's Supply hose to the bottom CIP port **(3)**. Verify that the gasket is present.
- Step 6.** Using the CIP cap's clamp, connect the CIP Kit's Return hose **(10)** to the top CIP port **(4)**. Verify that the gasket is present.

Filling the CIP Reservoir

Step 7. To fill the CIP reservoir **(A)** with water:

■ **Filling option 1:**

- Slightly open the Unit's inlet isolating valve **(1)** and open the top CIP port on the outlet side **(4)** and allow the facility's water to fill the CIP Kit's reservoir **(11)**.
- There is a full line indicator on the reservoir **(11)**. Make sure the water in the reservoir is up to the 100 liter (26.5 US gallons) level.
 - ◆ Close the Unit's inlet isolating valve **(1)**.
 - ◆ Close the CIP port **(4)** valve.

■ **Filling option 2:**

- Open the top cover of the CIP Kit's reservoir **(11)**.
- Using a hose of an external water source, fill the reservoir with 100 liter (26.5 US gallons) of room-temperature tap water ($\pm 25^{\circ}\text{C}/75^{\circ}\text{F}$).
- There is a full line indicator of the reservoir. Make sure the water in the CIP Kit's reservoir **(11)** is filled to the 100 liter (26.5 US gallons) level.
- Close the cover.

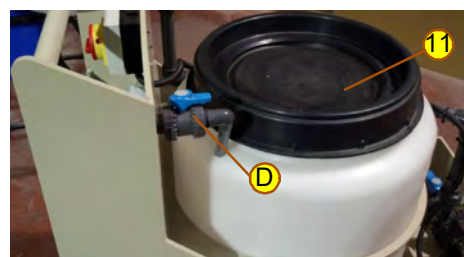


Figure 10-2: CIP Kit's Reservoir



Figure 10-3: CIP Cart's Inlet and Drain Port



WARNING!

Observe chemical safety rules! Follow all safety recommendations in the chemical manufacturer's product information and SDS publications!

Adding the Chemical Solution



Protect yourself from the ill-effects of chemicals with protective chemical-safe goggles, clothing and gloves.

- Step 8.** Open the top cover of the CIP Kit's reservoir **(11)** and add the prepared chemical solution to the water in the reservoir. (See *Selecting the Correct Chemicals for CIP* on page **117.**.)

Starting the CIP Circulation Process

ATTENTION!

The Atlantium Unit must be absolutely full for the solution to reach all of the inner surfaces.

- Step 9.** If the bottom and top CIP ports **(3 & 4)** are valves, open them.
- Step 10.** To start the CIP recirculation pump, on the CIP cart, turn the switch **(13)** to the **On** position and allow the solution to circulate through the Unit for **the period of time specified in the chemical's Use instructions, but not less than 30 minutes.**
- Step 11.** Verify that the Atlantium Unit is full of water and that the water is circulating correctly.
- Step 12.** During the circulation period open and close the sampling valve several times to assure chemical contact with the CIP chemicals.

If the draining valve is separate from the CIP ports, open and close the draining valve.

Rinsing the System and CIP Kit

After the chemical solution has circulated through the Unit for a sufficient duration, the chemicals solution must be rinsed from the system.

- Step 13.** Open the top cover of the CIP Kit's reservoir **(11)** and add the prepared chemical solution to the water in the reservoir. (See *Selecting the Correct Chemicals for CIP* on page **117.**.)
- Step 14.** Connect the CIP recirculation system's drain valve **(B)** to the facility's sewage system. See *Alternatives for Draining the Cleaning Solution* on page **125.**
- Step 15.** Turn on the Atlantium system, on the **Control Module**, by pressing the **Main ON/OFF Operation** button in the upper-right corner

ATTENTION!

Before performing the next step, verify that the lamp(s) are on and the system has stabilized and indicates it is ready. If not, restart the lamp(s) again and wait until the system has stabilized and indicates it is ready.

- Step 16.** Close the inlet CIP port **(3)**, stop the recirculation pump **(12)** and open the CIP recirculation system's drain valve **(C)**. Immediately slightly open the inlet valve **(1)** to rinse the Atlantium system thoroughly.
- Allow this rinsing process to operate until at least three cycles of water volume have gone through the Atlantium Unit to remove all of the scalant cleaning/disinfectant solution.

- Step 17.** To assure that all the chemicals are flushed out, use a measurable indicator, such as measuring the pH, or other indicators depending on the chemical being used (consult your chemical supplier).
- Step 18.** Slightly open the outlet valve **(2)** and close the CIP port on the outlet side **(4)**. To avoid hammer effect if there is air trapped in the system, carefully open the inlet valve **(1)** completely. Resume normal operation.

Rinsing the CIP Reservoir

After the chemical solution has circulated through the Unit for a sufficient duration as specified by the chemical supplier (typically 30 minutes), the chemicals solution must be rinsed from the system by the steps below.

- Step 19.** Open the CIP cart's drain valve **(C)** and completely drain the CIP reservoir **(11)**.
- Step 20.** Using an external water source, rinse the CIP cart's reservoir, letting the rinse water drain out of the CIP cart's drain valve **(C)**.
- Step 21.** Close the CIP cart's drain valve **(C)**.

Performing CIP Disinfection

- Step 22.** If you are planning to perform an additional CIP process using the disinfectant solution, refer to **Preparing the Chemical Solution** on page **119** and follow the CIP process again from **Filling the CIP Reservoir** in **Step 7.** above.

Or,

To return to normal operating status, proceed to the next step.

Ending CIP

- Step 23.** To drain out any water inadvertently collected in the CIP cart's storage pocket or base, use the CIP cart's drain valves **(A)** and **(B)**.
- Step 24.** Roll up the CIP Kit's hoses and return them to their storage pocket **(F)**.

Refilling the System

ATTENTION!

Make sure that the Atlantium Unit is filled with water before powering it up and turning on the lamps.

- Step 25.** Turn on the Atlantium system at 100% power and wait until the system has stabilized and indicates that it is ready.

Returning Power to the Lamps

- Step 26.** On the Connection Box next to each lamp, turn the switch to the **On** position.
- Step 27.** Turn on the Atlantium system, on the **Control Module**, by pressing the **Main ON/OFF Operation** button in the upper-right corner.

Alternatives for Draining the Cleaning Solution

- **If local regulations permit, and a physical drain setup exists,** drain the used cleaning solution to the facility's sewage system:
 - a Connect the CIP recirculation system's drain valve **(B)** to the facility's sewage system.
 - b With the Atlantium System operating, slightly open the Inlet valve.
 - c Close the inlet bottom CIP port **(3)**.
 - d To stop the CIP recirculation, on the CIP cart, turn the switch **(13)** to the **Off** position.
 - e Open the CIP cart's drain valve **(C)**. The water with the chemical solution begins to drain out.
 - f Connect the CIP cart's drain valve **(C)** to the facility's sewage system.

Or,

- **According to local regulations, use the Draining/CIP port to drain the solution in the system into a external container.**

Or,

- **Use the CIP reservoir (11) to collect the chemical solution.**
 - a Connect the CIP recirculation system's drain valve **(B)** to the facility's sewage system.
 - b With the Atlantium System operating, close the inlet bottom CIP port **(3)**.
 - c To stop the CIP recirculation pump, on the CIP cart, turn the switch **(13)** to the **Off** position.
 - d Allow the chemical solution to drain entirely into the CIP reservoir **(11)**.
 - e Dispose of the contents according to regulations. Connect a drainpipe to the CIP cart's drain pipe and open the CIP cart's drain valve **(C)**. The water with the chemical solution begins to drain out.
 - f Disconnect and close the CIP cart's drain valve **(B)**.

10.3 Stopping/Starting the Ultrasonic Cleaner (if installed)

For systems with the Ultrasonic Cleaning System, for whatever reason, you may want to manually stop or start the Ultrasonic Cleaner's operation per lamp.

➔ To stop/start the Ultrasonic Cleaner from the Control Module:

- Step 1.** At the top of the screen, tap . The **Monitor Tab** is displayed.
- Step 2.** Tap the **Cleaner tab**. The **Cleaner** screen appears.

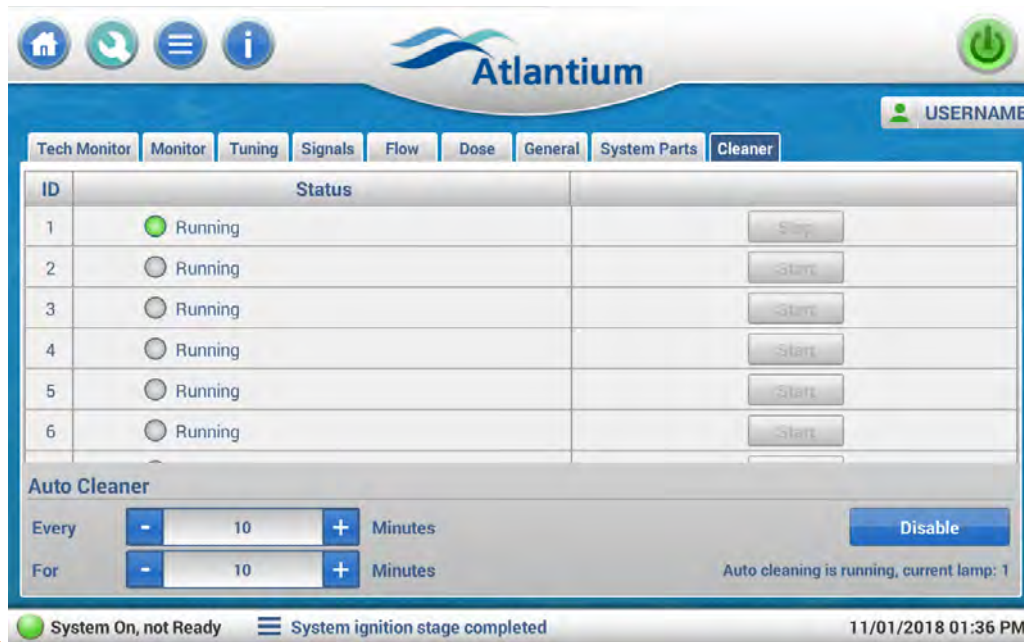


Figure 10-4: Cleaner Screen

- Step 3.** To start cleaning on a particular lamp, for the desired lamp, tap **Start**.
- Step 4.** To stop cleaning on a particular lamp, for the desired lamp, tap **Stop**.
- Step 5.** To disable the cleaner on the entire system, in the lower right corner, tap **Disable**.
- To reinstate the cleaner operation, tap **Enable**.

10.4 Checking & Cleaning the BM Cooling Fans



Once a month, perform the following maintenance procedure on Ballast Modules Type B/C:

➔ To check and clean the cooling fans:

- Step 1.** Check with your hand that the fans are blowing air out of each Ballast Module (BM types B and C, see figure below)



Electric Shock:

The system must be switched off before performing the following cleaning procedure

- Step 2.** For BM Type B, unscrew the 4 Phillips screws at the top of the fan cover and remove the fan cover - see Figure 10-5 on page 127.
- Step 3.** Using air pressure, clean the inlets on the underside of BM Type B (see airflow arrows) and the outlet vents of the fan on the top of the unit. The BM can be removed from the wall for cleaning but it is not necessary to disassemble it further.

- Step 4.** If dirt accumulates in the fan environment or in its suction openings of BM Type B, wipe clean with a damp cloth.
- Step 5.** Replace fan cover of BM Type B and screw it in place with the 4 Phillips screws, then remount unit on wall, as necessary.
- Step 6.** For BM Type C, dismount unit from wall and locate the fan on the inner side of unit (see figure).
- Step 7.** Using air pressure, clean the fan and the cooling ribs of BM Type C and wipe clean with damp cloth as necessary.
- Step 8.** Remount BM Type C on wall.

The interval time between performance of cleaning steps 2-8 can be increased following your actual experience with the rate of accumulated dirt on the fan and vents. Once that interval is changed, mark it in your maintenance procedure or in this book

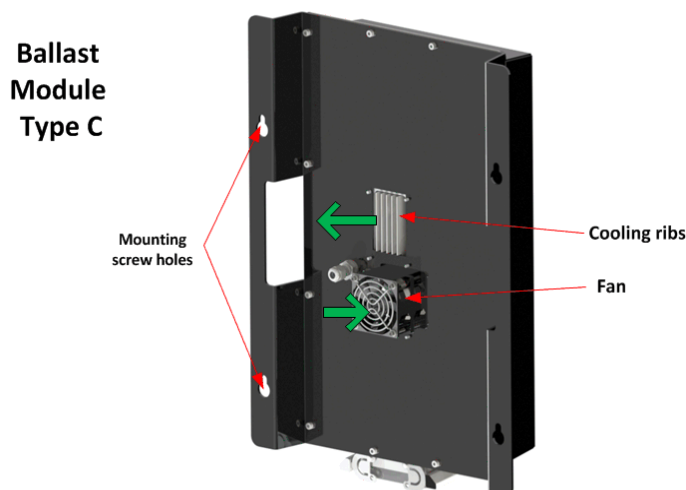
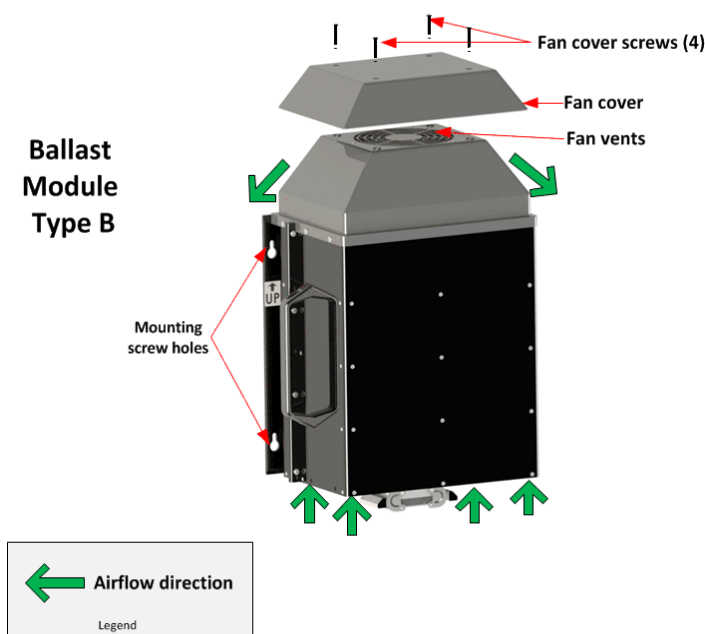


Figure 10-5: Dismounting Ballast Module (Type B or C) for cleaning

10.5 Checking the Temperature Sensors' Readings



Once a month both temperature sensors must be checked to verify that they are working properly.

➔ To check the temperature sensors' readings:

- Step 1.** At the top of the screen, tap . The **System Info** screen appears.
- Step 2.** Tap the **Monitor** tab. The Monitor screen is displayed.

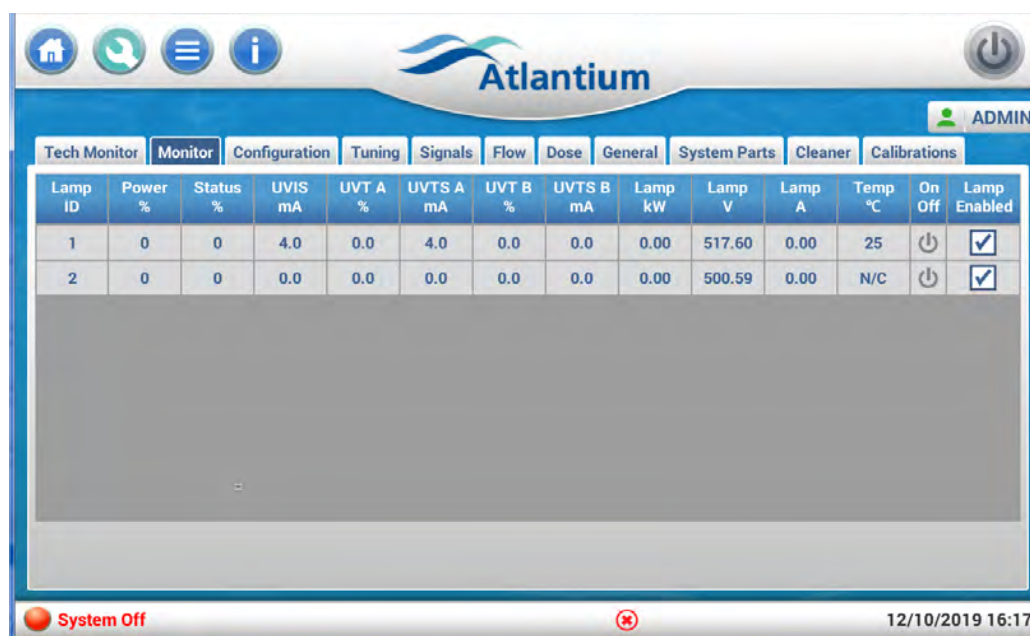


Figure 10-6: Monitor Screen


- Step 3.** In the temperature column, check the value for **Temp**.
- Step 4.** Verify that the temperature readings are within acceptable temperature range.

10.6 General LampsSleeves Maintenance Tips

The following are some tips that are meant to help you understand maintenance requirements:

- Lamps and quartz sleeves traverse the width of the Unit and are held in place by holders and connectors at both sides. For maintenance, you can access the lamps and quartz sleeves from either side. Depending on the constraints of the installation (sometimes one side is less accessible) you can usually decide from which side to access the them.
- To access the quartz sleeve, you must remove the lamp housed within it.
- On rare occasions, quartz sleeves and their O-rings may need to be replaced because of a maintenance issue that arises.

10.7 Replacing a UV Lamp



Performed
as needed

The UV lamp can be used as long as it provides the required dose and efficient service. (Generally, a lamp service status of 80% or more is considered efficient service.) A lamp should be replaced **ONLY** when necessary.

Each lamp's performance is measured directly by a dedicated UV Intensity Sensor. Replace a lamp when:

- Its status or performance declines and the lamp no longer provides the required performance at the appropriate electrical cost
- Once its rated hours expire, be alert to any changes in efficiency that could indicate the need to change the lamp

In the **Control Module**, you can set a margin to assure notification as status declines and a warning is sent to the operator at both the user setting level and the internally coded minimum.



For systems with multiple lamps, the system may continue to operate while any one of the lamps is being replaced, however, precautions must be carried out to protect you from the UV.

ATTENTION!



- If your system uses High-Power or Ultra High-Power (UHP) lamps, be sure to use replacement lamps of the same type.
- Note that the High Power/UHP lamps are distinguishable by the label on the lamp marked in red. See the example below.



Figure 10-7: High Power Lamp Label in Red

Before commencing this procedure:



CAUTION!



- Allow the old lamp at least 10 minutes to cool down before starting.
- Read carefully the instructions provided in the new Lamp package.
- Wear white cotton gloves.
- Before installing a new lamp, verify that it is clean and free of grease. If not, rub it gently with the provided lens tissue. Never touch the lamp with your bare hands - hold it only by the end-connectors. Oily residues from fingerprints can damage the lamp.



WARNING!



- The UV lamps are designed with high internal positive pressure. Wear protective eye-wear while replacing a lamp. Pay strict attention to the safety warnings and precautions in the **Safety Overview** on page 37 in the front of this manual.
- In case of lamp breakage, refer to the Safety instructions in **Safety Overview** on page 37.

When replacing a lamp while the rest of the system is still in operation, you must follow these safety requirements:



- Shutdown the electricity supplied to the lamp to be replaced.
- During the time when the lamp's breather caps are removed, use Caution floor signs at a distance of 1m/ 40inch from the Atlantium Unit that warn passersby against possible UV light exposure and not to approach without proper eye and skin protection.
- Wear white cotton gloves.
- Wear long sleeves rolled down to your wrist.
- Wear appropriate eye protection.
- Do not look directly into the lamp enclosure or into any openings that emit UV light during the entire lamp replacement procedure.



CAUTION!

While carrying the steps of this procedure, replace all of the O-rings on the components, such as the lamp housings and holders.

Prepare the following Information for the replacement lamp:

- lamp's serial number
- system model
- the number of hours on the lamp usage clock when you changed the lamp
- the number of ignitions of the lamp
- the status of the lamp when you changed it

10.7.1 Lamp Replacement Options

- Replacing a Lamp after System Shutdown (10.7.2)
- Replacing a Lamp while System is Operating (10.7.3)

Generally, a lamp is replaced after shutting down the entire Atlantium system. However, in a facility where there is no redundant UV purification, and you require minimizing system downtime, you can replace a lamp while other lamps continue operation provided you follow these safety requirements:

Replacing a Lamp after System Shutdown


Prepare the following:

- Replacement lamp
- Lamp cleaning cloth (comes with the lamp)
- White cotton gloves
- Eye protection
- #3 Allen wrench
- #4 Allen wrench
- Caution signs

10.7.2 Shutting Down the Entire System

Generally, a lamp is replaced after shutting down the entire Atlantium system.

➔ To shut down the entire system:

- Step 1.** Using the viewport on the Atlantium Unit, check that the lamps are indeed turned off.
- Step 2.** Check the main screen of the **Control Module** and verify that the system parameter for **Power** is **0%**.
- Step 3.** On the top-right of the screen, tap . The button turns grey. Wait approximately three minutes for the **Lamps Off** signal to transmit.



A severe danger of electrocution exists if the lamp is not turned off during replacement. Be absolutely sure you have turned off the correct lamp's switch before you proceed to replace the lamp.

- Step 4.** Open the **Control Module** using the attached key and locate the circuit breaker. Turn the circuit breaker to the **OFF** position.
- Step 5.** Continue with the procedure, **Replacing the Lamp** on page 132.


10.7.3 Replacing a Single Lamp/ while System is Operating

If you are replacing a lamp while other lamps are still in operations, follow these safety requirements:



- Shutdown the electricity supplied to the lamp to be replaced.
- **During the time when the lamp's breather caps are removed, use Caution floor signs at a distance of 1m/ 40inch from the Atlantium Unit that warn passersby against possible UV light exposure and not to approach without proper eye and skin protection.**
- Wear white cotton gloves.
- Wear long sleeves rolled down to your wrist.
- Where appropriate eye protection, such as containing polycarbonate lens that meet EN166, CAN/CSA-Z94.3-02 and/or Z87.1 standards. The UV lamps are designed with high internal positive pressure.
- **Do not look directly into the lamp enclosure or into any openings that emit UV light during the entire lamp replacement procedure.**

➔ To shut down electricity to a single lamp:

- Step 1.** At the top of the screen, tap . The **Monitor Tab** is displayed.



Lamp ID	Power %	Status %	UVT %	UVIS mA	UVTS mA	Lamp kW	Lamp V	Lamp A	Temp °F	On Off	Lamp Enabled
1	100	100	97.0	17.8	18.0	1.70	220.00	7.72	77		<input checked="" type="checkbox"/>
2	100	99	97.1	17.8	18.0	1.70	220.00	7.72	77		<input checked="" type="checkbox"/>
3	100	99	0.0	17.8	0.0	1.70	220.00	7.72	77		<input checked="" type="checkbox"/>
4	100	99	97.1	17.8	18.0	1.70	220.00	7.72	77		<input checked="" type="checkbox"/>
5	100	99	0.0	17.8	0.0	1.70	220.00	7.72	N/C		<input checked="" type="checkbox"/>
6	100	100	0.0	17.8	0.0	1.70	220.00	7.72	N/C		<input checked="" type="checkbox"/>
7	100	99	0.0	17.8	0.0	1.70	220.00	7.72	N/C		<input checked="" type="checkbox"/>
8	100	99	0.0	17.8	0.0	1.70	220.00	7.72	N/C		<input checked="" type="checkbox"/>

Monitor tab

Step 2. Under **Lamp Enabled**, for each lamp you want to disable, tap the checkbox to clear it. The corresponding lamp is disabled.



A severe danger of electrocution exists if the lamp is not turned off during replacement. Be absolutely sure you have turned off the correct lamp before you proceed to replace the lamp.

Step 3. Continue with the procedure, *Replacing the Lamp*, below.

10.7.4 Replacing the Lamp

The **System Parts** tab of the AIO control application enables convenient recording of the replacement of lamps and other consumables.

➤ Recording lamp replacement

- Step 1.** Log in as an ADMIN user and tap on **System Parts** tab to open it (see Figure 10-8)
- Step 2.** In the **Select System Part** column, tap on **Lamps** and the **Lamps - Replace** column opens
- Step 3.** Select the correct **UV unit ID** (=1 if there is just one UV unit in system)
- Step 4.** Choose (LM, Connection) **card** number
- Step 5.** Enter the **Serial number** of the new lamp and the **replacement reason**.
- Step 6.** In the **Age** field, set the age of the new lamp (0 hours for a brand new lamp).
- Step 7.** Tap **Done** to save changes.

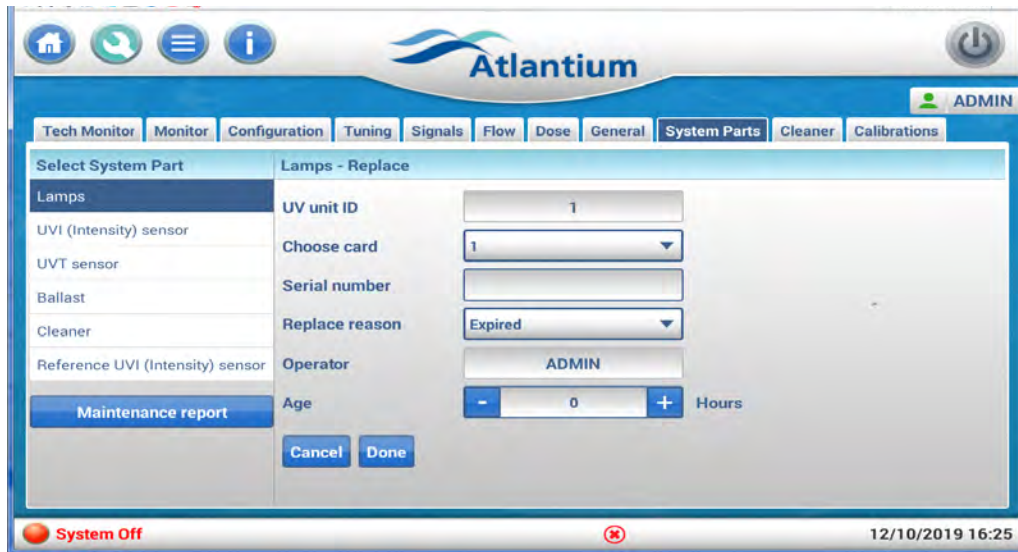


Figure 10-8: System Parts tab with Lamps selected

Step 8. To view Maintenance report, tap **Maintenance report** button (see **Viewing Maintenance Report** on page 151)
Once the electricity is turned off for the system or for the specific pair of lamps (at least one of which is to be replaced) and preparations are made (see above) you can replace the lamp.

➡ **Before replacing a lamp:**

- Step 1.** On the corresponding Connection Box associated with the lamp to be replaced, turn the switch to the **OFF** position.
Step 2. If you are replacing a lamp while other lamps are still in operation, follow these safety requirements:



- **During the time when the lamp's breather caps are removed, use Caution floor signs at a distance of 1m/ 40inch from the Atlantium Unit that warn passersby against possible UV light exposure and not to approach without proper eye and skin protection.**
- Wear white cotton gloves.
- Wear long sleeves rolled down to your wrist.
- Where appropriate eye protection, such as containing polycarbonate lens that meet EN166, CAN/CSA-Z94.3-02 and/or Z87.1 standards.
- **DO NOT look directly into the lamp enclosure during the entire lamp replacement procedure.**

➡ To remove lamp connector assembly

- Step 3.** Using a #3 Allen wrench, remove the four Allen screws (1) that secure the lamp's connector assembly (2) and remove the connector assembly. Each screw has a washer.
- Step 4.** **To prevent any damage to the lamp**, make sure you pull the lamp's connector assembly straight out and not at an angle.
- Step 5.** Using a #4 Allen wrench, remove the 4 screws (3) of the lamp's housing (4). Each screw has a washer.
- Step 6.** Grasp the lamp's housing and rotate it clockwise and counterclockwise until it loosens. **Make sure the housing is not tilted against the quartz sleeve while rotating it.**

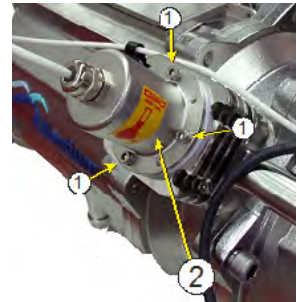


Figure 10-9: Lamp Replacement (Generic View 1)

(The O-Ring on the sleeve stopper between the holder and the stopper may cause the two parts to stick due to the heat. The slight rotation releases it).

- Step 7.** **To prevent any damage to the lamp and quartz sleeve**, make sure you pull the lamp's housing straight out and not at an angle.



Figure 10-10: Lamp Replacement (Generic View 2)



ATTENTION!

While carrying the steps of this procedure, check that the O-rings on the components, such as the lamp housings and holders, are not damaged. If damaged, replace them before refastening the component in place.

Accessing the Lamp



ATTENTION!

For systems that contain wave guides, **be sure to access the lamp from the side that contains the sensors**. The wave guide is fragile and may be damaged easily if the lamp is inserted from the opposite site.

➔ Removing the Faulty Lamp



The lamp is hot! DO NOT touch the lamp with bare hands, particularly the quartz portion.

Wait at least ten minutes until the lamp has cooled down or use an appropriate pair of long-nose pliers to carefully pull out the lamp.

- Step 8.** Wearing appropriate cotton gloves and skin covering, and using a suitable long-nose pliers, pull the lamp straight out of the quartz sleeve in the Unit and set it aside on a stable surface.
- Step 9.** Check the inner surface of the quartz sleeve for residual moisture or high humidity. If any visible moisture exists, using a lens cleaning cloth, dry it.

Installing the Replacement Lamp

- Step 10.** Unpack the new UV lamp from its vacuumed sealed package.
- Step 11.** Make a note of the serial number of the new lamp.



Figure 10-11: Removing the lamp

- Step 12.** Clean the new lamp using the cleaning pad provided with the lamp. Verify that no visible fingerprint or dust is on the lamp.
- Step 13.** Insert the new lamp (F) into the quartz sleeve, all the way until it stops. Ensure that the male contact point (G) on the end of the lamp has meshed with the female contact point (G) in the lamp's housing on the other side of the Unit.
- Step 14.** Check that the lamp housing's O-ring is in place, clean, dry and undamaged. Replace if necessary.

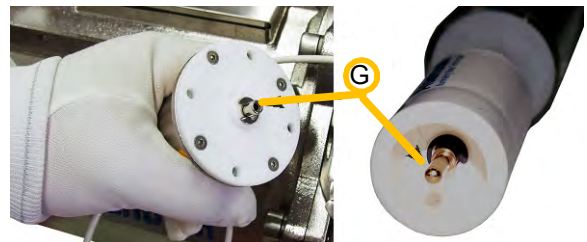


Figure 10-12: Lamp, Connector Assembly and connectors

- Step 15.** Reinstall the lamp's housing and, using the # 4 Allen wrench, fasten the four Allen screws with their washers to secure it to the Unit.
- Step 16.** Reinstall the lamp's connector assembly pushing it straight in. Ensure that the male contact point (G) on the end of the lamp has meshed with the female contact point (G) in the lamp's housing on the other side of the Unit. Using the # 3 Allen wrench, fasten the four Allen screws with their washers to secure it to the Unit.

Allowing the Atlantium Unit to Run with breather caps Open

- Step 17.** Temporarily place Caution floor signs at a distance of 1m/40inch from the Atlantium Unit that warn passersby against possible UV light exposure and not to approach without proper eye and skin protection.
 - Step 18.** On the side without the DPM, unscrew and remove the two breather caps (H) on each side of the lamp. (See the figure to the right.)
 - Step 19.** Operate the system without the lamp's breather caps for one hour.
 - Step 20.** Return the lamp's breather caps and remove the Caution floor signs.
- Perform system tuning according the instructions on page 145

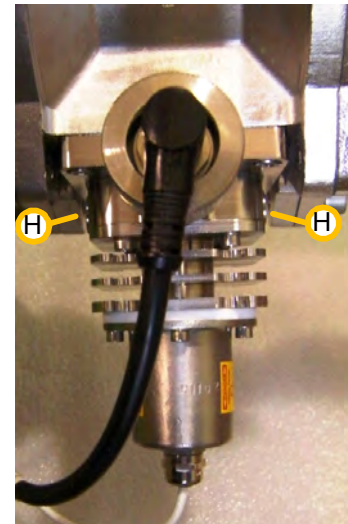


Figure 10-13: Lamp's breather caps (Generic View)

Reactivation the Lamp

- Step 21.** For the lamp that is replaced, on the connection box, turn the lamp switch to the **On** position. Check that the lamp ignites properly. See Figure 10.7
- Step 22.** Operate the system without the lamp's breather caps for one hour.
- Step 23.** Return the lamp's breather caps (G).

System Tuning

- Step 24.** Perform system tuning according the instructions on page 147.

Observing Lamp Efficiency

- Step 25.** Observe the system's efficiency for **100 hours**. If after this period there is a performance degradation of more than 5%, remove the UV intensity sensor and check for humidity. Clean if necessary. For the adjustable UVIS sensor, see the instructions on page 142.
- Step 26.** Perform **System Tuning** according the instructions on page 147.

10.8 Cleaning/Replacing the UV Intensity Wave Guide



If your system includes wave guides:

For each UVIS sensor in the Atlantium Unit, there is an internal wave guide for directing UV light into the sensor. The UV Intensity Sensor's wave guide must be cleaned every time the lamps are replaced.

Prepare the following:

- Replacement UV Intensity Sensor's Wave Guide PN SAM000800
- Wave Guide tool PN SA0066000
- White cotton gloves
- Alcohol/isopropanol and lint-free lens cleaning paper
- Appropriate Phillips screwdrivers



- Allow the old lamp at least 10 minutes to cool down before starting.



- Be very careful when handling the wave guide. The wave guide is made of quartz and is fragile and easily broken.

➔ To clean/replace the wave guide:

Accessing the Wave Guide to be Replaced

- Step 1.** On the side of the Unit where the UVIS sensors are located, identify the lamp whose wave guide is to be cleaned/replaced.
- Step 2.** Follow the directions for removing a lamp. See *Replacing a UV Lamp* on page 129.

Removing the Wave Guide

- Step 3.** Screw the Wave Guide tool (**L**) onto the wave guide socket (**J**).

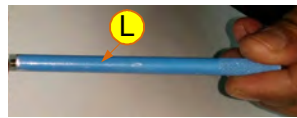


Figure 10-14: Wave Guide Tool

- Step 4.** While holding the Wave Guide tool (**L**) now attached to the wave guide (**G**), using an appropriate Phillips screwdriver, (**M**) unfasten each of the screws (**K**).

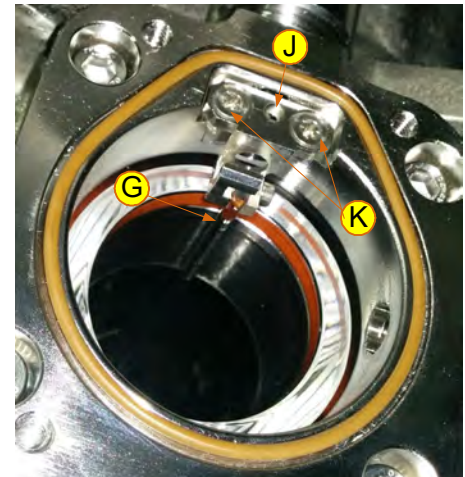


Figure 10-15: Wave Guide Elements (Generic View)

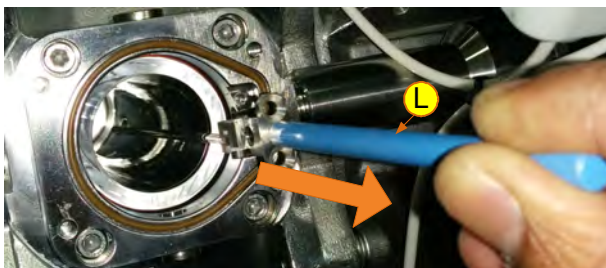


Figure 10-16: Removing the Wave Guide (Generic View)

- Step 5.** With the Wave Guide tool (**L**), carefully pull out the wave guide.
- Step 6.** Unscrew the Wave Guide tool (**L**) and detach it from the wave guide (**G**).

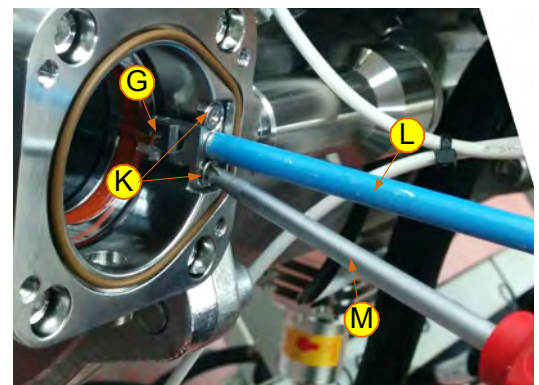


Figure 10-17: Unfastening the Wave Guide (Generic View)

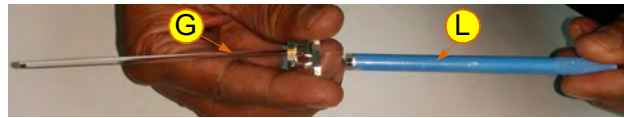


Figure 10-18: Wave Guide Tool and Wave Guide

Cleaning the Wave Guide

- Step 7.** While wearing white cotton gloves, carefully clean the wave guide with isopropanol and lint-free lens cleaning paper.
- Step 8.** Ensure that the wave guide is completely dry before returning it to its place.
- Step 9.** Examine the wave guide for marks and damage. Fingerprints or other stains may cause erroneous UV intensity sensor readings. If the wave guide's surface is damaged, it must be replaced.

Preparing the Replacement Wave Guide

- Step 10.** Screw the Wave Guide tool (L) onto the wave guide socket (J).
- Step 11.** With the Wave Guide tool (L), carefully insert the wave guide in place.
- Step 12.** While holding the Wave Guide tool (L) now attached to the wave guide (G), using an appropriate Phillips screwdriver, (M) fasten each of the screws (K).
- Step 13.** Check that the wave guide is parallel to the side of the quartz sleeve and not pointing at an angle. If it is at an angle, the quartz sleeve is not installed straight. Remove the wave guide and remove and reinstall the quartz sleeve following the directions in **Cleaning/Replacing a Lamp's Quartz Sleeve and O-Rings** on page 139. When complete, install the wave guide again.



The correct position of the wave guide is parallel to the side of the quartz sleeve and a distance of 0.75mm from the quartz sleeve.

- Step 14.** Follow the directions to reinsert the lamp and refasten the lamp's housing and connector See **Replacing a UV Lamp** on page 129.

10.9 Cleaning/Replacing the UV Intensity Sensor's Mirror



If your system includes UVIS mirrors:

For each lamp in the Atlantium Unit, there is a small internal mirror (A) for directing UV light into the sensor. The UV Intensity Sensor's Mirror must be cleaned every time the lamps are replaced.

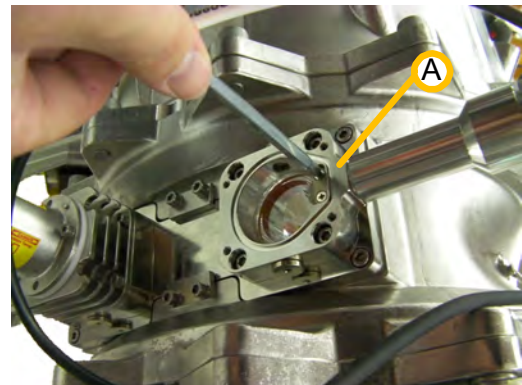


Figure 10-19: (Generic) Cleaning the UV Intensity Sensor's Mirror

Prepare the following:

- Replacement UV Intensity Sensor's Mirror
- Isopropanol and lint-free lens cleaning paper
- Small Phillips screwdriver

➔ To clean the mirror:

- Step 1.** No particular parts need be removed from the Unit in order to access the mirror for cleaning, once the lamp has been removed. See page 129 for instructions on replacing the lamp.
- Step 2.** Clean the reflective side of the mirror – the side facing into the Unit – with isopropanol and lint-free lens cleaning paper.
- Step 3.** Ensure that the mirror is completely dry before re-assembling the UV lamp.
- Step 4.** Examine the mirror's surface after cleaning and before you close the UV lamp' housing. Fingerprints or other stains may cause erroneous UV intensity sensor readings. If the mirror's surface is damaged, it must be replaced.

➔ To replace the mirror:

- Step 5.** Once the lamp has been removed, you can replace a damaged mirror. See page 129 for instructions on replacing the lamp.
- Step 6.** Using a small Phillips screwdriver, remove the two screws holding the mirror in place and remove the mirror.
- Step 7.** Clean the reflective side of the replacement mirror with isopropanol and lint-free lens cleaning paper.
- Step 8.** Examine the mirror's surface after cleaning and before you install it to make sure it is damage-free.
- Step 9.** Carefully place the new mirror in position and using the screwdriver, fasten it securely.
- Step 10.** Before you close the UV lamp' housing, examine the mirror's surface it make sure it is free of fingerprints or other stains, which may cause erroneous UV intensity sensor readings. Clean it again if necessary.
- Step 11.** Ensure that the mirror is completely dry before re-assembling the UV lamp.



Figure 10-20: Removing the Mirror



Figure 10-21: Cleaning the Replacement Mirror

10.10 Cleaning/Replacing a Lamp's Quartz Sleeve and O-Rings



The quartz sleeve is cleaned as needed according to the UVT Sensor readings and when deposit collects on the quartz sleeve. **The quartz sleeve's rubber O-rings must be replaced when dismantling the quartz sleeve.**

Depending on the quality of the water being treated by the Atlantium Unit, the exterior surface of the quartz sleeve that houses a lamp may require periodic cleaning or replacement if after the optional Cleaning system and the CIP process the quartz sleeve is still not sufficiently clean. This is to be determined by the quality control officer at the facility.

Under normal environmental conditions, the quartz sleeve's rubber O-rings (as shown in Section) must be replaced once a year even if they pass visual inspection. For environments where the water temperature is above 70°C (160°F), the quartz sleeve's O-rings must be replaced yearly.

Prepare the following:


- Replacement quartz sleeve (if replacing)
- Two O-rings (See view **B** in below)
- #3 Allen wrench
- #4 Allen wrench
- Protective gloves
- Appropriate cleaning cloth. A mild, household cleaning solution
- Alcohol

ATTENTION!

While carrying the steps of this procedure, check that the O-rings on the components, such as the lamp housings and holders, are not damaged. If damaged, replace them before refastening the component in place.

➔ To clean or replace the quartz sleeve:

Powering Down the System

- Step 1.** On the **Control Module**, tap  to switch lamps off. Wait approximately three minutes for the **Ready Lamps Off** signal to transmit.



A severe danger of electrocution exists if the lamp is not turned off during replacement. Be absolutely sure you have turned off the correct lamp before you proceed to replace the lamp.

- Step 2.** Using the viewport on the Atlantium Unit, check that the lamps are indeed turned off.
- Step 3.** Check the main screen of the **Control Module** and verify that the system parameter for **Power** is **0%**.

Isolating the Unit

- Step 4.** To isolate the Unit, close the Inlet and Outlet valves.
- Step 5.** Using the Drain valve, drain the water from the Unit.

Accessing the Quartz Sleeve

Quartz sleeve removal requires that the lamp connector assemblies, lamp housings (on both ends of the lamp) and the lamp be removed, as well as the quartz sleeve holder.

- Step 6.** Quartz sleeve removal requires that the lamp connector assemblies, lamp housings (on both ends of the lamp) for systems that have them, and the lamp be removed. In the section, 10.7.4. Replacing the Lamp, follow from **Step 2.** on page **137** and remove the lamp connector assembly and lamp housing **from both sides of the Unit**, as well as the lamp, placing them in a secure location until they need to be reinstalled.




For systems with wave guide, while reinstalling the sleeve holder, **DO NOT** tilt it and **DO NOT** insert it at an angle. the wave guide is fragile. Take care not to damage it when inserting the lamp housing.

- Step 7.** Install the quartz sleeve holder on the lower side and close it loosely with 4 screws in a diagonal pattern (upper left, lower right, upper right, lower left). **Do not tighten the screws!!**
- Step 8.** Install the quartz sleeve holder on the upper side.
- Step 9.** Using a #4 Allen wrench, close the screws in diagonal pattern and tighten them.
- Step 10.** To reinstall the lamp, See **Replacing a UV Lamp** on page **129**.
- Step 11.** Reinstall the lamps' connector assemblies pushing each straight in and using the # 4 Allen wrench, fasten the four Allen screws with their washers to secure them to the Unit.
- Step 12.** Connect the UVIS sensors' cables.
- Step 13.** On the corresponding Connection Box to where the sleeves/lamps are located, turn the switch to the **On** position.

Reintroducing the Water

- Step 14.** Carefully open the Inlet and Outlet valves (Be sure to avoid water hammer). Follow the directions in the section **Filling unit with water** on page **104**.

Powering Up the System

- Step 15.** On the **Control Module**, tap . The button turns green. Wait approximately three minutes for the **Ready Lamps ON** signal to transmit.

Verifying System Performance

- Step 16.** Wait 10 minutes for lamps to turn on and the system to stabilize.
- Step 17.** Open the viewport and check that there are no air bubbles in the water flow. If necessary, release all air bubbles from within the system.
- Step 18.** Run the system with the breather caps of the lamp off as described in the section, 10.7.4. Replacing the Lamp.
- Step 19.** Check the main screen of the **Control Module** and verify that the Atlantium system parameters for **Power**, **Flow**, and **UVT** are within wanted acceptable range and record is using the Table in Appendix B. Checking the System Parameters on page **181**.
- Step 20.** If the values are out of range, notify the executive maintenance engineer

10.11 Checking/Replacing UVIS Sensors



- From time to time, sensors may need to be checked and wiped clean (most frequently, from condensation).
- During the Calibration process, the UVIS sensor also requires to be removed and temporarily replaced with a Reference Master sensor.
- Sometimes a sensor has to be replaced.

There are two types of UVIS sensors. The sensor itself is the same in both types. The casings of both types are marked with a millimeter scale (Figure 10-22) which enables the sensor to be removed for cleaning and replaced in precisely the same position. The casing markings also include the sensor's sensitivity range (4 - 20 mA / 10Wm²) part number and serial number.



Figure 10-22: Sensor casing, showing millimeter scale

The difference between sensor types is in how they are fastened to the Atlantium Unit. The two types are:

- **Adjustable UVIS sensor** - The Sensor's position is adjustable and its casing is fastened with nuts. See below.
- **Fixed UVIS sensor** - The sensor's casing screws into a fixed position. This type of sensor may include a cover with a pinhole. See *Replacing/Checking a UVT Sensor* on page 145.

Prepare the following:

- Wrenches # 24 and # 30

➞ Checking position of a UVIS sensor

- Step 1.** Before removing the UVIS sensor, look at the point where the millimeter scale on the sensor touches the securing nut (**A** in Figure 10-23).
- Step 2.** Record this point on mm scale as a reference for returning the sensor to same position after cleaning.

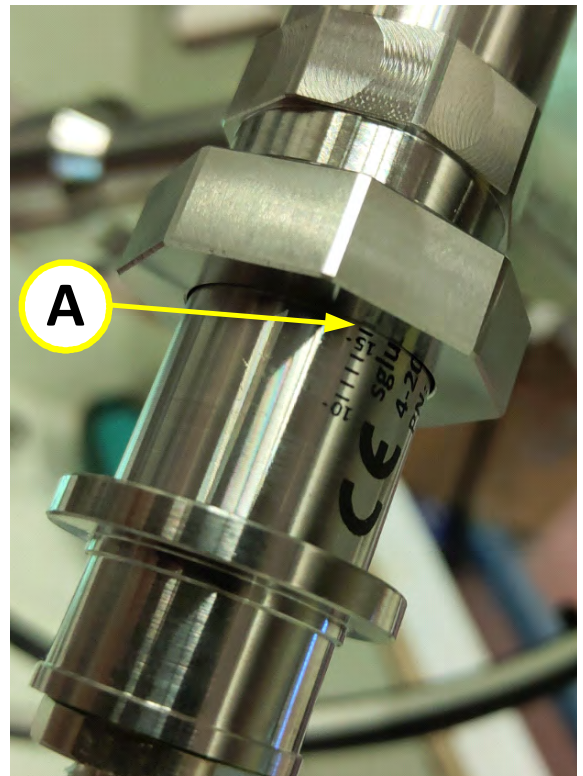


Figure 10-23: Using mm scale as position reference

➡ To remove a fixed sensor:

Step 3. To disconnect the harness connector (shown by the arrow in view **A** below), unscrew the sensor's threaded locking nut

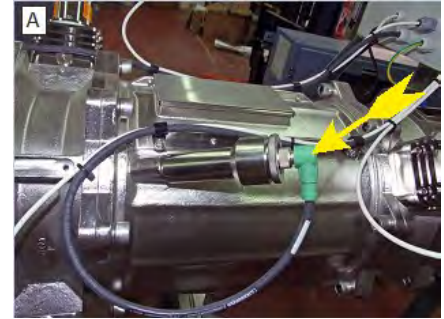


Figure 10-24: Removing a Sensor A (Generic View)

Step 4. Unscrew the sensor's threaded locking nut from the bottom of the sensor housing, as shown in view **B**

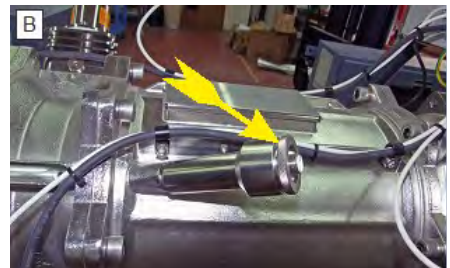


Figure 10-25: Removing a Sensor B (Generic View)

Step 5. Carefully pull the sensor out of the housing (**C**). If a pinhole (**D**) is present it slides out. Ensure that the rubber washer stays in place.

Step 6. Proceed to **Returning cleaned sensor into place** on page 145



Figure 10-26: Removing a Sensor C 2 (Generic View)

➤ To remove an adjustable UVIS sensor:

- Step 1.** To disconnect the harness connector (shown in view **A**, Figure 10-27), unscrew the sensor's threaded locking nut.

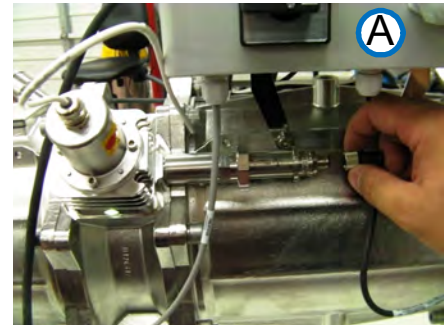


Figure 10-27: Removing connector A (Generic View)

- Step 2.** Grip the Sensor casing with wrenches # 24 and # 30, as shown in view **B**, Figure 10-28. The inset shows the wrench #24 in the left hand gripping the casing's left band and wrench #30 in the right hand gripping the casing's large nut on the right.
- Step 3.** Carefully pull the sensor out of the housing (Figure 10-26). If a pinhole (**D**) is present it slides out. The large nut comes off together with the sensor.

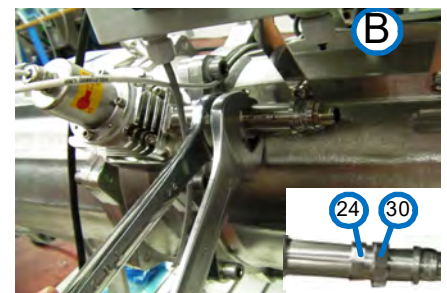


Figure 10-28: Loosening nuts B (Generic View)

➤ Cleaning a sensor

- Step 4.** Check the sensor's lens (**1** in Figure 10-29) for condensation. If present, using a dry lens cloth, dry the lens thoroughly.
- Be sure that the lens is completely dry before it is returned to its place.**
- Step 5.** Ensure that threaded locking nut (**2**) and washer (**3**) are in place
- Step 6.** If replacing a sensor with a new one, go to **Step 13**.

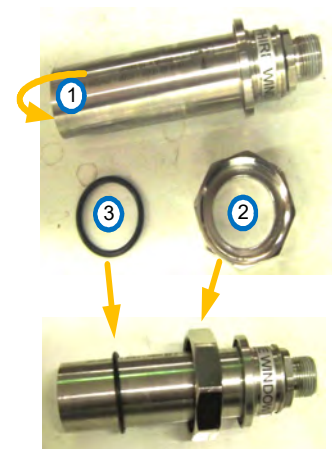


Figure 10-29: Sensor, nut and washer

➞ Returning cleaned sensor into place

- Step 7.** Slide pinhole (if present) back into place over the end of sensor housing.
- Step 8.** When you return the sensor to its place, make sure to insert it to the same reference point on the mm scale (**A** in Figure 10-23) recorded in **Step 1.** on page 142.
- Step 9.** Ensure that the washer on the sensor screw thread is in place. Replace as necessary.
- Step 10.** To re-install an **adjustable sensor**, tighten both nuts by reversing process in **Step 2.** on page 144.
- Step 11.** To re-install a **fixed sensor**, tighten the threaded cap back onto the housing, Figure 10-25.
- Step 12.** In the **Control Module**, check that the value for UVIS for the lamp on which the sensor was replaced is identical to the value before the sensor was removed. For details on finding the **Control Module** screen with this information, see the section, **System Tuning** on page 147.

➞ Replacement with new sensor

- Step 13.** Unpack the new sensor (Figure 10-29) and the sensor pinhole (**D** in Figure 10-26, if supplied).
- Step 14.** To enable the system to track relevant data about the sensor, make a note of its serial number.
- Step 15.** Verify that the sensor lens (**F**) is clean. If needed, using a lens cloth, clean it.
- Step 16.** If a pinhole (**E**) is present, insert it.
- Step 17.** Insert the sensor into the housing and reinstall as in **Step 10./Step 11.** above.
- Step 18.** Reconnect the harness's threaded cap to the new sensor.
- Step 19.** In the **Control Module**, perform **System Tuning**, on page 147.

10.11.1 Replacing/Checking a UVT Sensor



UVT sensors should be cleaned/replaced as required. The procedure is the same as that described for **fixed** UVI sensors in **Replacing/Checking a UVT Sensor** on page 145. For some of the sensors, there is a pinhole located on the sensor's window. This pinhole is calibrated by Atlantium for the specific measurement point. Do not switch disks between ports. Before inserting the sensor, be sure to include the pinhole if present.

➞ To replace a sensor:

- Step 1.** To disconnect the harness connector (shown by the arrow in view **A** below), unscrew the sensor's threaded locking nut.
- Step 2.** Unscrew the sensor's threaded locking nut from the bottom of the sensor housing, as shown in view **B**.



Figure 10-30: Replacing the Sensors 2 (Generic View)



Figure 10-31: Replacing the Sensors 2 (Generic View)

- Step 3.** Carefully pull the sensor out of the housing (C).
- Step 4.** If an pinhole (E) is present it slides out.
- Step 5.** Unpack the new sensor (D) and (if it is supplied) the sensor pinhole.



Figure 10-32: Replacing the Sensors 4 (Generic View)



Figure 10-33: Replacing the Sensors 3 (Generic View)

- Step 6.** To enables the system to track relevant data about the sensor, make a note of its serial number.
- Step 7.** Verify that the sensor lens (F) is clean. If needed, using a lens cloth, clean it.
- Step 8.** If an pinhole (E) is present, insert it.
- Step 9.** Insert the sensor into the housing, and screw the threaded cap back into the housing to secure the sensor.
- Step 10.** Reconnect the harness's threaded cap to the new sensor.
- Step 11.** In the **Control Module**, perform **System Tuning**, see the section, **System Tuning** on page 147.

10.12 Testing System Lamps



During normal operations, an authorized facility technician may need to test the lamps that appears on the Tech Monitor screen.

➔ To test the lamps:

- Step 1.** At the top of the screen, tap . The **Monitor Tab** is displayed.
- Tap the **Tech Monitor Tab**. The **Tech Monitor** screen appears.



Figure 10-34: Tech Monitor Tab

- Step 2.** For each lamp to be tested according to the **Lamp ID** column on the left, make a mark in the checkbox on the right.
- Step 3.** To adjust the power of the selected lamp(s), using the **-/+** buttons, set the desired power value. Check that the values for the other columns are in normal range.
- Step 4.** To Turn off the he selected lamp(s), tap **Lamp Off**. The Lamp's **On/Off** icon turns grey. Check that the selected lamp is indeed off. Check that the values for the other columns are in normal range.
- Step 5.** To Turn on the he selected lamp(s), tap **Lamp On**. The Lamp's **On/Off** icon turns green. Check that the selected lamp is indeed on. Check that the values for the other columns are in normal range.

When leaving the **Tech Monitor tab**, the lamps are returned to the settings of the system's configuration.


10.13 System Tuning



System tuning is performed on these occasions:

- As the last step in system installation
- As the last step when lamps are changed and after 100 operating hours (as needed)
- Upon advice of an Atlantium Service Representative when the system is reset

➤ To tune the Atlantium system:

- Step 1.** Just prior to tuning, obtain a water sample from the sampling valve on the inlet side of the Atlantium Unit. Test the water sample in an external spectrophotometer. Write down the results. If a spectrophotometer is not available, record the current UVT value shown on the system's display.
- Step 1.** On the **Control Module**, tap  to switch lamps off. Wait approximately three minutes for the **Ready Lamps Off** signal to transmit.
- Step 2.** On the Atlantium Unit, locate each UVIS and UVT Intensity Sensor.
- Step 3.** On each sensor (refer to the figures in the section, **Checking/Replacing UVIS Sensors** on page 141):
- a Unscrew the locking nut and gently pull out the sensor.
 - b With a dry and clean lint free cloth, wipe the UVIS sensor's quartz window.
 - c Reinsert the sensor and replace the locking nut.

- Step 4.** To turn on the Atlantium system, on the **Control Module** main screen, tap . The button turns green. Wait approximately three minutes for the **Ready Lamps On** signal to transmit. At the top of the screen, tap . The **Monitor Tab** is displayed.

Tap the **Tuning Tab**. The **Tuning** screen



Lamp ID	UVIS mA	UVT %	Status %	UVTS mA	Tuning status %	
1	17.8	97.0	100	18.0	- 100% +	<input type="checkbox"/>
2	17.8	97.1	100	18.0	- 100% +	<input type="checkbox"/>
3	17.8	0.0	100	0.0	- 100% +	<input type="checkbox"/>
4	17.8	97.1	100	18.0	- 100% +	<input type="checkbox"/>
5	17.8	0.0	100	0.0	- 100% +	<input type="checkbox"/>
6	17.8	0.0	100	0.0	- 100% +	<input type="checkbox"/>
7	17.8	0.0	100	0.0	- 100% +	<input type="checkbox"/>
8	17.8	0.0	100	0.0	- 100% +	<input type="checkbox"/>

Tuning reason: Select reason Set UVT: - 97.0% + Done: 0% Start tuning

appears.. System On, Ready 10/07/2018 01:26 PM

Figure 10-35: Technician Settings Screen> Tuning Tab (Actual numbers vary according to system configuration)

- Step 5.** Verify that the lamps are on and enabled (the number of lamps listed in the display is according to the number of lamps in your system configuration). For each lamp to be tuned, according to **Lamp ID** in column 1, make a mark in the appropriate checkbox in the last column on the right.
- Step 6.** Under **Status TO %**, using the **-/+** buttons, set the **Status TO percentage** up to **100%**.
- Step 7.** Wait a few minutes to allow the system to stabilize.
- Step 8.** To verify that the Sensor readings are stable, observe the reading for a few seconds to see that they remain the same numbers. For the UVIS sensor, see the **UVIS mA** column above. For the UVT Intensity sensor, see the **UVTS mA** column above. If the numbers are not stable, unscrew and remove the two breather caps on each side of the lamp. (See Figure 10-13 on page 136.)
- Step 9.** Leave the breather caps open for 30 minutes to make sure no humidity is present in the lamp housing. Then replace the breather caps and check the sensor reading again.



When the Lamp's breather caps are removed, do not look directly into the opening without appropriate eye protection. The UV light emitted via the opening is a danger to the eyes.

- Step 10.** At the bottom of the screen, for **UVT To**, enter the current UVT value obtained from the spectrophotometer that you wrote down in **Step 14.** above (or the recorded current UVT value).
- Step 11.** To record the reason for tuning the system, At the bottom of the screen, for **Tuning Reason**, from the dropdown list, select the reason.

The options are:

- System Integration
- Lamp changed

■ Maintenance

Step 12. Tap **Start Tuning**. A progress bar appears at the bottom of the screen. The process takes about 6 to 15 minutes.



If the system is not running, or if a lamp is not on, a popup message appears informing you that in order to start a tuning process, the system must be running.


Step 13. Verify that the UVT is the number you set previously (see the **UVTS mA** column) and that the Status on the Monitor tab is the same as the number you set in the **Status T0 %** column.


Step 14. To shutdown the Atlantium system, on the **Control Module** main screen, tap  and wait approximately three minutes for the **Ready Lamps Off** signal to transmit.

Step 15. On the Atlantium Unit, locate each UVIS and UVT Intensity Sensor.

Step 16. On each sensor (refer to the figures in the section, **Replacing/Checking a UVT Sensor** on page 145):

- a Unscrew the locking nut and gently pull out the sensor.
- b With a dry and clean lint free cloth, wipe the UVIS sensor's quartz window.
- c Reinsert the sensor and replace the locking nut.

Step 17. To turn on the Atlantium system, on the main screen, tap  and wait approximately three minutes for the **Ready Lamps On** signal to transmit.

Return to the AIO Monitor screen (see Figure on page 132). Under **Lamp Enabled**, for each lamp you want to enable, tap the checkbox  to fill it. The corresponding lamp is enabled.

10.14 Advanced Maintenance

The advanced maintenance procedures require opening the Connection Box. **Local regulations may require a certified electrician to perform any of these procedures.**

This section contains:

- **Replacing the Temperature Sensor** on page 150
- **Replacing the Temperature Converter Card** on page 151

10.14.1 Replacing the Temperature Sensor



In the event that the Temperature sensor requires replacement, this section details the procedure.



Follow your local regulations regarding whether a certified electrician may be required to perform this procedure.



Any person involved in handling the Connection Box card or its components is required to wear an electrostatic discharge (ESD) Wrist Strap.

Connect the ESD Wrist Strap to any bolt on the body of the Atlantium Unit or to the metal bracket under the Connection Box using a banana plug or an alligator clip.

Prepare the following:

- Replacement Temperature sensor
- #5 Allen wrench
- #3 Flat screwdriver
- #2 Phillips screwdriver

➔ To replace the Temperature sensor:

- Step 1.** Turn the Mains circuit breaker to the **Off** position.
- Step 2.** Using the appropriate Allen wrench, open the Connection Box cover.
- Step 3.** Verify with volt meter that there is no power in first Connection Box card and that no LED is lit on the card.
- Step 4.** Locate and disconnect the Temperature Sensor connector **(A)**.
- Step 5.** Detach the wire from the terminal connector and remove the wire from the Connection Box via the gland.
- Step 6.** Using a #2 Phillips screwdriver, detach the temperature sensor **(C)** from the Atlantium Unit.
- Step 7.** Attach the replacement Temperature sensor **(C)** to the Atlantium Unit.
- Step 8.** Thread the wire through the gland and attach it to the terminal connector.
- Step 9.** Insert the connector **(A)** to its socket on the terminal block.
- Step 10.** Return the Connection Box cover and using the Allen wrench, fasten the screws. Tighten them in a diagonal pattern.
- Step 11.** Turn the Mains circuit breaker to the **On** position.

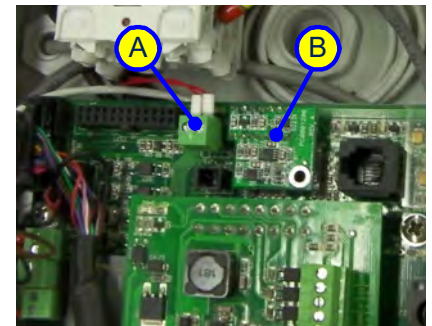


Figure 10-36: Location of the Temperature Sensor Connector (Generic)

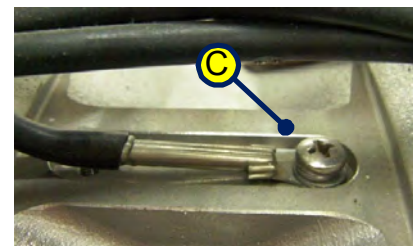


Figure 10-37: Location of the Temperature Sensor on the Atlantium Unit

10.14.2 Replacing the Temperature Converter Card



In the event that the Temperature sensor card requires replacement, this section details the procedure.



Follow your local regulations regarding whether a certified electrician may be required to perform this procedure.



Any person involved in handling the Connection Box card or its components is required to wear an electrostatic discharge (ESD) Wrist Strap.

Connect the ESD Wrist Strap to any bolt on the body of the Atlantium Unit or to the metal bracket under the Connection Box using a banana plug or an alligator clip.

Prepare the following:

- Replacement Temperature Converter card
- #5 Allen wrench
- #2 Phillips screwdriver

➔ To replace the Temperature sensor card:

- Step 1.** Turn the Mains circuit breaker to the **Off** position.
- Step 2.** Using the appropriate Allen wrench, on the first Connection Box, open the Connection Box cover.
- Step 3.** Verify with volt meter that there is no power in first Connection Box card and that no LED is lit on the card.
- Step 4.** Locate and carefully pull off the Temperature Sensor card **(C)**.
- Step 5.** Aligning the pins of the replacement Temperature Sensor card **(C)** with the connector (on the board) on the Connection Box card, carefully insert the small card into the connector of the Connection Box card.
- Step 6.** Return the Connection Box cover and using the Allen wrench, fasten the screws. Tighten them in a diagonal pattern.
- Step 7.**

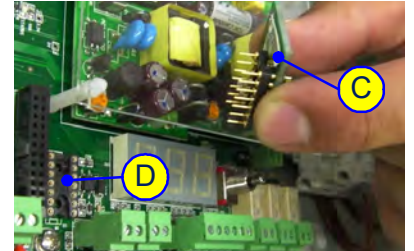


Figure 10-38: Replacing the Temperature Sensor Card (Generic)

- ➔ Turn the Mains circuit breaker to the **On** position.

10.15 Viewing Maintenance Report

➔ To view a report:


- Step 1.** At the top of the screen, tap . The **Monitor Tab** is displayed.
- Step 2.** Tap the **System Parts tab**. The **System Parts** screen appears
- Step 3.** Tap **View Report**. The report displays accordingly
 (.The reports contain information for the components listed in the table below:

Table 10-1: Report Contents

Component Type	Details Provided
Lamps	<ul style="list-style-type: none">■ Unit number■ Lamp number■ Last operator who installed or modified the component■ Date of Installation■ Date of Replacement (if replaced)■ Reason for Replacement (if replaced)■ Age in hours■ Number of Ignitions■ Serial number
UVI Sensor	<ul style="list-style-type: none">■ Unit number■ Associated lamp number■ Last operator who installed or modified the component■ Date of Installation■ Date of Replacement (if replaced)■ Reason for Replacement (if replaced)■ Age in hours■ Serial number
UVT Sensor	<ul style="list-style-type: none">■ Unit number■ Associated lamp number■ Last operator who installed or modified the component■ Date of Installation■ Date of Replacement (if replaced)■ Reason for Replacement (if replaced)■ Age in hours■ Serial number

Table 10-1: Report Contents

Component Type	Details Provided
Ballasts (Modules)	<ul style="list-style-type: none"> ■ Unit number ■ Associated lamp number ■ Last operator who installed or modified the component ■ Date of Installation ■ Date of Replacement (if replaced) ■ Reason for Replacement (if replaced) ■ Age in hours ■ Number of Ignitions ■ Serial number
Cleaner (if installed)	<ul style="list-style-type: none"> ■ Unit number ■ Lamp number ■ Last operator who installed or modified the component ■ Date of Installation ■ Date of Replacement (if replaced) ■ Reason for Replacement (if replaced) ■ Counter ■ Type
UVI Reference Sensor	<ul style="list-style-type: none"> ■ Unit number ■ Last operator who installed or modified the component ■ Date of Installation ■ Reason ■ Expiration date ■ Serial number



11 Troubleshooting

11.1 Viewing system errors

The sections headers in this chapter are comprised of message headers that appear as error messages on the Event log screen of the **Control Module**.

ID	Description	Date	Time
1	Dose above maximum defined level [73]	01/23/2019	09:26:09 AM
20	System ignition stage completed [72]	01/23/2019	09:25:39 AM
61	System ready [71]	01/23/2019	09:25:38 AM
18	System tuned On automatically: power restored. [70]	01/23/2019	09:25:21 AM
101	Communication restored [69]	01/23/2019	09:25:21 AM
65	Controller turned On [68]	01/23/2019	09:25:21 AM
1	Dose above maximum defined level [67]	01/22/2019	04:27:44 PM
20	System ignition stage completed [66]	01/22/2019	04:27:14 PM

Figure 11-1: Event log screen

11.2 Troubleshooting issues

The temperature is too high on page 165

Temperature is critically high! on page 165

The UV Lamp unexpectedly shut down on page 170

The rate of the water flow is too low / too high on page 167

UVT is too low! on page 168

UV Lamp ignition failed! on page 168

Control Module power failure on page 170

Ballast Module communication error on page 171

The UV Lamp unexpectedly shut down on page 170

CRC error on page 171

Each event/alarm provides the following additional information:

- System power
- System dose
- System flow
- System status
- System UVT
- System Temperature

11.3 Voltage Error Codes

For Ballast Module version C, the Voltage parameter provides a value that functions as an additional Error code and indicates additional information about the fault. See ***Lamp Failure codes in Technician screen 3*** on page **80**.

Table 11-2: Voltage Error Codes and Troubleshooting procedures

Lamp voltage value when lamp is off = Error Code	Lamp turn off reason	Probable Cause	Troubleshooting
0 (± 24)	Unknown	Input voltage at one of the three phases is low	1 At the output side of the ballast's Circuit Breaker/fuses , check that the input voltage of the ballast is in the proper range at all three phases. Make sure that the ballast harness and input wires are properly secured tightly.
			2 If the voltage is within range, and the wires are secured tightly, try to reignite the lamp. If the lamp reignites, wait 10 minutes and see if the ballast is working properly.
		Internal fault at the ballast	3 If the problem reappears, or the lamp does not ignite, replace the ballast.
			Problem in all ballasts at the same time:
			1 Try to locate the point where the voltage is low in the input phases feeding the ballasts.
			2 If all of the voltage lines are in range, check for the source of the input voltage sags and stabilize the voltage.
50 (± 24)	Lamp nominal voltage too low	input voltage is too high	1 Check that the input voltage of the ballast is in the proper range and if yes try to reignite lamp. If the lamp reignites wait 10 minutes and see if the ballast is working properly.

Table 11-2: Voltage Error Codes and Troubleshooting procedures

Lamp voltage value when lamp is off = Error Code	Lamp turn off reason	Probable Cause	Troubleshooting
-		faulty ballast	2 If problem appears again or lamp does not start properly replace the ballast.
		faulty lamp	3 If the problem is not fixed replace the lamp.
100 (± 24)	Lamp nominal voltage too high	faulty lamp	If the problem is not fixed replace the lamp.
150 (± 24)	Device cooling *	Room's ambient temperature is above 45°C The ballast fan is faulty or faulty ballast	1 Check the room temperature. If it is too high, reduce the temperature via external means.
			2 Reignite the lamp and check that the ballast external fan is working. If not, try to clean it or replace it. If it is still not working replace the ballast
200 (± 24)	Lamp Internal failure / Phase lost	One phase of the supply is down due to a ballast CB / Fuse fault or wire disconnection at the input of the ballast	Problem in one ballast

Table 11-2: Voltage Error Codes and Troubleshooting procedures

Lamp voltage value when lamp is off = Error Code	Lamp turn off reason	Probable Cause	Troubleshooting
250 (± 24)	Lamp earth short circuit	One of the lamp's wires is touching the ground	1 Disconnect the faulty ballast from the supply by switching off its switch. Disconnect the Ballast wire connector and check using a DVM if there is short circuit between one of the lamp phases to the ground. If a short circuit is detected, locate the short circuited segment (junction box to ballast or junction box to lamp) and replace it.
300 (± 24)	Lamp not ignited / gone out	Ballast cable fault	1 Inspect the ballast cable & connectors between the electrical junction box and ballast.
		Faulty ballast/ Faulty lamp	2 Switch the cables between the ballast of the faulty lamp and the nearby ballast of a working lamp. If lamp doesn't work, replace lamp. If lamp works, replace the Ballast.
		Lamp connector	3 Check the lamp connector and if damaged, replace it and the lamp.

Table 11-2: Voltage Error Codes and Troubleshooting procedures

Lamp voltage value when lamp is off = Error Code	Lamp turn off reason	Probable Cause	Troubleshooting
350 (± 24)	Lamp short circuit	Cable fault	1 Disconnect the ballast and check that there is no short circuit between lamps wires
		Faulty ballast	2 Replace the ballast and check again. If the new ballast works, it means the cause was an internal ballast short circuit. Reduce the number of lamp ignitions per ballast to not more than six ignitions per day.
		Water inside the lamp sleeve	3 Replace the sleeve's O-rings
400 (± 24)	LAMP X MAINS UNDERVOLTAGE	Input voltage of the ballast is low due to a ballast CB fault or wire disconnection at the input of the ballast	Problem in one ballast
		Low voltage or loss connection	1 At the output side of the ballast's Fuses (inside the Junction Box) , check that the input voltage is according to the allowed range at all three phases. Make sure that the ballast harness and input wires are properly secured tightly.
	Phase failure mains voltage		2 If the voltage is valid and the wires are secured tightly, try to reignite lamp. If the lamp reignites, wait 10 minutes and see if the ballast is working properly.
		Faulty ballast	3 If problem appears again, or the lamp does not ignite, replace the ballast.
			Problem in all ballasts at the same time:

Table 11-2: Voltage Error Codes and Troubleshooting procedures

Lamp voltage value when lamp is off = Error Code	Lamp turn off reason	Probable Cause	Troubleshooting
		Low voltage	1 Try to locate the point where the voltage is low in the input phases feeding the ballasts.
			2 If all of the voltage lines are in range, check for the source of the input voltage sags and stabilize the voltage.

Table 11-2: Voltage Error Codes and Troubleshooting procedures

Lamp voltage value when lamp is off = Error Code	Lamp turn off reason	Probable Cause	Troubleshooting
450 (± 24)	Mains over-voltage	Input voltage is too high (above 565V) or unbalanced voltage supply	Problem in one ballast
		Voltage out of range	1 At the output side of the ballast's Fuses (inside the Junction Box) check that the input voltage of the ballast is in the proper range at all three phases.
			2 If the voltage is valid and the wires are fixed, try to reignite the lamp. If the lamp reignites, wait 10 minutes and see if the ballast is working properly.
		Faulty ballast	3 If the problem appears again at just one ballast, or the lamp does not start properly, replace the ballast.
			Problem in all ballasts at the same time:
		Unbalanced voltage supply	1 Verify that the the voltage supply is balanced (the three phases to PE voltages are equal $\pm 10\%$). If not create balanced supply by isolation transformer
		Voltage out of range	2 Check for the source of the input high voltage and stabilize the voltage.

Table 11-2: Voltage Error Codes and Troubleshooting procedures

Lamp voltage value when lamp is off = Error Code	Lamp turn off reason	Probable Cause	Troubleshooting
500 (± 24)	Manual switch off		NA
600 (± 50)	Loss of ballast's internal parameters***		NA

* Voltage of lamp is low while the current to the lamp is at the maximum allowed value – in this state, the required power cannot be delivered to the lamp.

** The voltage required by the lamp cannot be created by the ballast. The current going to the lamp is zero.

*** In case of loss of internal ballast parameters, consult with Atlantium service personnel for instructions on how to solve this issue.

Y Pay attention to the following safety notes when reviewing the troubleshooting issues:



The solution to the problem might involve exposure to UV light.

The system generates ultraviolet (UV) light within the Atlantium Unit, which can cause serious eye damage or blindness if you stare at it directly when it is working.

Do not look directly into the lamp enclosure during system operation, or while examining or servicing the system's internal components when the system is operating, or when a lamp's breather caps are open.



The solution to the problem might involve working in a high-voltage environment.

Before replacing a UV lamp or other components, and during any maintenance requiring lamps to be turned off, **turn the BMmain circuit breaker to the Off position.**

Place a sign on the relevant switch and **Control Module** alerting others **NOT** to touch the switch and touch screen during maintenance so that no one can inadvertently turn it on while maintenance is in progress.



The solution to the problem might involve working with hot surface.

Do not touch the UV lamp with your bare hands. Lamps can reach a temperature of 1,000°C under operating conditions.

Wait at least 10 minutes until the lamp is cooled down before replacing it.

Use appropriate protective gloves both to protect your hands and to avoid skin oils that leave fingerprints and/or harm the UV lamp.

11.4 The dose is above the maximum dose


Event Index	Control Module displays this warning message
1	The dose is above the maximum defined in the system settings

	Possible Cause	Solution
1	The current flow rate is too low. An upstream process has obstructed the flow rate.	Check the upstream piping and the components installed there, such as the pumps, filters.
2	The Max Dose parameter is set too low.	In the Control Module , raise the Max Dose setting. See Configuring Dose Settings on page 92.
3	The system is set for a constant power that is too high given the current water flow.	In the Control Module , change the Operation Mode from Power to Dose setting. See Configuring Dose Settings on page 92.

11.5 The UV dose is too low

Event Index	Control Module displays this warning message
2	Dose too low! Below minimum!

!

	Possible Cause	Solution
1	The Water flow rate is too high.	Check the water flow on the Control Module's main screen. If it is higher than normal, decrease the rate of the water flow through the system. See Configuring the Flow Settings on page 75.
2	UVT has declined because of chemicals (chlorine, etc.) or solids (sand, silt, etc.) in the water flow.	Carry out cleaning procedures. See Cleaning In Place (CIP) on page 96. Try to improve the water condition. Check on the status of upstream filtering equipment and upstream chemical processes.
3	UV lamp efficiency has dropped.	 <p>Check the UVIS sensors and clean them if necessary. Check the lamp's efficiency reading. If it is low, replace the lamp. See on page 101.</p>
4	UVT has declined because of chemicals (chlorine, etc.) or solids (sand, silt, etc.) in the water flow.	Carry out cleaning procedures. See Cleaning In Place (CIP) on page 96. Try to improve the water condition. Check on the status of upstream filtering equipment and upstream chemical processes.
5	The UVT sensor has malfunctioned.	Switch between the UVT and UVIS sensors and see if the reading increased. If the reading is increased, switch the sensors back and replace the UVT sensor. See Replacing/Checking a UVT Analyzer or UVIS Sensor on page 111.
6	The system is operating on Power mode instead of Dose mode .	If the system settings are in Power mode, in the Control Module , access the Settings screen and change the Operation Mode from Power to Dose setting. Or, change the Power mode settings to allow higher power to respond to operating conditions. See Configuring the Operation Mode on page 74.


11.6 The temperature is too high





Event Index	Control Module displays this warning message
4	The lamp's temperature getting too high - check water flow

	Possible Cause	Solution
1	The Max temperature value is too low.	Check the system's Max Temperature settings. See <i>Configuring the General & Connection Settings</i> on page 96.
2	The water flow has significantly decreased.	Check the flow reading in the Control Module to see if it has deviated from normal flow. Check the flow via the flow meter. Check the water source for a problem.
3	There are air bubbles or the system is not fully filled with water.	Verify this by looking through the Atlantium Unit's view port.
4	You did not install a designated air release valve at the highest point on the inlet side of the system.	Release the air by installing a designated air release valve at the highest point on the inlet side of the system.

11.7 Temperature is critically high!


Event Index	Control Module displays this warning message
5	The lamp's temperature is too high and the unit will shut down

	Possible Cause	Solution
1	If this message appeared right after a BM Communication Error message (and both messages refer to the same lamp) and the temperature display on the monitor is 165°C/329°F, then most likely the communication between the Control Module and the Connection box is lost.	Follow the solutions offered in <i>CRC error</i> on page 171.
2	The temperature reading dropped to 0°C / 32°F due to a short-circuit in the Temperature sensor or Connection Box Card	 Replace the temperature sensor. See <i>Replacing the Temperature Sensor</i> on page 113. If the problem still persists replace the Connection Box card. Contact your Atlantium Service representative.
3	The Max temperature value is too low.	Check the system's Max Temperature settings. See <i>Configuring the Technician Settings</i> on page 78.
4	There is no water flow.	Check the flow reading in the Control Module's main screen to see if it has deviated from normal flow. Check the flow via the flow meter. Check the water source for a problem.

	Possible Cause	Solution	
5	There are air bubbles or the system is not filled with water to capacity.	Verify this by looking through the Atlantium Unit's view port.	
6	You did not install a designated air release valve at the highest point on the inlet side of the system.	Release the air by installing designated air release valve at the highest point on the inlet side of the system.	
7	The Temperature sensor is faulty.		Replace the temperature sensor. See Replacing the Temperature Sensor on page 113.
8	Relevant for Ultrasonic Cleaner700/750 Connection Box Cards only: The Temperature jumper is missing.		<p>Verify the existence of the Temperature jumper in its designated location on the Connection Box card #1. On the last Connection Box, open the top cover and locate Jumper J32 marked A in the figure.</p>  <p>Figure 11-2: Jumper Location</p>
9	The Temperature Converter card is faulty.		If the problem persists replace the Temperature Converter card. See Replacing the Temperature Converter Card on page 151.

11.8 Temperature sensor fault

Event Index	Control Module displays this warning message
6	One of the temperature sensors has malfunctioned or the communication with the Connection Box card was lost.

	Possible Cause	Solution
1	If this message appeared right after a BM Communication Error message (and both messages refer to the same lamp) and the temperature display on the monitor is 0°C/32°F, then most likely the communication between the Control Module and the Connection box is lost.	Follow the solutions offered in CRC error on page 171.
2	The temperature reading dropped to 0°C / 32°F due to a short-circuit in the Temperature sensor, or Connection Box Card	 <p>Replace the temperature sensor. See Replacing the Temperature Sensor on page 113. If the problem still persists replace the Connection Box card. Contact your Atlantium Service representative.</p>




11.9 The rate of the water flow is too low / too high

Event Index	Control Module displays this warning message
10	<p>The water flow rate is higher than the maximum flow rate defined in the system settings. Check the water flow.</p> <p>System turned off automatically - water flow too low/high</p>

	Possible Cause	Solution
1	The water flow rate into the system is too high.	Decrease the rate of water flow from the facility to the Atlantium Unit.
2	Maximum allowable flow rate parameter is too low.	Increase the setting of the Maximum allowable flow rate parameter to the maximum allowable flow rate.

11.10 UVT is too low!

Event Index	Control Module displays this warning message
11	The UVT is lower than the minimum UVT defined in the system settings.










	Possible Cause	Solution	
1	Minimum allowable UVT parameter is too high.	Decrease the setting of the Minimum allowable UVT parameter to the minimum allowable UVT.	
2	The UVT sensor's lens is fouled.		Pull out the UVT sensor and see if the sensor's lens is foul or damaged. Clean the lens with a dry lens cloth. If it is damaged, replace the sensor with a new one and perform System Tuning according.
3	Deposit has collected in the UV chamber or lamp's quartz sleeve.	Look through the Atlantium Unit's view port. If the color of the light is in a shade of green or yellow, it probably indicate there is deposit present. Perform CIP. Cleaning In Place (CIP) on page 96	
4	There are air bubbles or the system is not filled with water to capacity.	Verify this by looking through the Atlantium Unit's view port.	
5	You did not install a designated air release valve at the highest point on the inlet side of the system.	Install air release valve at the highest point on the inlet side of the system.	
6	There is a leak inside the UV chamber		Look through the Atlantium Unit's view port and check if there is condensation on the inner side of the view port and/or if there is water collected between the quartz tube sleeve and the stainless steel underneath. If you see this, contact Atlantium support for further instructions.
7	The UVT sensor has malfunctioned.		Switch between the UVT and UVIS sensors and see if the reading increased. If the reading is increased, switch the sensors back and replace the UVT sensor. See page See Replacing/Checking a UVT Analyzer or UVIS Sensor on page 111.

11.11 UV Lamp ignition failed!

Event Index	Control Module displays this warning message
14	Lamp ignition failed Check if it needs to be replaced, or if there is a faulty connection or ballast malfunction.






For Ballast Module version C, check the Voltage value error code. See **The dose is above the maximum dose** on page 163.

	Possible Cause	Solution	
1	The system is set to the wrong model.	In the Control Module , access Technician screen #2 . Verify that the system is set to the correct model, number of lamps and branches. See Configuring the Technician Settings on page 78.	
2	One or more connectors are burnt out.		Turn off the system's main power source On each Connection Box, turn the switch to the Off position. Disconnect and thoroughly inspect the Ballast connectors. IF replacement is needed, contact Atlantium Technical Support.
3	The power supply inside the Ballast Module is faulty.	 	In a system with more than one lamp, if possible, switch between the Ballast Module connectors in order to verify the Ballast is faulty, if so replace the Ballast Module. In a system with only one lamp, replace the Ballast Module with a new one. See Connecting the Cables to the Electrical Cabinet on page 56.
4	A lamp is faulty/burned out.	 	In a system with more than one lamp, switch between the lamps in order to verify the lamp is faulty, if so replace the lamp. In a system with only one lamp, replace the lamp with a new one. See Replacing a UV Lamp on page 129.
5	The ID number of the Connection Box card does not match ID number of the Ballast Module.		On each Connection Box, open the top cover and locate the 3-digit display (as shown on the right). Check that the set number is identical to the number marked on corresponding Ballast Module. If not identical, use the switch to change it to the correct number. 
6	One or more of the fuses in the Connection Box is burned out.		Replace the burned out fuse in the Connection Box. Contact Atlantium support for further instructions.
7	The Connection Box card is faulty.		On the Connection Box, open the top cover and check that the 3-digit display and LEDs are lit. If they are dark, replace the Connection Box card. Contact Atlantium support for further instructions.

11.13 Control Module power failure

Event Index	
39	The system turned off due to Control Module power failure.

	Possible Cause		Solution
1	No power is feeding into the Connection Box.		Open the Connection boxes and verify that all Connection Boxes have power. See Connection Box Connections Diagram provided.
2	A wire is loose.		With a small flat screwdriver go over all the communication screws in the Control Module and Connections Box s and make sure all wires are located properly in their place and are well tightened. Control Module Connections on page 51
3	A jumper is missing.		A communication jumper might need to be installed, contact Atlantium Support for further instruction.
4	Ground is not connected to the Control Module's power inlet.		A certified electrician is required to verify that the Control Module is properly grounded. Control Module Connections on page 51
5	There is a Hardware problem in the Control Module's I/O (ISO) or in the Connection Box.		Contact Atlantium support for further instructions.

11.14 The UV Lamp unexpectedly shut down

Event Index	Control Module displays this warning message
43	A lamp shutdown unexpectedly.



For Ballast Module version C, check the Voltage value error code. See *The dose is above the maximum dose* on page 163.

	Possible Cause	Solution
1	A short power failure (up to 15 seconds) to the Atlantium Unit only, while the Control Module still had power.	After 3 minutes, turn the lamps back on using the On/Off button on the Control Module's main screen.
2	Ballast, lamp, connection failure	Check for faulty connection, ballast or lamp.



This situation can happen only in installations were the **Control Module** and the Atlantium Unit have separate power sources.

11.15 CRC error

Event Index	Event
44	Cyclic Redundancy Check error. Check if the parameters and counters have been reset to factory defaults. If so, contact Atlantium Technical Support.




	Possible Cause	Solution
1	While writing parameters into the Control Module's flash storage, the system encountered a problem due to an unexpected power failure or software upgrade.	Reenter all system parameters from scratch. Contact Atlantium support for further instructions. See Configuring the General & Connection Settings on page 96.



For Ballast Module version C, check the Voltage value error code. See *The dose is above the maximum dose* on page 163.

11.16 Ballast Module communication error

Event Index	Control Module displays this warning message
46	There is lost communication between one of the Connection Boxes and the Control Module . The system is shutting down.
69	

	Possible Cause		Solution
1	No power is feeding into the BM.		Verify that BM and all Connection Boxes have power.
2	A wire is loose.		With a small flat screwdriver go over all the communication screws in the Control Module and the BM and make sure all wires are located properly in their place and are well tightened. Control Module Connections on page 51
3	A jumper is missing.		A communication jumper might need to be installed, contact Atlantium Support for further instruction.
34	Ground is not connected to the Control Module's power inlet.		A certified electrician is required to verify that the Control Module is properly grounded. Control Module Connections on page 51
45	There is a Hardware problem in the Control Module's I/O (ISO) or in the Connection Box.		Contact Atlantium support for further instructions.

11.17 Tuning process aborted by system

Event Index	Control Module displays this warning message
100	Tuning process aborted by system

	Possible Cause	Solution
1	Communications fault	<p>Check the communications cables and cable connections between the Control Module and other equipment.</p> <p>Restart the Control Module.</p> <p>If the problem persists, contact Atlantium Technical Support.</p>



Appendix A Modbus Communication Protocol

Modbus is an application layer messaging protocol for client/server communication between devices connected on different types of buses or networks.

Modbus is often used to connect a supervisory computer with a Remote Terminal Unit (RTU) in supervisory control and data acquisition systems.

For information on how to configure the communication properties, see **Modbus Communication Connections** on page 65.

➤ Physical connection to Modbus

Physical connection to Modbus shall be performed by a technician. Ask your Atlantium representative for details.

➤ To set Modbus connection parameters in Control Module:

Step 1. Set Modbus address to 1

Step 2. Set baud rate to 19200

The installation technician will set the IP address.

A.1 Modbus Registry Map

The table on the following pages provides the information you need to help you configure your network to properly communicate with the Atlantium system.

ATTENTION



- Modbus registers are meant to be used for specific commands in a command algorithm. Write only once to any register and await response.
- Registers 194-224 are 'Read' Only
- All of the registers have a length of Unsigned 16 bits, even the Coils Bits
- To read input from a register, use Function Code 4 (Read input registers)
- To write output to a register, use Function Code 6 (Write output single register).

Table A-1: Modbus Registry Map (*) R = Read Only RW = Read/Write

Register address	Register name	Divide	Type	Comment	Units	Read/Write
0	Min Dose	:10		Up to 6553	mJ/cm ²	R
1	Max Dose	:1			mJ/cm ²	R
2	Set For	:10		Up to 6553	mJ/cm ²	R
3	System Unit format		Coil Bit	0 - Imperial, 1 - Metric		R

Table A-1: Modbus Registry Map (*) R = Read Only RW = Read/Write

Register address	Register name	Divide	Type	Comment	Units	Read/Write
4	Flow in FS mode	: 1		Min. Val = 1 , Max.Val = 30000 - Display according to format set on HMI (m ³ /h or gal/min)	m ³ /h	R/W
5	Min Flow	: 100		Min. Val = 1 , Max.Val = 300 - Display according to format set on HMI (m ³ /h or gal/min)	m ³ /h	R/W
6	Max Flow	: 1		Min. Val = 1 , Max.Val = 30000 - Display according to format set on HMI (m ³ /h or gal/min)	m ³ /h	2.1.1-B43
7	Operation Mode		Coil Bit	0: Power Mode, 1: Dose Mode		R/W
8	System Lamps status	: 1		Average of all lamps status.	%	R
204	Dose	: 1		Actual dose	mJ/cm ²	R
205	System On/Off		Coil Bit	0 - System OFF, 1 - System ON		R/W
227	UVT	: 100		Actual UVT	%	R
228	Power	: 1		Actual power	%	R
229	Flow	: 1		Actual flow value - Display according to format set on HMI (m ³ /h)	m ³ /h	R
194	System Temperature	: 100			°C	R
32	Set Power	: 1		Set the power for power mode	%	R/W
Lamp1						
35	UVIS	: 100			4-20 mA	R
36	UVTS A	: 100			4-20 mA	R
37	UVTS B	: 100			4-20 mA	R

Table A-1: Modbus Registry Map (*) R = Read Only RW = Read/Write

Register address	Register name	Divide	Type	Comment	Units	Read/Write
38	Lamp Current	: 100			Amper	R
39	Lamp Voltage	: 10			Voltage	R
40	Lamp On		Coil Bit	1 - Lamp is ON , 0 - Lamp is OFF		R
42	Lamp UVT A	: 100			%	R
43	Lamp Status	: 100			%	R
44	Lamp UVT B	: 100			%	R
46	Lamp Age	: 1			Hour	R
47	Lamp Ignitions	: 1				R
51	Lamp Enable		Coil Bit	0 - Disable, 1 - Enable		R/W
52	Turn On/Off		Coil Bit	1 - Turn ON , 0 - Turn OFF		R/W
53	Lamp state			0 -> lamp OFF 1 -> Lamp Ignition, 2 -> Lamp On		R
Lamp 2						
54	UVIS	: 100			4-20 mA	R
55	UVTS A	: 100			4-20 mA	R
56	UVTS B	: 100			4-20 mA	R
57	Lamp Current	: 100			Amper	R
58	Lamp Voltage	: 10			Voltage	R
59	Lamp On		Coil Bit	1 - Lamp is ON , 0 - Lamp is OFF		R
61	Lamp UVT A	: 100			%	R
62	Lamp Status	: 100			%	R
63	Lamp UVT B	: 100			%	R
65	Lamp Age	: 1			Hour	R
66	Lamp Ignitions	: 1				R
70	Lamp Enable		Coil Bit	0 - Disable, 1 - Enable		R/W

Table A-1: Modbus Registry Map (*) R = Read Only RW = Read/Write

Register address	Register name	Divide	Type	Comment	Units	Read/Write
71	Turn On/Off		Coil Bit	1 - Turn ON , 0 - Turn OFF		R/W
72	Lamp state			0 -> lamp OFF 1 -> Lamp Ignition, 2 -> Lamp On		R
Lamp 3						
73	UVIS	: 100			4-20 mA	R
74	UVTS A	: 100			4-20 mA	R
75	UVTS B	: 100			4-20 mA	R
76	Lamp Current	: 100			Amper	R
77	Lamp Voltage	: 10			Voltage	R
78	Lamp On		Coil Bit	1 - Lamp is ON , 0 - Lamp is OFF		R
80	Lamp UVT A	: 100			%	R
81	Lamp Status	: 100			%	R
82	Lamp UVT B	: 100			%	R
84	Lamp Age	: 1			Hour	R
85	Lamp Ignitions	: 1				R
89	Lamp Enable		Coil Bit	0 - Disable, 1 - Enable		R/W
90	Turn On/Off		Coil Bit	1 - Turn ON , 0 - Turn OFF		R/W
91	Lamp state			0 -> lamp OFF 1 -> Lamp Ignition, 2 -> Lamp On		R
Lamp 4						
92	UVIS	: 100			4-20 mA	R
93	UVTS A	: 100			4-20 mA	R
94	UVTS B	: 100			4-20 mA	R
95	Lamp Current	: 100			Amper	R
96	Lamp Voltage	: 10			Voltage	R

Table A-1: Modbus Registry Map (*) R = Read Only RW = Read/Write

Register address	Register name	Divide	Type	Comment	Units	Read/Write
97	Lamp On		Coil Bit	1 - Lamp is ON , 0 - Lamp is OFF		R
99	Lamp UVT A	: 100			%	R
100	Lamp Status	: 100			%	R
101	Lamp UVT B	: 100			%	R
103	Lamp Age	: 1			Hour	R
104	Lamp Ignitions	: 1				R
108	Lamp Enable		Coil Bit	0 - Disable, 1 - Enable		R/W
109	Turn On/Off		Coil Bit	1 - Turn ON , 0 - Turn OFF		R/W
110	Lamp state			0 -> lamp OFF 1 -> Lamp Ignition, 2 -> Lamp On		R
Lamp 5						
111	UVIS	: 100			4-20 mA	R
112	UVTS A	: 100			4-20 mA	R
113	UVTS B	: 100			4-20 mA	R
114	Lamp Current	: 100			Amper	R
115	Lamp Voltage	: 10			Voltage	R
116	Lamp On		Coil Bit	1 - Lamp is ON , 0 - Lamp is OFF		R
118	Lamp UVT A	: 100			%	R
119	Lamp Status	: 100			%	R
120	Lamp UVT B	: 100			%	R
122	Lamp Age	: 1			Hour	R
123	Lamp Ignitions	: 1				R
127	Lamp Enable		Coil Bit	0 - Disable, 1 - Enable		R/W
128	Turn On/Off		Coil Bit	1 - Turn ON, 0 - Turn OFF		R/W

Table A-1: Modbus Registry Map (*) R = Read Only RW = Read/Write

Register address	Register name	Divide	Type	Comment	Units	Read/Write
129	Lamp state			0 -> lamp OFF 1 -> Lamp Ignition, 2 -> Lamp On		R
Lamp 6						
130	UVIS	: 100			4-20 mA	R
131	UVTS A	: 100			4-20 mA	R
132	UVTS B	: 100			4-20 mA	R
133	Lamp Current	: 100			Amper	R
134	Lamp Voltage	: 10			Voltage	R
135	Lamp On		Coil Bit	1 - Lamp is ON, 0 - Lamp is OFF		R
137	Lamp UVT A	: 100			%	R
138	Lamp Status	: 100			%	R
139	Lamp UVT B	: 100			%	R
141	Lamp Age	: 1			Hour	R
142	Lamp Ignitions	: 1				R
146	Lamp Enable		Coil Bit	0 - Disable, 1 - Enable		R/W
147	Turn On/Off		Coil Bit	1 - Turn ON , 0 - Turn OFF		R/W
148	Lamp state			0 -> lamp OFF 1 -> Lamp Ignition, 2 -> Lamp On		R
Lamp 7						
149	UVIS	: 100			4-20 mA	R
150	UVTS A	: 100			4-20 mA	R
151	UVTS B	: 100			4-20 mA	R
152	Lamp Current	: 100			Amper	R
153	Lamp Voltage	: 10			Voltage	R
154	Lamp On		Coil Bit	1 - Lamp is ON , 0 - Lamp is OFF		R

Table A-1: Modbus Registry Map (*) R = Read Only RW = Read/Write

Register address	Register name	Divide	Type	Comment	Units	Read/Write
156	Lamp UVT A	: 100			%	R
157	Lamp Status	: 100			%	R
158	Lamp UVT B	: 100			%	R
160	Lamp Age	: 1			Hour	R
161	Lamp Ignitions	: 1				R
165	Lamp Enable		Coil Bit	0 - Disable, 1 - Enable		R/W
166	Turn On/Off		Coil Bit	1 - Turn ON , 0 - Turn OFF		R/W
167	Lamp state			0 -> lamp OFF 1 -> Lamp Ignition, 2 -> Lamp On		R
Lamp 8						
168	UVIS	: 100			4-20 mA	R
169	UVTS A	: 100			4-20 mA	R
170	UVTS B	: 100			4-20 mA	R
171	Lamp Current	: 100			Amper	R
172	Lamp Voltage	: 10			Voltage	R
173	Lamp On		Coil Bit	1 - Lamp is ON , 0 - Lamp is OFF		R
175	Lamp UVT A	: 100			%	R
176	Lamp Status	: 100			%	R
177	Lamp UVT B	: 100			%	R
179	Lamp Age	: 1			Hour	R
180	Lamp Ignitions	: 1				R
184	Lamp Enable		Coil Bit	0 - Disable, 1 - Enable		R/W
185	Turn On/Off		Coil Bit	1 - Turn ON , 0 - Turn OFF		R/W
186	Lamp state			0 -> lamp OFF 1 -> Lamp Ignition, 2 -> Lamp On		R

Table A-1: Modbus Registry Map (*) R = Read Only RW = Read/Write

Register address	Register name	Divide	Type	Comment	Units	Read/Write
Valve						
200	Bypass Valve		Coil Bit	1 - Valve ON , 0 - Valve OFF		R
201	Inlet Valve		Coil Bit	1 - Valve ON , 0 - Valve OFF		R
202	Outlet Valve/ Ready		Coil Bit	1 - Valve ON , 0 - Valve OFF		R
Alarms						
203	General Alarm		Coil Bit	1 - Valve ON , 0 - Valve OFF		R
206	Over dose		Coil Bit	1 - Valve ON , 0 - Valve OFF		R
207	Min Dose #2		Coil Bit	1 - Valve ON , 0 - Valve OFF		R
208	High Temp #4		Coil Bit	1 - Valve ON , 0 - Valve OFF		R
209	Over Temp #5		Coil Bit	1 - Valve ON , 0 - Valve OFF		R
210	Shut Down Alarm		Coil Bit	1 - Valve ON , 0 - Valve OFF		R
211	Low UVT		Coil Bit	1 - Valve ON , 0 - Valve OFF		R
212	Lost Comm		Coil Bit	1 - Valve ON , 0 - Valve OFF		R
213	Under flow		Coil Bit	1 - Valve ON , 0 - Valve OFF		R
214	High Flow #10		Coil Bit	1 - Valve ON , 0 - Valve OFF		R
224	Under dose set #41		Coil Bit	1 - Valve ON , 0 - Valve OFF		R



Table B-1: Atlantium System Parameters Checklist

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Appendix C System Messages

The table below details the message that can appear on the **Control Module's** screen or in the Event logs. A number of parameters are User Defined and include setting a value and upon reaching, exceeding or falling below it, an Action is set to be triggered. The Action is also configurable. The options are:

- **None** - The event is not considered an error, so no corrective action is taken. No warning message is issued.
- **Caution** - The caution alerts you to an anomaly based on the user preferences.
- **Warning** - One or more warning messages are issued and it triggers a pop-up window message and a General Alarm (if configured, see **Configuring the General Alarm** on page 73).
- **Shut-Down** - In case of a serious error or dangerous condition, the system shuts down and triggers a pop-up window message and a General Alarm (if configured, see **Configuring the General Alarm** on page 73).

The other parameters are system defined. The type column in the table below details the type of parameter.

Table C-1: **Control Module's** Messages

Key	Type	Event Log	Line Message/Popup Title	Popup Message
1	The value is User Defined	Over Max. Dose	The dose is above the maximum dose	The dose is above the maximum defined in the system settings.
2	The value is User Defined (The default is None)	Dose Too Low	The UV dose is too low	Dose too low! Below minimum!
4	Warning - The default temperature threshold is 5°C (9°F) below what is defined for Over Temp	Temp. Too High	Temperature is Too High	The lamp's temperature getting too high -- check water flow.
5	Shutdown - - The default temperature threshold is User Defined	Over Temp	Temperature is Critically High!	The lamp's temperature is too high and the unit will shut down.
6	Shutdown - Hardware malfunction	Temperature Sensor Fault	Temperature Sensor Fault	One of the temperature sensors has malfunctioned or the communication with the Connection Box card was lost.
9	Shutdown ---The Minimum Flow is User Defined	Low Flow	The rate of the water flow is too low	The water flow rate is lower than the minimum flow rate. Check the water flow.
10	The value is User Defined	High Flow	The rate of the water flow is too high	The water flow rate is higher than the maximum flow rate allowed. Check the water flow.
11	The value is User Defined	Transmission Low	UVT is too low!	UVT is below the required value
14	Warning	Lamp Ignition	UV Lamp Ignition Failed!	The UV lamp has failed to ignite due to an electronic fault. The UV lamp may be burnt out or a wire may be disconnected.
16	Appears in the Event Log only - pops up from additional info from Event Log	User On		The Control Module screen or an external signal turned on the system.

Table C-1: **Control Module's Messages**

Key	Type	Event Log	Line Message/Popup Title	Popup Message
17	Appears in the Event Log only - pops up from additional info from Event Log	User Off		The Control Module screen or an external signal shut down the system.
18	Appears in the Event Log only - pops up from additional info from Event Log	Auto On		System power was restored or flow raise above minimum. The lamps reignite.
19	Appears in the Event Log only - pops up from additional info from Event Log	Auto Off		Flow rate below user low flow setting; automatic shutdown.
20	Appears in the Event Log only - pops up from additional info from Event Log	Lamps On		System Ready. All the enabled lamps are on.
24	Caution	Dose On Spec	Dose On Spec	The UV dose being delivered by the system is above the minimum validated value
25	Warning	Dose Off Spec	Dose Off Spec	The UV dose being delivered by the system is below the minimum validated value
26	Caution	UVT On Spec	UVT On Spec	The UVT value is above the minimum validated UVT
27	Warning	UVT Off Spec	UVT Off Spec	The UVT value is below the minimum validated UVT
28	Caution	Flow On Spec	Flow On Spec	The flow rate is below the maximum validated flow
29	Warning	Flow Off Spec	Flow Off Spec	The flow rate is above the maximum validated flow
33	Warning	UVT 4th calibration failed	UVT Analyzer 4th calibration check failed	UVT Analyzer calibration check failed 4 times in a row. System is off-spec
34	The value is User Defined (Default as None)	Validated Min UVT	Validated Min UVT	UVT is below Validated Min UVT
35	The value is User Defined (Default as None)	Validated Max Flow	Validated Max Flow	Flow is above Validated Max Flow
39	Appears in the Event Log only - pops up from additional info from Event Log	Power Failure	Power Failure	The system was turned off due to power failure
41	The value is User Defined	UV Dose	The UV Dose is below the set level	The UV Dose is below the Operate At dose
42	Warning - Sensor needs to be replaced or there may be a loose wire	Temp. Sensor Fault	Temperature Sensor Fault	Fault on lamp temperature sensor
43	Shutdown	Lamp Shutdown	The UV lamp unexpectedly shutdown	Lamp shutdown

Table C-1: **Control Module's Messages**

Key	Type	Event Log	Line Message/Popup Title	Popup Message
44	Appears in the Event Log only - pops up from additional info from Event Log	CRC Error	CRC Error	System error parameters and counters might be reset to factory defaults. Please check
45	Shutdown	PS Fault	Power supply fault	Ballast fault [value displayed], error code: [number displayed].
46	Warning	Communication Error	Communication Error	Lost communication with the Ballast Module
49	Appears in the Event Log only - pops up from additional info from Event Log	UVIS calib info	UVIS calib info	UVIS calib lamp [value displayed]
50	Appears in the Event Log only - pops up from additional info from Event Log	UVT calib info	UVT calib info	UVT calib lamp [value displayed]
53	Appears in the Event Log only - pops up from additional info from Event Log	Settings Changed	Settings changed	Settings changed [value displayed]
54	Caution	UVIS is calibrated successfully	UVIS is calibrated successfully	UVIS is calibrated successfully
55	Caution	UVIS calibration failed	UVIS Calibration Failed	UVIS calibration failed, Sensor is out of calibration. Correction Factor is implemented
56	Caution	UVT successful calibration check	UVT successful calibration check	UVT Analyzer successful calibration check
57	Caution	UVT check failed	UVT Analyzer check failed	UVT Analyzer check failed; Auto recalibration was done



Appendix D Glossary of Terms

Term	Definition
Auxiliaries	Valves, flow devices, etc. essential to the workings of the Atlantium system but not directly a part of the Atlantium system.
Ballast	The power supply that translates the electrical power to UV power.
Connection Box	The box that sits on top of each lamp unit and holds the circuit board for the Electrical Cabinet or Ballast Module electrical configurations. Not relevant for Ballast Module/Cable-style.
Control Module	Control Module that controls operations and dose measurement. Comes in two versions: Standard and Premium. The Standard has a monochromatic screen and several key features. The Premium has a color screen can accommodate a full complement of reporting and trending features.
External On/Off	This enables an external source (SCADA, PLC, Process) to turn the Atlantium system on and off.
IP56	Protected from limited dust ingress. Protected from high pressure water jets from any direction
<i>Electrical configuration styles: Atlantium provides a choice of electrical configurations.</i>	
Electrical Cabinet-style (EC)	EC - Electrical Cabinet.
Ballast Module	Waterproof case for the ballast which connects via a consolidated plug from the circuit board which sits on top of each lamp unit.
General Alarm	This enables the Atlantium unit to send an alarm to a buzzer, cell phone or other destination.
Inlet/Outlet Valves	Isolating Valves on the Inlet/outlet sides.
Lamp Chamber	The chamber which holds the lamp.
Lifting Support	The lifting element which can also be used to help support the Unit.
Pinhole	This is a small disc that is fitted for each sensor port to ensure that the right amount of light penetrates.
Portable CIP System	The portable unit Atlantium sells that connects to the Unit to clean and disinfect it without disassembling. It includes several kits – a valve kit, an accessories kit and the CIP kit itself.
Quartz Chamber	The quartz pipe in which the disinfection occurs.
System Ready Signal	The signal the Atlantium unit provides to tell the production system that the Atlantium System is ready to supply properly disinfected water.

Term	Definition
System Tuning	This is process is performed when key components are replaced or changed to synchronize them.
Triangle Support Brackets	RZ-Series only- brackets that can be used to support and balance a unit.
Ultrasonic Cleaner	Ultrasonic cleaning system.
UV Intensity Sensor	The sensor that measures the UV intensity in the Lamp chamber and feeds the real time dose calculation.
UVT Analyzer	The sensor that measures the lamp UV intensity through the water. Together with the UV Intensity sensor and the Control Module, it analyzes, tracks and reports the water quality.



Appendix E Consumables & Spare Parts



The Part Numbers and Descriptions and unit prices of the Consumables & Spare Parts shown in these tables are subject to change.

-RZ163 Spare Parts

Part Number	Description
Consumables	
MP0023000	O-RING 2-327 V0680-70 FOR SLEEVE
OPF000400	UV LAMP 155mm 1.7kW STANDARD POWER
OPF000420	UV LAMP 155mm 2.3kW HIGH POWER
OPF000425	UV LAMP 155mm 2.3kW HIGH POWER OZONE FREE
OPF000430	UV LAMP 155mm 1.7kW OZONE FREE
OPF000435	UV LAMP 155mm 2.3kW HP OZONE FREE WITH COATING
OPF000440	UV LAMP 155mm 2.3kW HIGH POWER PURE SILICA
OPF000450	UV LAMP 155mm 1.7kW PURE SILICA
OPF000460	UV LAMP 155mm 3.0kW UHP LN COATED
MPE007600	O-RING 2-012 V0884-75 FOR SENSOR HOUSING
Recommended Spares	
HSL010950	PT100 TEMPERATURE SENSOR, 1.1m
OPF004200	QUARTZ SLEEVE RZ163
OPF004300	QUARTZ SLEEVE RZ163 WITH COATING
OPB000100	UV SENSOR 10W/m ²
SAE013300	LAMP CONNECTOR ASSY, RZ
PS0000240	BALLAST MODULE 1.0-2.3KW, 380-480V
AP0001200	TEMPERATURE CONVERTER CARD
AP0001300	LM CARD, RZ SYSTEMS
AP0001400	DC/DC MODULE, 48V TO 24V
PS0000500	POWER SUPPLY, AC/DC, 48V, 5A, 240W, DIN RAIL
HA0000321	TIMING BELT, 280x10, RTT5, PU
SAM000800	WAVE GUIDE ASSY
PS0004000	POWER SUPPLY, AC/DC, 12V, 2.1A, 25.2W, HOLES