



## PRO50



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## **PREFACE**

### **Contact Information**

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### **About VIQUA – a Trojan Technologies Business**

We believe clean water is an invaluable resource. That's why, for more than a quarter of a century, we have led the development of water treatment solutions using environmentally friendly ultraviolet (UV) light. Today, VIQUA has the largest installed base of UV systems in operation on the planet, and many of our innovations define the industry standards for safeguarding our water from the damaging effects of microbial contamination.

From offices and facilities in eight countries, the 800 employees of Trojan are united by an unwavering commitment to deliver advanced water treatment solutions that make water safety a reality worldwide.

VIQUA is an ISO9001:2008 registered company specializing in the design, manufacture and sale of ultraviolet systems for:

- household drinking water
- light commercial drinking water
- point-of-use treatment
- point-of-entry treatment

VIQUA has over 600,000 systems installed worldwide and VIQUA systems can be found in almost every country in the world. Applications of VIQUA systems include rain water harvesting, ground water treatment, disaster relief, humanitarian aid, medical devices and bottled-water refill stations.

### **Scope**

This document highlights the features and specifications of the PRO50 system. The PRO50 system is a USEPA UVDGM 2006 protocol certified system ideal for regulated markets and is suited for light commercial applications.

## 1.0 PROJECT & SYSTEM DESCRIPTION

### 1.1 Project Description

Project Name		Guidelines
		PRO50
Maximum flow rate		50 GPM
Design dose (@ 95% UVT)		40 mJ/cm <sup>2</sup>
Operating pressure		15 psi (103 kPa) – 125 psi (861 kPa)
Ambient air temp.		0°C (32°F) - 40°C (104°F)
Ambient water temp.		1°C (34°F) - 45°C (113°F)
Hardness		120 ppm (7 grains / gallon) max.*
Manganese content		0.05 ppm max.*
Iron content		0.3 ppm max.*
UVT		85% min.*

\*after pretreatment

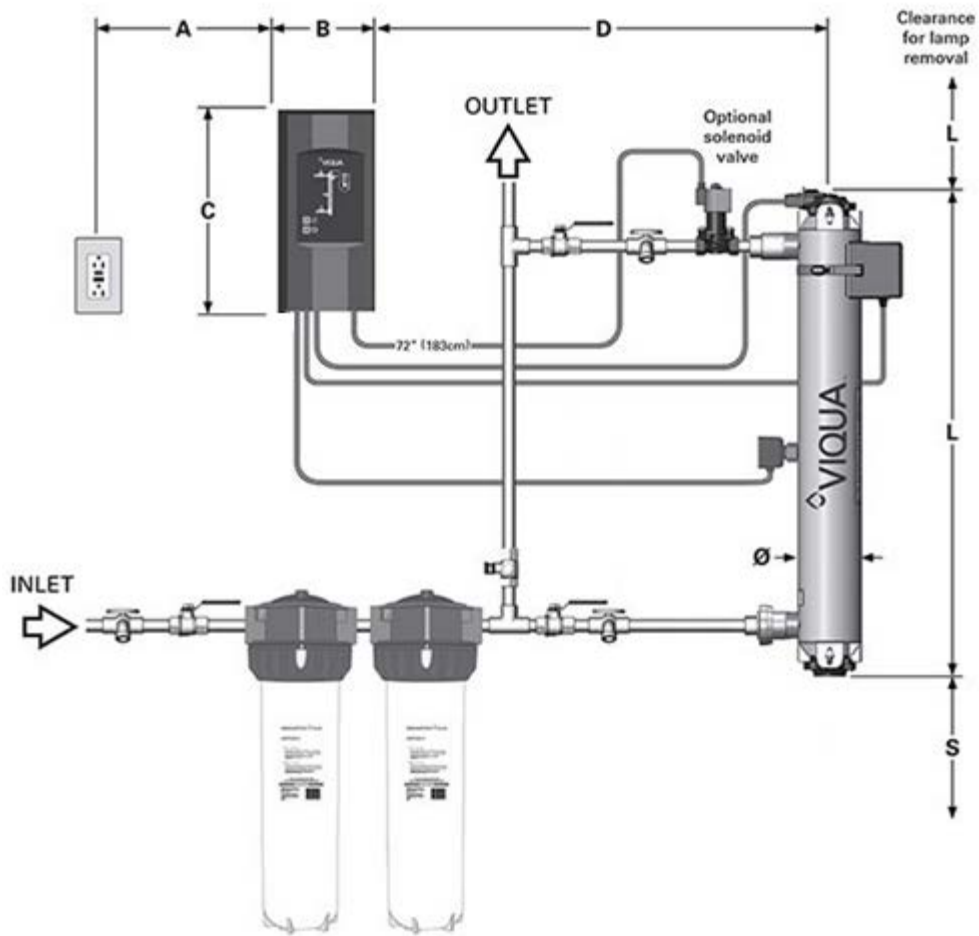
### 1.2 System Description

Model	PRO50
Quantity	
<b>Chamber</b>	
Material	316L SST
Dimensions	41" x 4" (103 x 10 cm)
Inlet & outlet ports	2" MNPT
UL Certified burst pressure	300 psi (3.45 MPa)
Orientation	Vertical
<b>Electrical</b>	
Power Supply	13" x 6.5" (33 x 16.5 cm)
Voltage	100 - 240 V AC
Frequency	50 - 60 Hz
Max. current	2.5 Amps
Max. power consumption	230 Watts
Lamp power	200 Watts

Spare Parts	Quantity	Optional Accessories	Quantity
Lamps		Solenoid valve	
Sleeves		COMMcenter™	
CoolTouch™ Fans		4-20 mA Interface	
UV sensors			

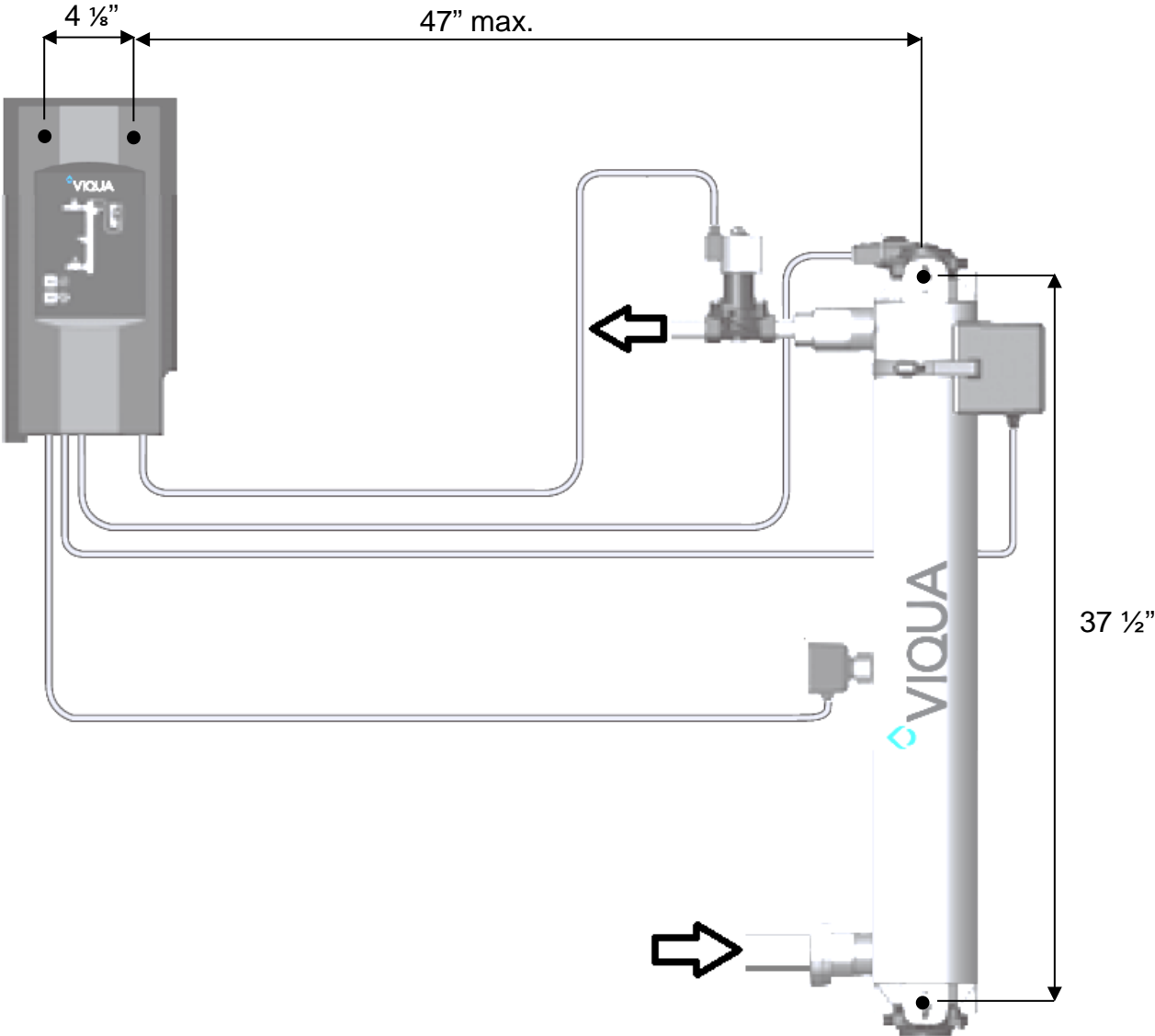
## 2.0 PRODUCT DRAWINGS

### 2.1 Install Diagram

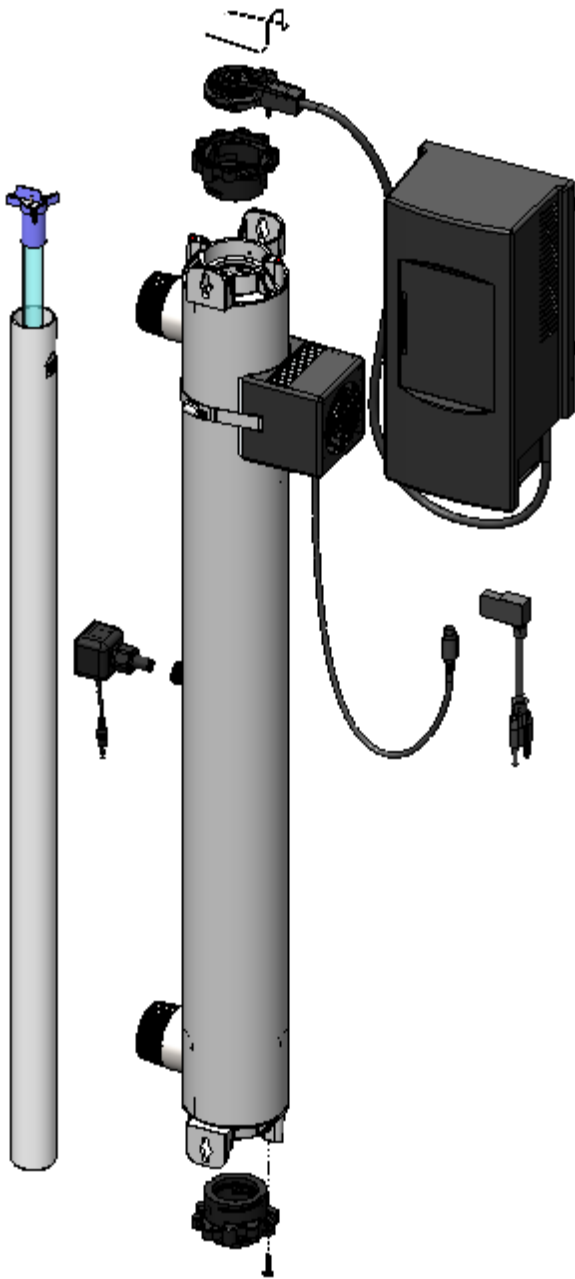


Item	L	S (min.)	Ø	A (max.)	B	C	D (max.)
PRO50	41" (103cm)	12" (30cm)	4" (10cm)	72" (182cm)	6.5" (16.5cm)	13" (33cm)	48" (122cm)

## 2.2 Mounting Diagram



## 2.3 Exploded View

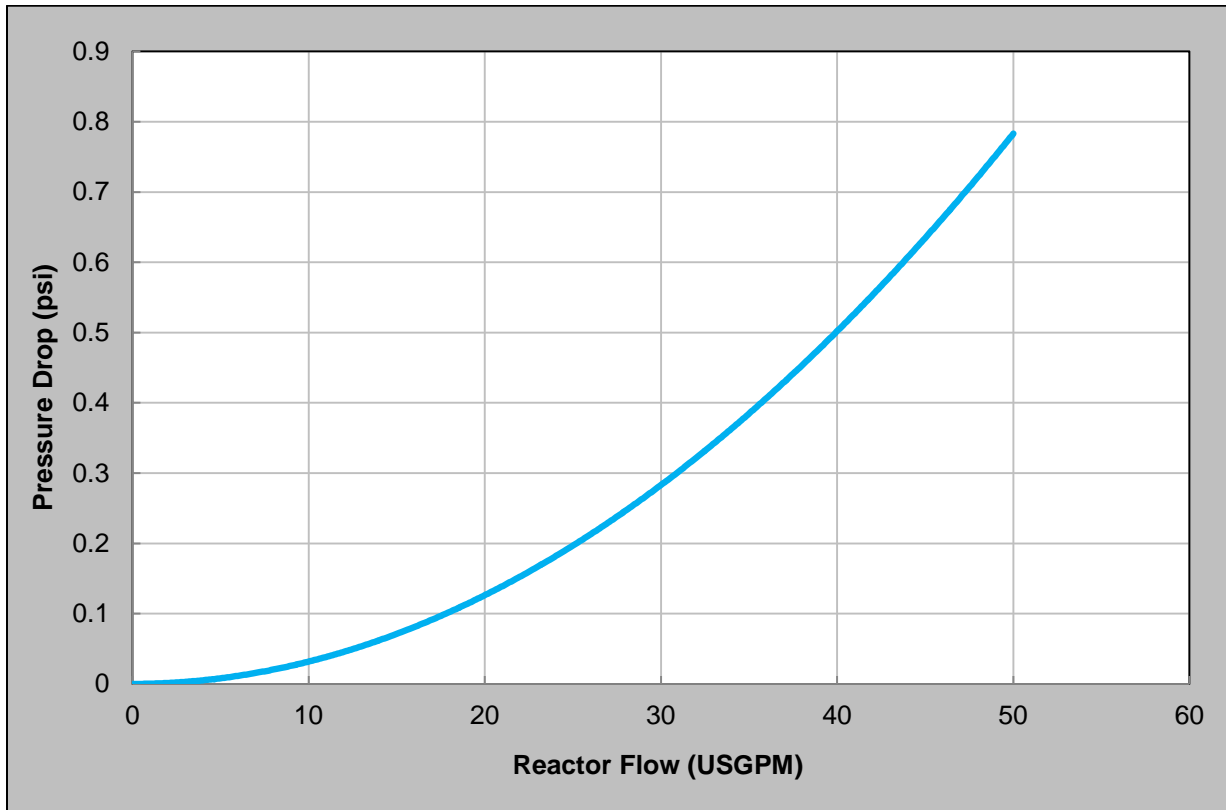


Refer to .pdf and .step files for engineering drawings and part numbers.

### 3.0 SYSTEM OVERVIEW

#### 3.1 Pressure Drop

The pressure drop across the system is proportional to the flow through the system.

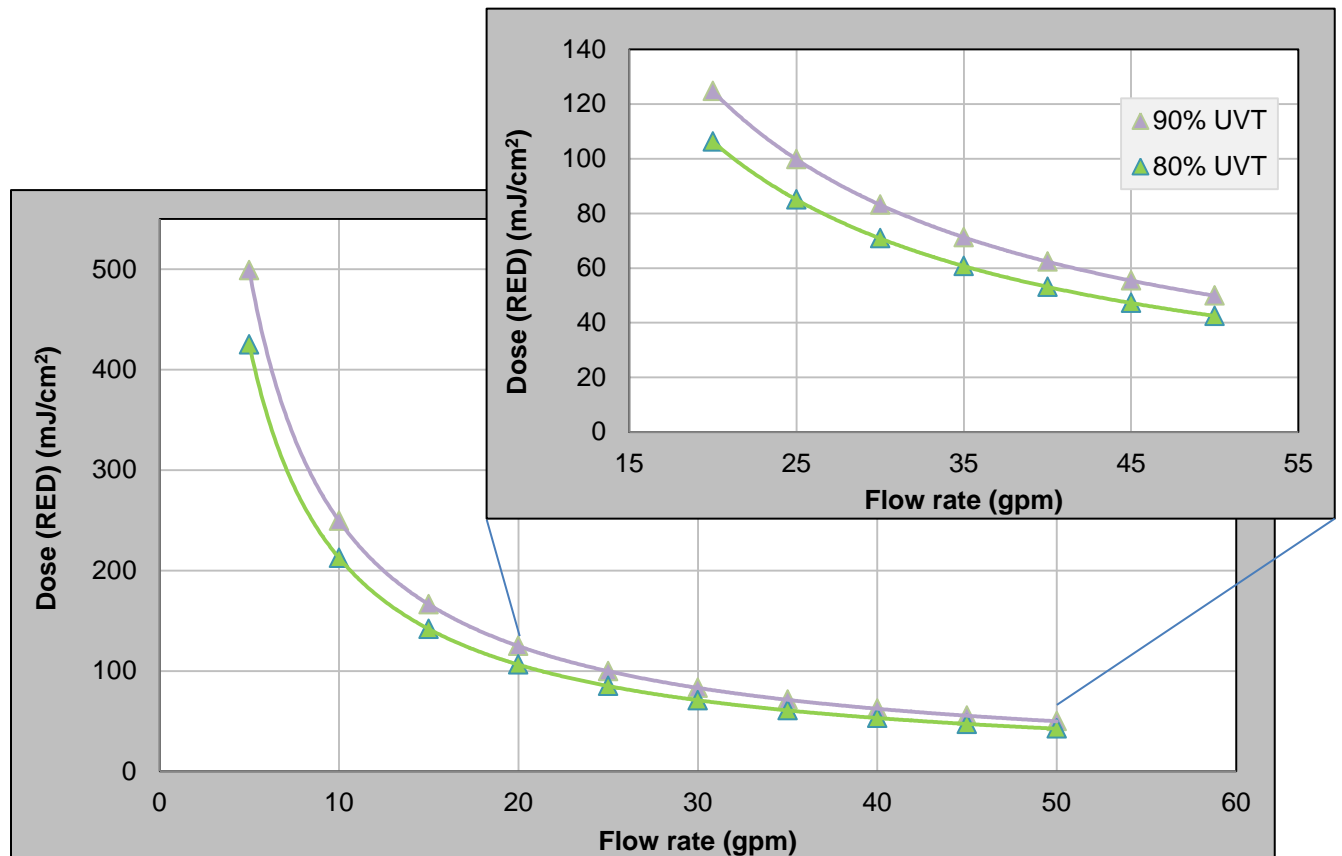




### 3.2 Dose Curves

Flow rate, UVT, and required UV dose conditions dictate which system is appropriate for a given location.

Dose values such as those in the following graph are calculated based on set-points. Set-point conditions are determined by third party verified bioassay testing completed in compliance with the 2006 UV Disinfection Guidance Manual (UVDGM).

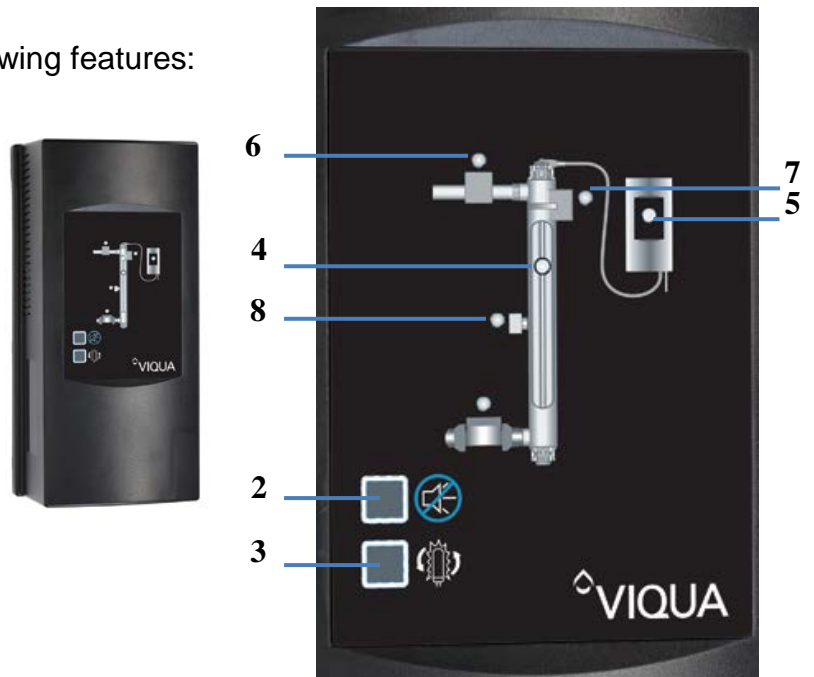


There is no flow restrictor or flow meter available for the PRO50 system; therefore, users may consider employing some external method to measure and control flow to ensure the maximum design flow is not exceeded.

### 3.3 Controller Interface

The controller is equipped with the following features:

1. Audible alarm
2. Audible alarm mute
3. Replacement lamp counter reset
4. Lamp operation indicator
5. Controller operation indicator
6. Solenoid valve operation indicator
7. Fan operation indicator
8. Sensor reading indicator



Controllers will enter audible and visual alarm if the sensor input is too low given an assumed maximum flow of 50 GPM or the maximum flow predicted and set by the user on the CommCenter™. The PRO50 does not monitor or control real time flow rates, this must be controlled externally.

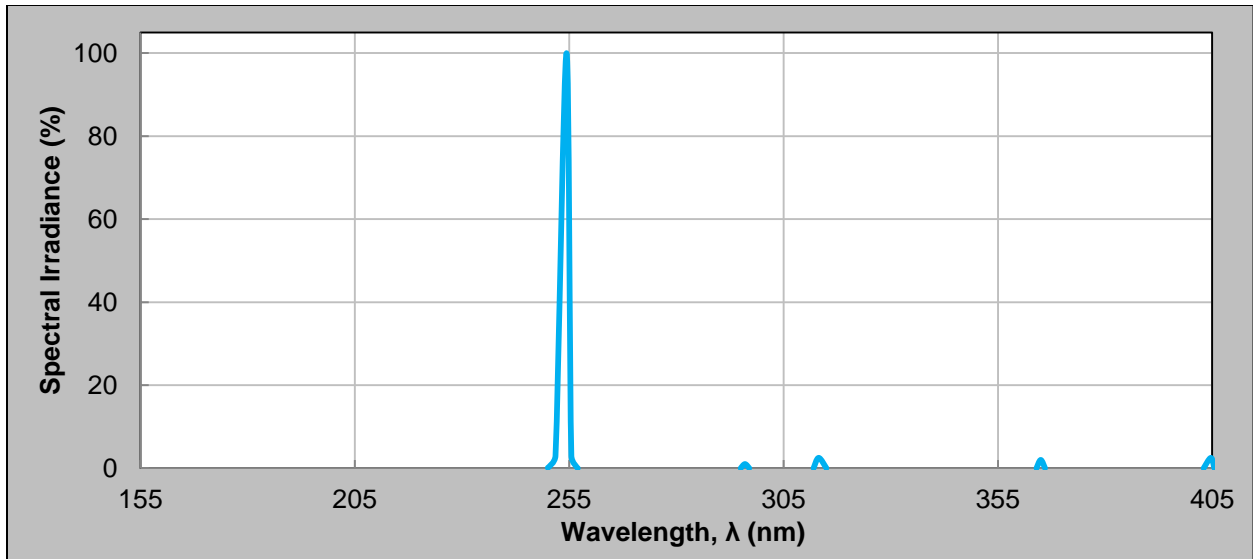
#### Features

- Continuously monitors dose based on assumed flow and measured dose rate
- Communicates minor and major audible alarms when operation falls outside the USEPA UVDGM prescribed operating range
- Auto-ranging
- Constant Current

### 3.4 UV Lamp

#### 3.4.1 Mercury Discharge Lamp Spectral Output

The lamp produces germicidal ultraviolet light (UV-C) at a wavelength of 253.7 nm. The absence of a peak at 185 nm is significant because it means no harmful ozone will be produced. VIQUA's PRO50 system amalgam lamps have a mercury content of less than 15 mg (IMERC registered).



VIQUA's amalgam lamps use a mercury amalgam matrix as opposed to mercury in its pure liquid form. Therefore, the mercury is contained as a secure, solid segment. Additionally, this segment is trapped in a compartment at the bottom of the lamp.



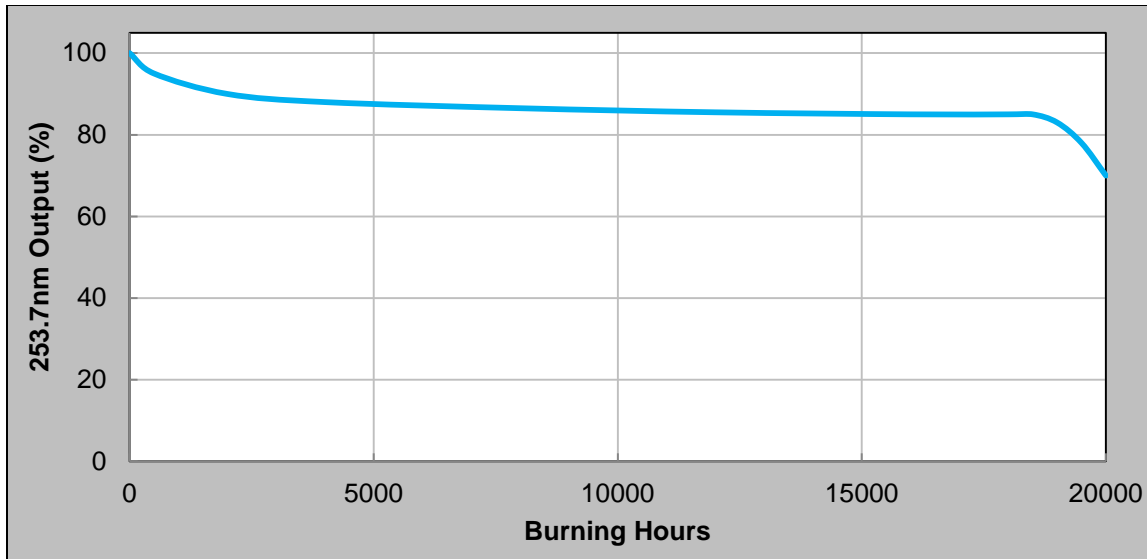
In the case of a broken lamp, this compartment would contain the mercury. Even if this compartment also broke open, the quartz sleeve prevents the mercury from coming in contact with water.

### Features

- All electrical connections made at one end of the lamp
- Lamp base features a diabolic barrier which prevents arcing between pins

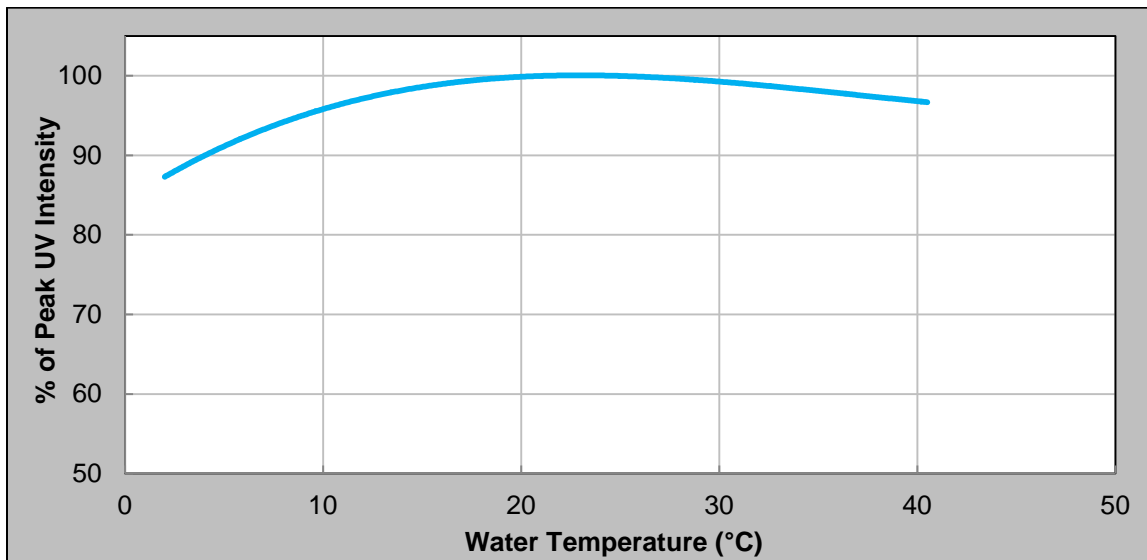
### 3.4.2 Degradation Chart

Amalgam lamps have a useful life of approximately 18,000 hours. They can provide adequate disinfection for up to two years and then require replacement.



### 3.4.3 Temperature Profile

VIQUA's lamps use a mercury amalgam mix to control the vapour pressure and produce a more stable output than conventional standard output lamps.



### 3.4.4 Quartz Sleeve

The UV lamp is enclosed by a quartz sleeve made of GE Type 214 or equivalent clear fused silica quartz. Overtime, mineral deposits will form on the quartz, which inhibit the amount of light that can reach the water. The sleeve must be manually cleaned on a regular basis using a mineral acid such as a calcium, lime, and rust remover.

### 3.5 UV Sensor

Many factors influence a system's level of UV disinfection. Some of these factors include water quality (primarily UVT), lamp output, and quartz sleeve fouling. Rather than base set-points on any one of these factors, alarm set-points are based on the quantity of light that actually reaches the sensor. In this way, the UV sensor detects when the water is no longer being purified properly as a result of change in any factor and sends a 4-20 mA output signal to the controller. VIQUA's UV sensors reliably detect low UV output and identify the need for maintenance.

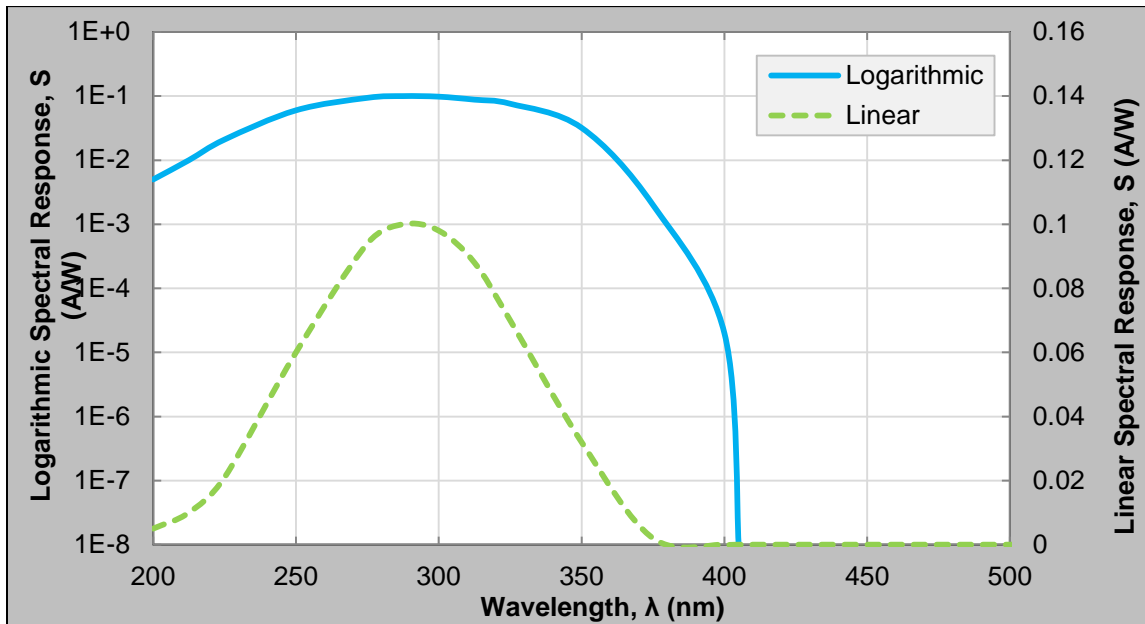


#### Features

- Factory assembled and calibrated
- UV monitored by a silicon carbide photodiode for long term stability

#### 3.5.1 Sensor Response Curve

The sensor's photodiode detects the emitted germicidal 253.7 nm wavelength.



## 3.6 Signals and Remote Capabilities

### 3.6.1 COMMcenter™

The COMMcenter™ provides live monitoring and records past performance. When a Mini-SD card is inserted into the system, information is recorded every minute. A 512 MB Mini-SD card should store 18 years-worth of data. Without the Mini-SD, the COMMcenter™ will store the last 40 alarms that have occurred in memory.



#### Features

- Notifies alarm situations and provides help screens to overcome the problem
- Archives past performance, water quality changes, power failures, alarms, and lamp age.
- RJ45 Ethernet cable connection between COMMcenter™ and controller.
- Equipped with a 2 GB Micro-SD card and Mini-SD adapter.

### 3.6.2 Dry Contacts

The dry contact can be used to signal a remote device in event of the following major alarms:

- Lamp Fault
- Ballast (Controller) Fault
- UV Sensor Fault
- Low UV Fault



#### Connection Logic Chart

Wire	Output Terminal	UV System in Normal Operation	UV System in Major alarm/not powered on
RED	N.O. (Normally Open Contact)	The Electrical path between these contacts are closed	The Electrical path between these contacts are open
BLACK	COM. (Common)		
BLACK	COM. (Common)	The Electrical path between these contacts are open	The Electrical path between these contacts are closed
GREEN	N.C. (Normally Closed Contact)		

### 3.6.3 4-20 mA Interface

An optional 4-20 mA interface allows the user to read the current output by the UV sensor or the flow meter. The interface can be used to send information to other monitoring systems.



## 4.0 CERTIFICATIONS

PRO50 systems are tested and certified to USEPA UVDGM 2006 standards. Additionally, PRO50, K, and K+ systems are tested and certified to UL, CE, RoHS, and Low Lead standards.



## 5.0 WARRANTY

VIQUA warrants the system components to be free from defects in material and workmanship for the time specified in the table below. During this time, VIQUA will repair or replace, at its option, any defective parts covered by the warranty.

<b>Component</b>	<b>Warranty</b>
UV Chamber	ten (10) years from the date of purchase
Electrical (controller) and Hardware Components	five (5) years from the date of purchase
UV Lamps, Sleeves, and UV Sensors	one (1) year from the date of purchase



## VIQUA DECLARATION

VIQUA is a sustainable business that designs and builds industry-leading UV systems. Our products are used worldwide in applications that help improve quality of life.

VIQUA utilizes quality materials and processes to ensure each product meets safety, health and environmental protection requirements. VIQUA's product development process ensures comprehensive product validation and certification.

VIQUA manufactures each UV disinfection system to the highest quality standards. Each system is subjected to rigorous functional testing prior to shipment to guarantee proper operation.

VIQUA is an ISO9001:2008 registered company.

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