VIQUA™
simply safe water

PRO Series



PRO10 **PRO20** **PRO30**

520373-R_RevC

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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 PRO10, PRO20, and PRO30 systems. These PRO products are NSF Standard 55 Class A certified and are ideal for regulated markets and light commercial applications.

1.0 PROJECT & SYSTEM DESCRIPTION

1.1 Project Description

Project Name		Guidelines
Maximum flow rate		10, 20, or 30 GPM
Design dose		40, 80, or 120 mJ/cm^2
Operating pressure		15 psi (103 kPa) - 125 psi (862 kPa)
Ambient air temp.		0°C (32°F) - 40°C (104°F)
Ambient water temp.		2°C (35.6°F) - 40°C (104°F)
Hardness		120 ppm (7 grains / gallon) max.*
Manganese content		0.05 ppm max.*
Iron content		0.3 ppm max.*
UVT		75% min.*

*after pretreatment

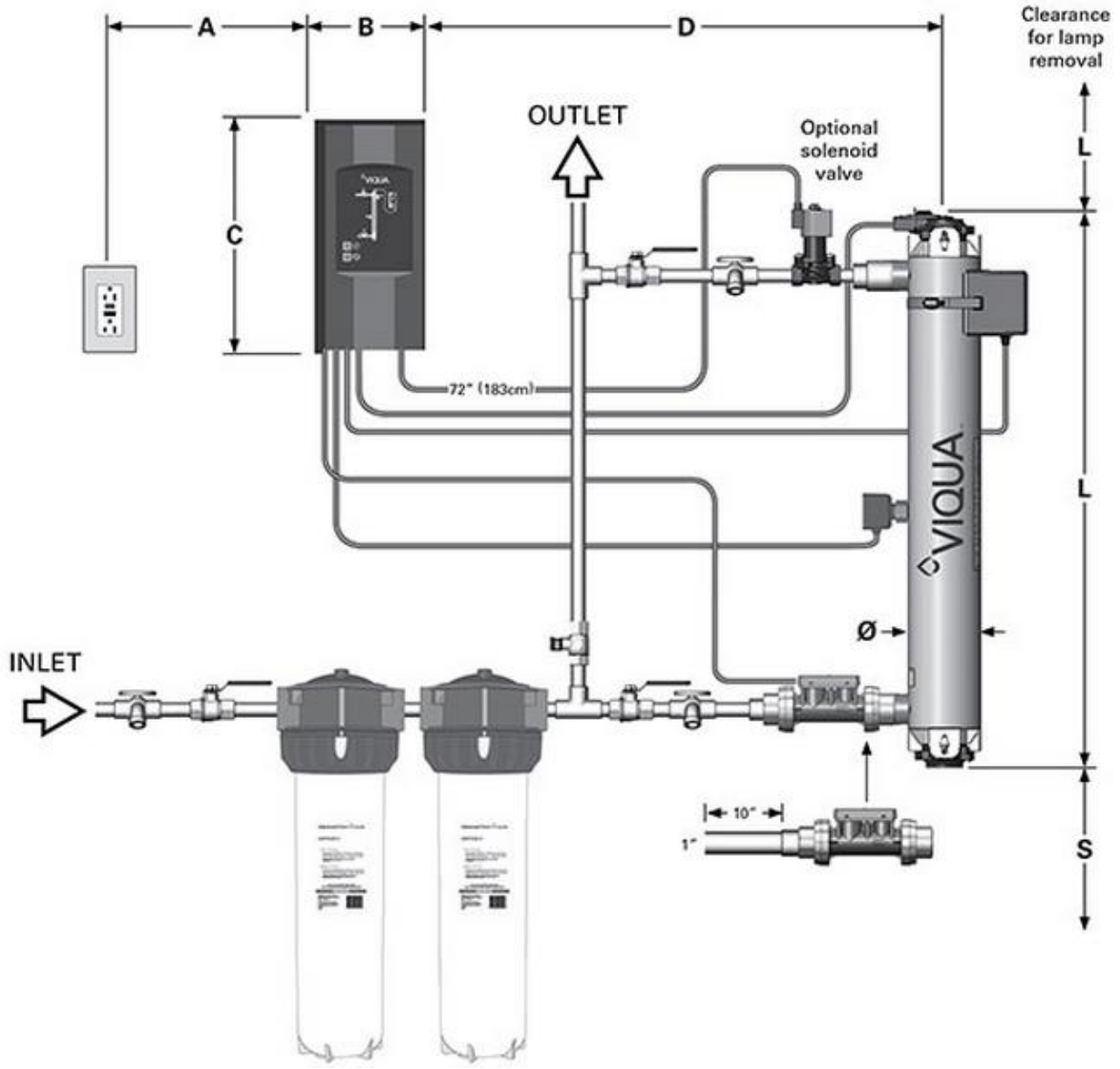
1.2 System Description

Model	PRO10	PRO20	PRO30
Quantity			
Chamber			
Material	316L SST		
Dimensions	21.4” x 4” (55 x 10 cm)	31” x 4” (78 x 10 cm)	41” x 4” (103 x 10 cm)
Inlet & outlet ports	Combo 1-1/4" MNPT, 1" FNPT		
UL Certified burst pressure	300 psi (2.067 MPa)		
Orientation	Vertical		
Integrated flow restrictor	10 GPM (38 lpm) max.	20 GPM (76 lpm) max.	30 GPM (113 lpm) max.
Electrical			
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	2.5 Amps	2.5 Amps
Max. power consumption	120 Watts	160 Watts	230 Watts
Lamp power	100 Watts	140 Watts	200 Watts

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

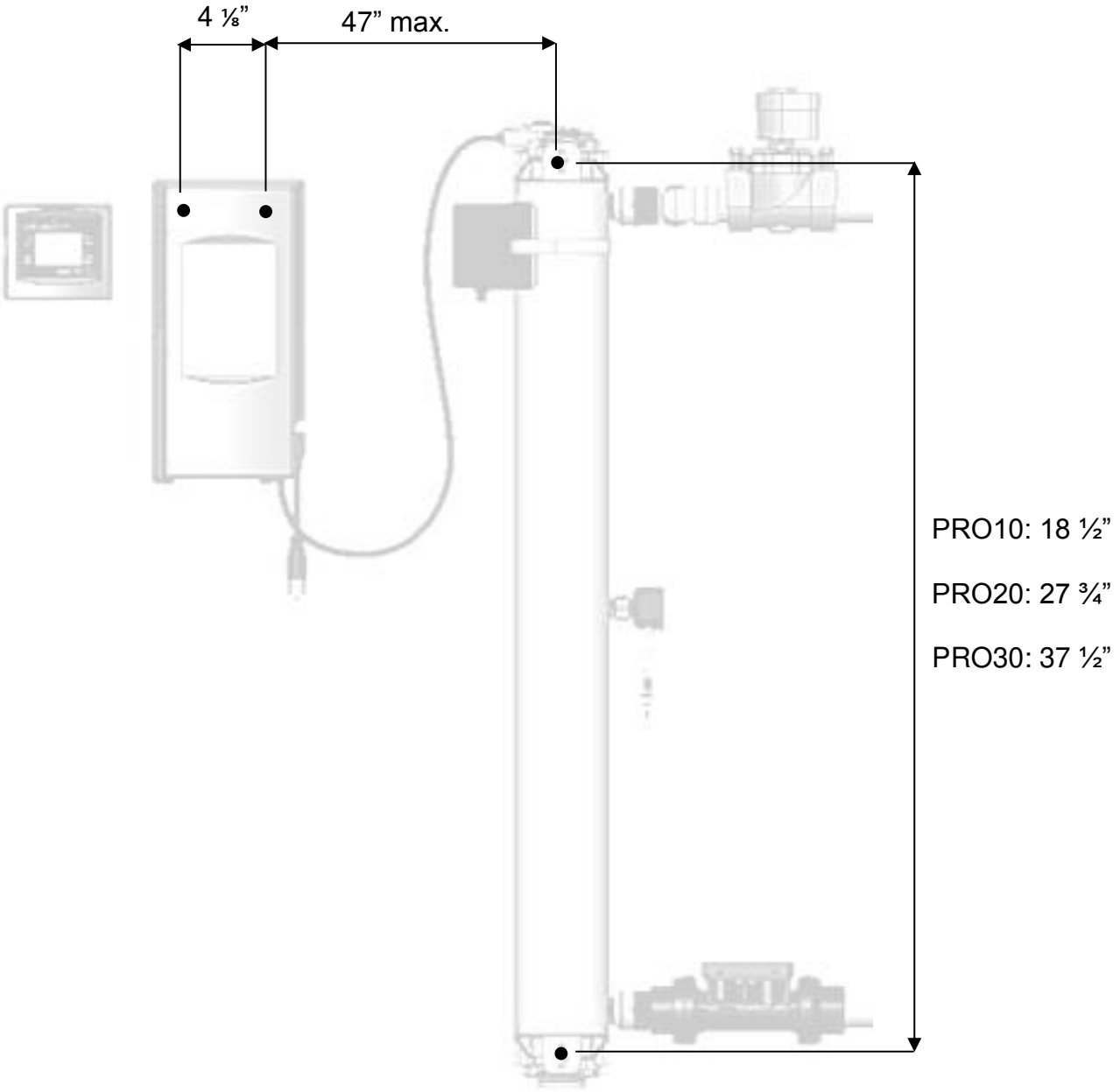
2.0 PRODUCT DRAWINGS

2.1 Install Diagram

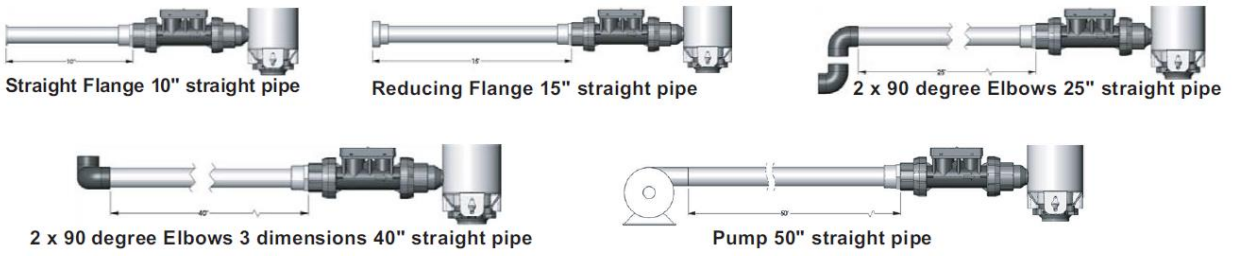


Item	L	S (min.)	Ø	A (max.)	B	C	D (max.)
PRO10	21.4" (55 cm)	12" (30 cm)	4" (10 cm)	72" (182 cm)	6.5" (16.5 cm)	13" (33 cm)	48" (122 cm)
PRO20	31" (78 cm)	12" (30 cm)	4" (10 cm)	72" (182 cm)	6.5" (16.5 cm)	13" (33 cm)	48" (122 cm)
PRO30	41" (103 cm)	12" (30 cm)	4" (10 cm)	72" (182 cm)	6.5" (16.5 cm)	13" (33 cm)	48" (122 cm)

2.2 Mounting Diagram

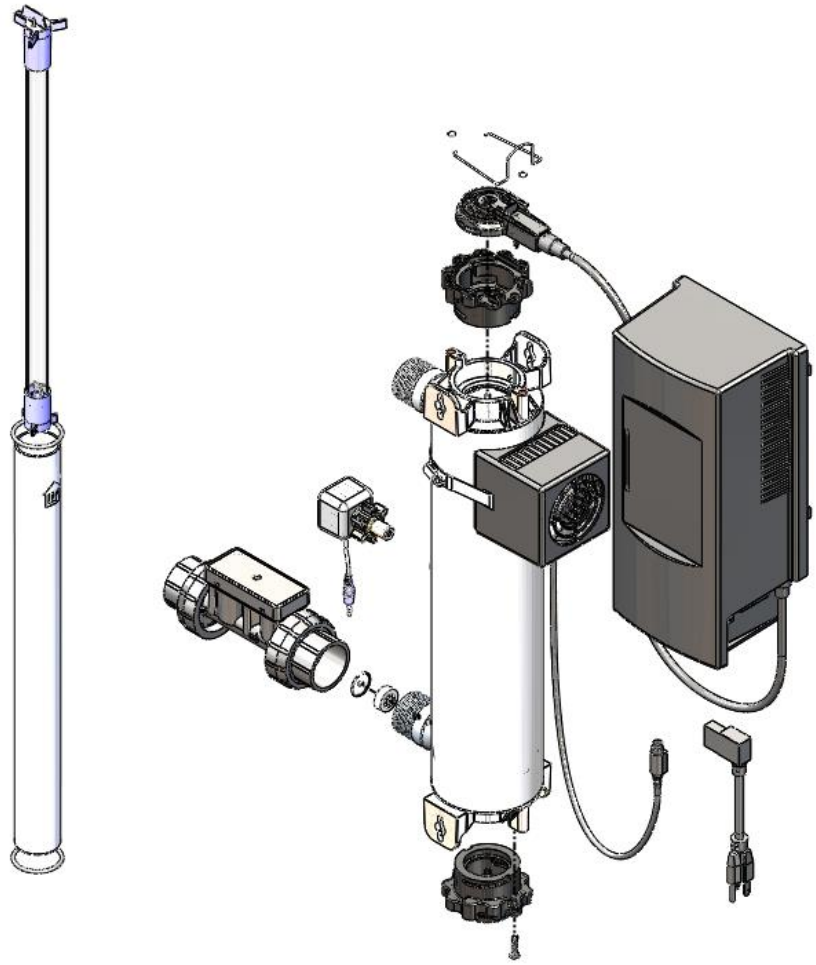


2.3 Flow Meter Installation Option



Note: *Flow Meter Sensor must be mounted in the following orientation with the LED facing up. Ensure all air is purged from the piping and Flow Meter Sensor. All straight length to the Flow Meter Sensor must be 1.00" in diameter.*

2.4 Exploded View

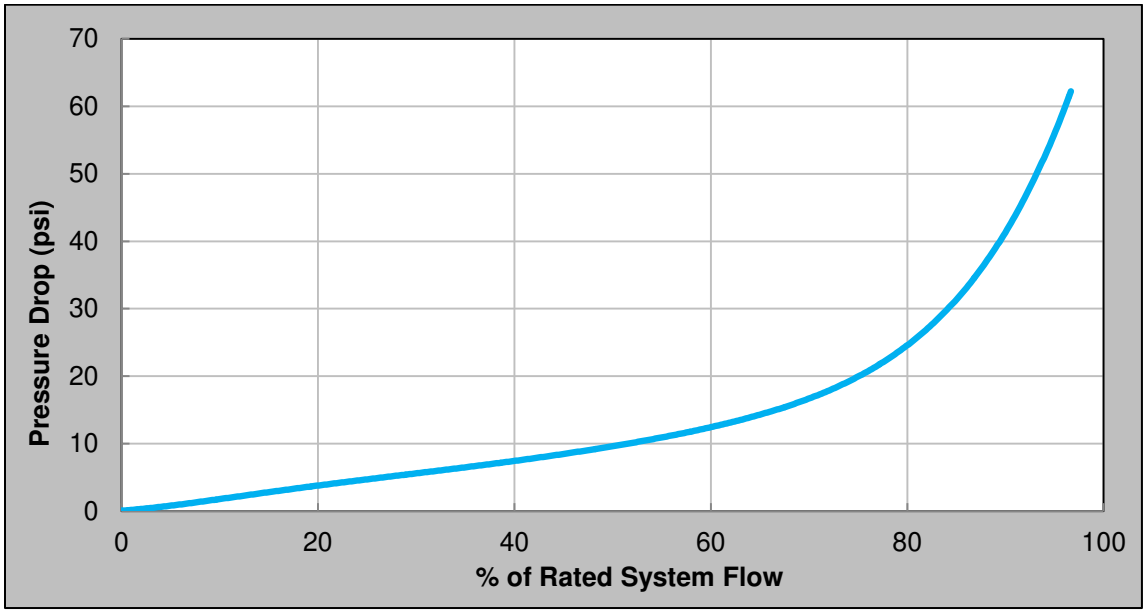


Refer to .pdf and .step files for engineering drawings and part numbers.

3.0 SYSTEM OVERVIEW

3.1 Pressure Drop

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

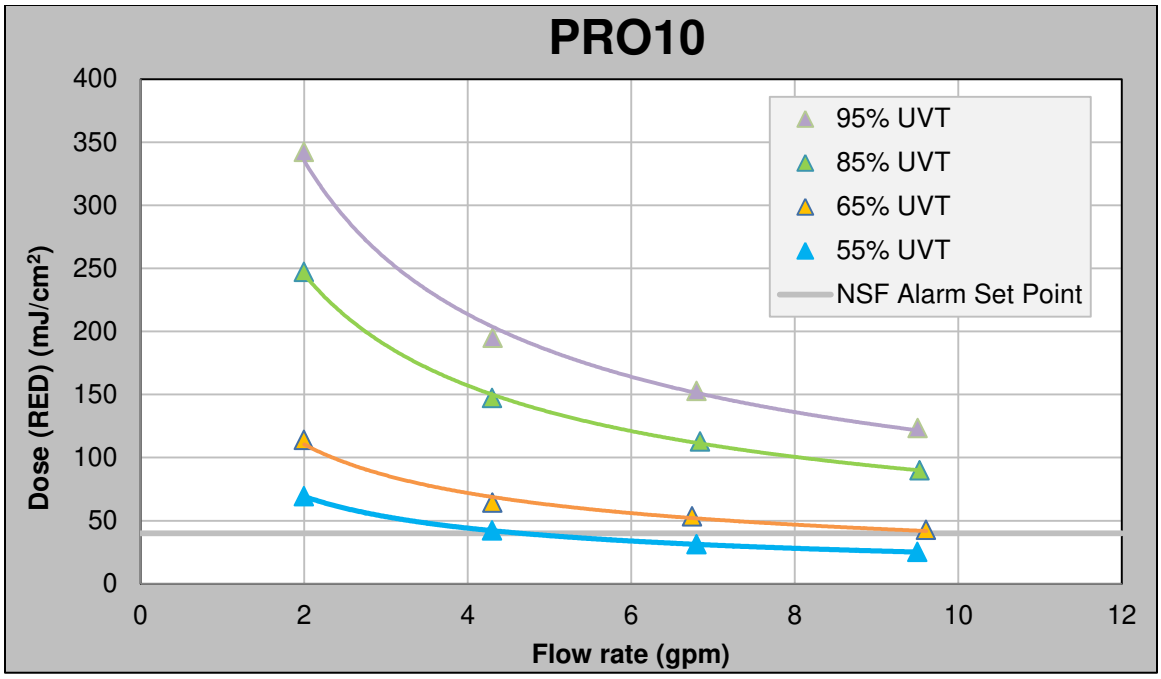


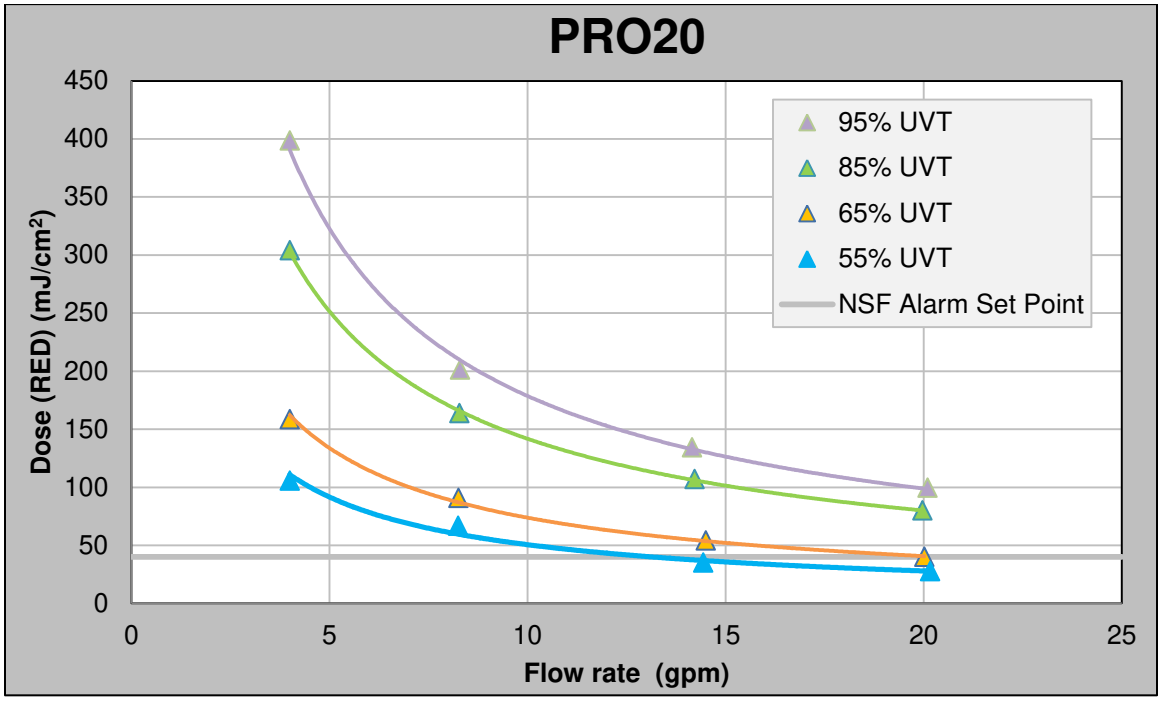
3.2 Dose Curves

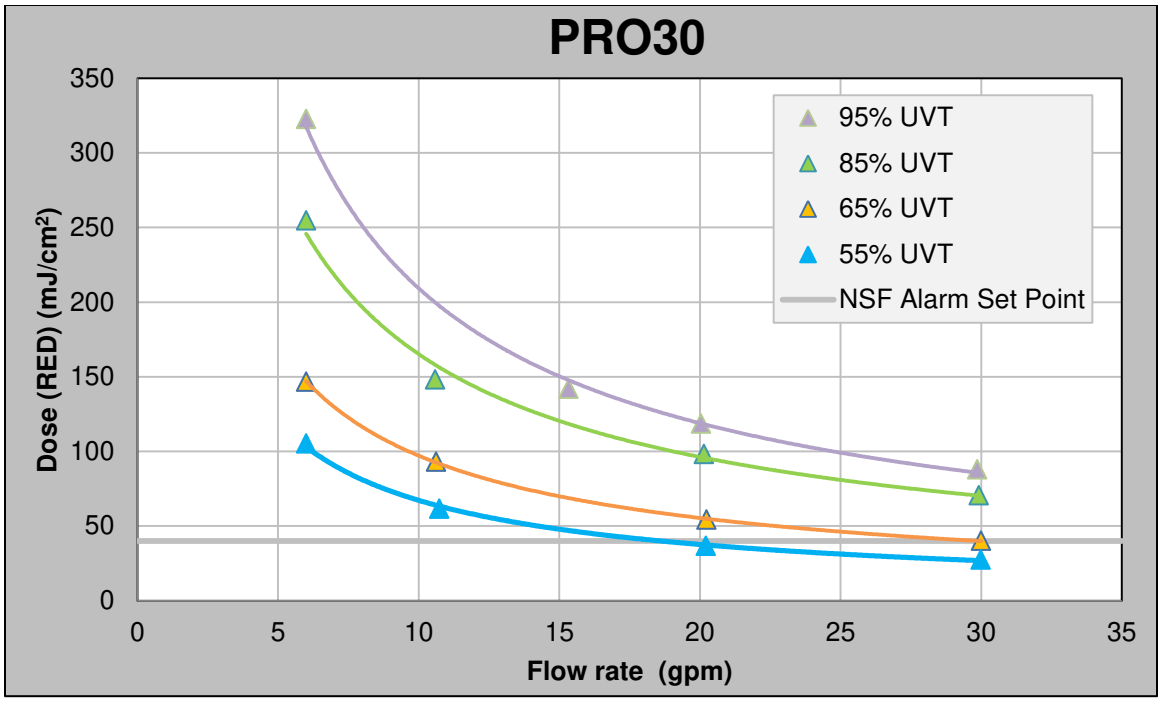
Flow rate, UVT, and required UV dose conditions dictate which system is appropriate for a given location.

Dose values such as those in the following graphs 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).

Each of the PRO systems has a unique flow restrictor to limit flow rates to 10, 20, and 30 GPM for the PRO10, PRO20, and PRO30 systems respectively. These restrictors are found in the inlet port of the chamber and physically inhibit flow rates from exceeding maximum design flow.


PRO10
Dose (RED) (mJ/cm²)
400
350
300
250
200
150
100
50
0
0
2
4
6
8
10
12
Flow rate (gpm)
95% UVT
85% UVT
65% UVT
55% UVT
NSF Alarm Set Point

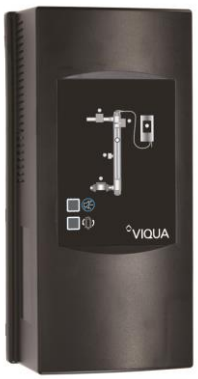

PRO20
Dose (RED) (mJ/cm²)
450
400
350
300
250
200
150
100
50
0
0
5
10
15
20
25
Flow rate (gpm)
95% UVT
85% UVT
65% UVT
55% UVT
NSF Alarm Set Point

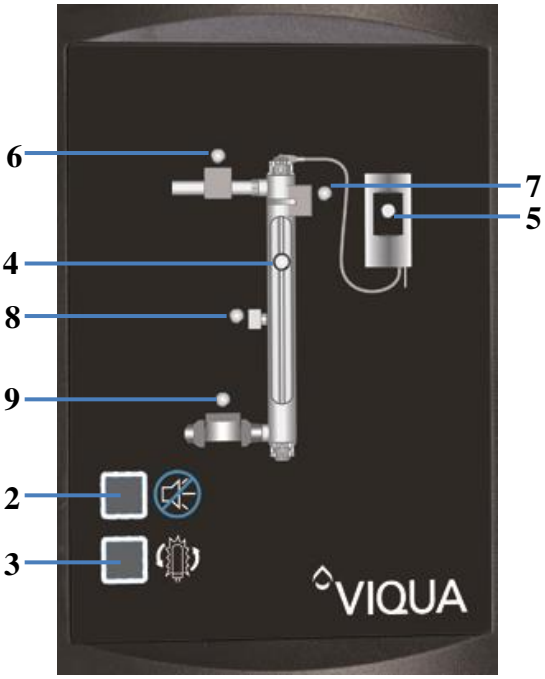


3.3 Controller Interface

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
9. Flow meter operation indicator





Firmware in the controllers monitors flow rate and sensor input for set point conditions. Controllers will enter audible and visual alarm if the sensor input is too low given the measured flow rate. Set points depend on the Adjustable Alarm Set Points (sec. 3.7.3).

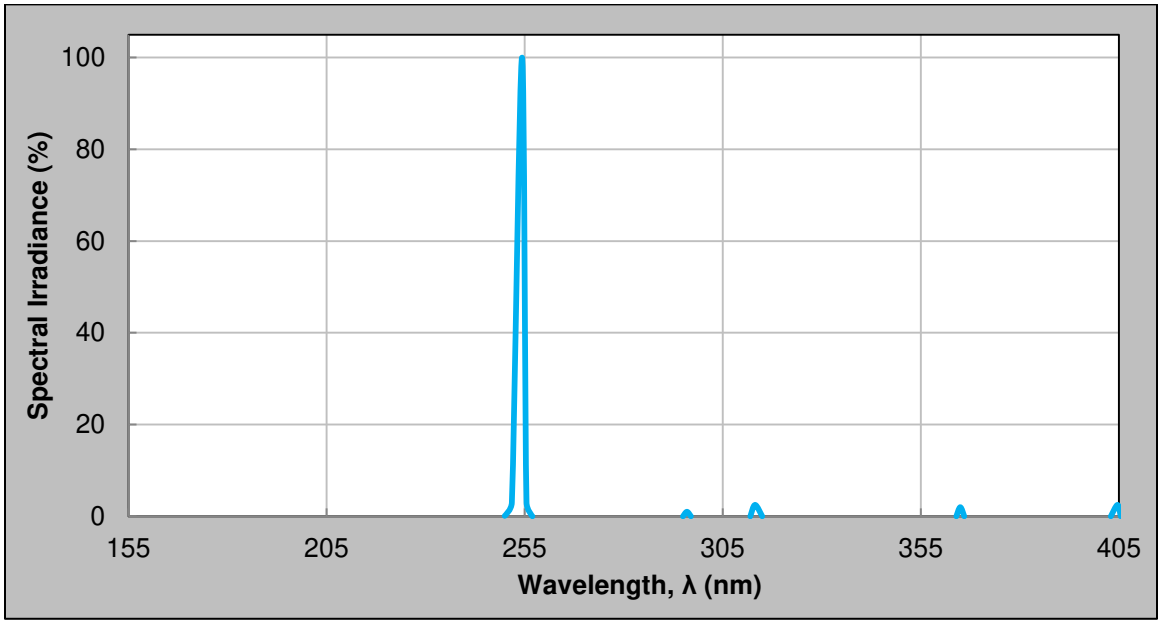
Features

- Continuously monitors and controls the system.
- Communicates minor and major audible alarms when conditions fall outside the NSF Standard 55 Class A 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 PRO 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 flowing through the chamber.

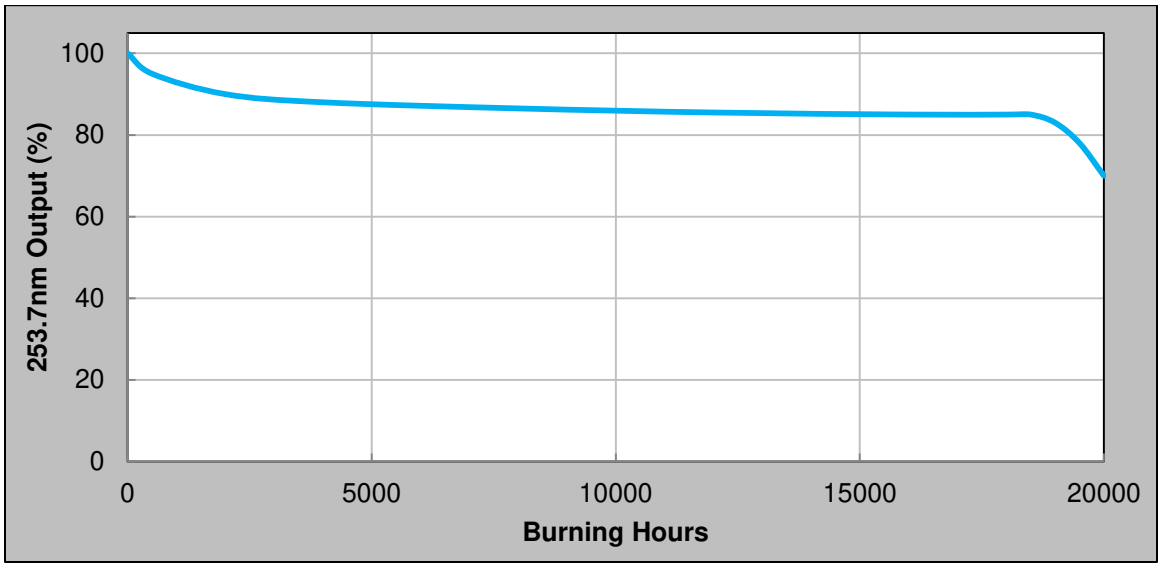


Features

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

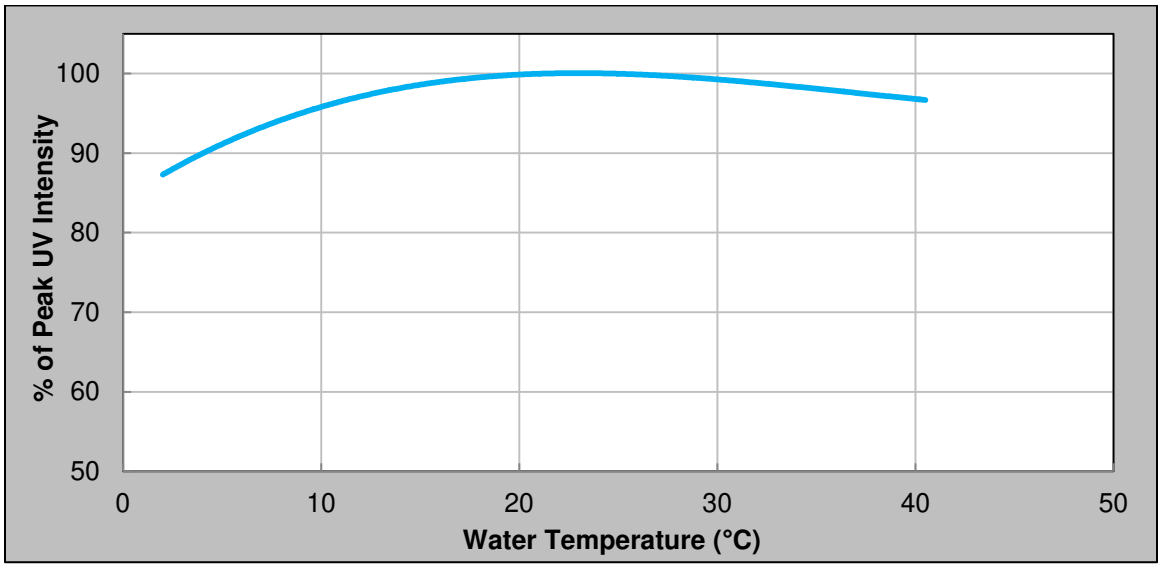
3.4.2 Degradation Chart

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.

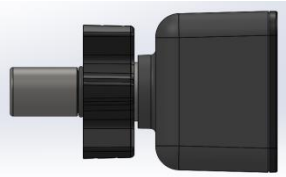


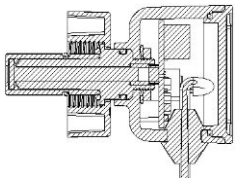
3.4.4 Quartz Sleeve

The UV lamp is enclosed by a quartz sleeve made of GE Type 214 or equivalent clear fused silica quartz.
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

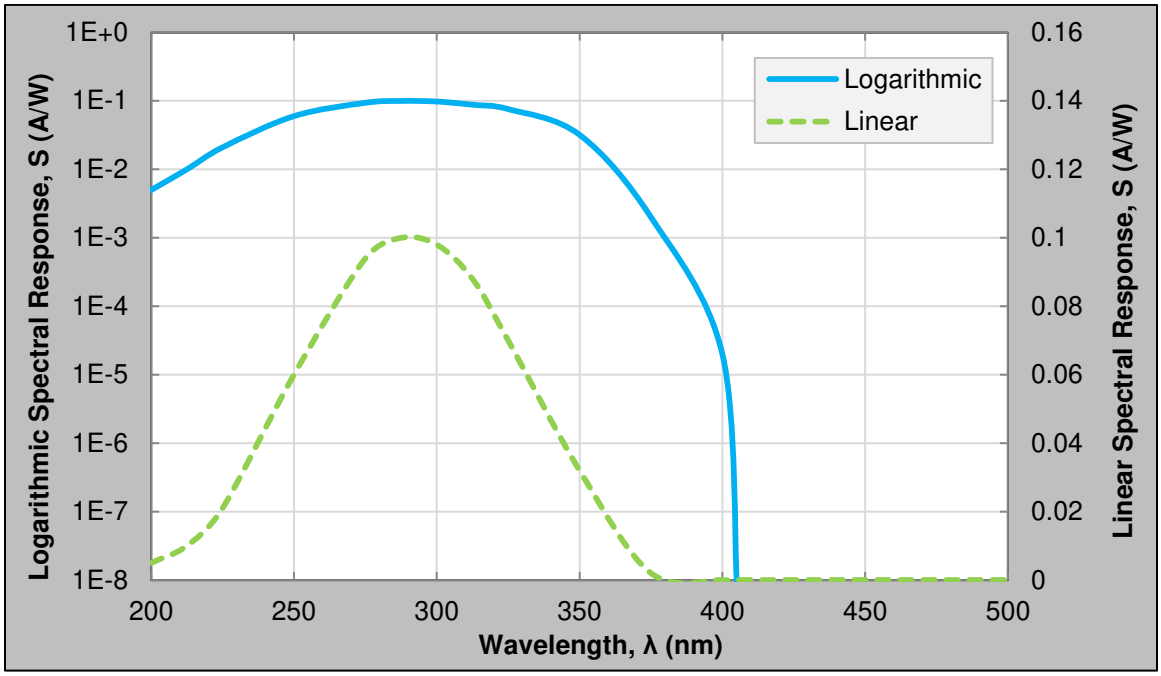
Many factors influence a system's level of UV disinfection. Some of these factors include water quality (primarily UVT), lamp output, and quartz sleeve fouling. Rather than base set-points on any one of these factors, alarm set-points are based on the quantity of light that actually reaches the sensor.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





3.5.1 Sensor Response Curve

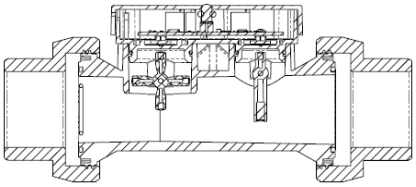
The sensor's photodiode detects the emitted germicidal 253.7 nm wavelength.



3.6 Flow meter

The flow meter measures the flow rate of water passing through the UV systems. The flow meter utilizes a paddle wheel and a flow detect arm to ensure reliable measurements.





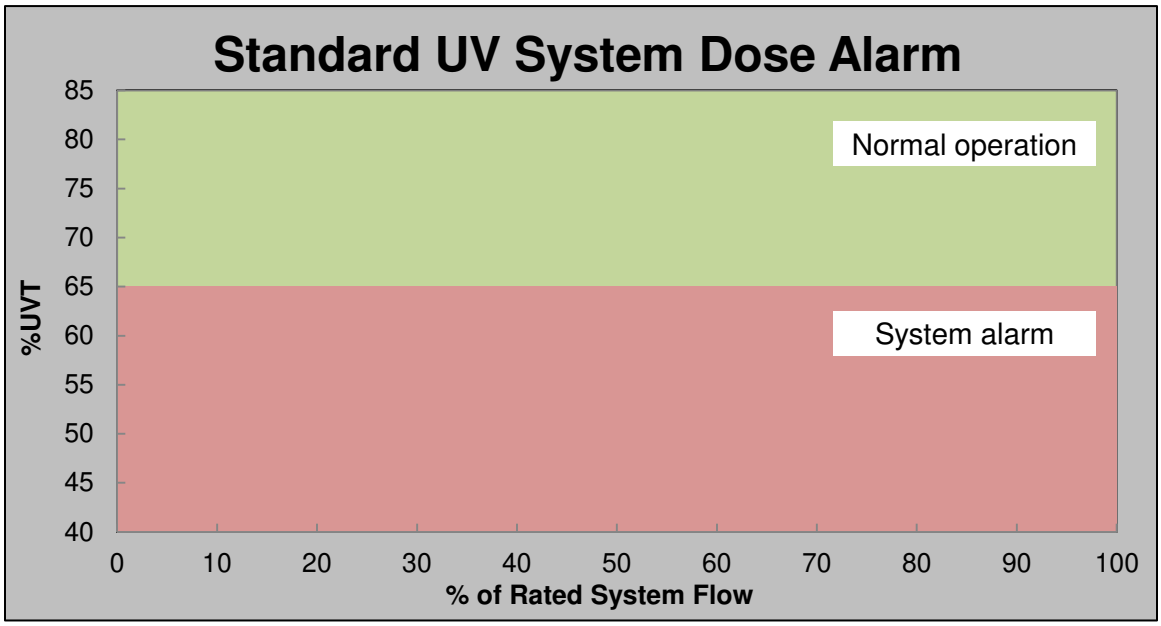
3.7 Product Features and Benefits

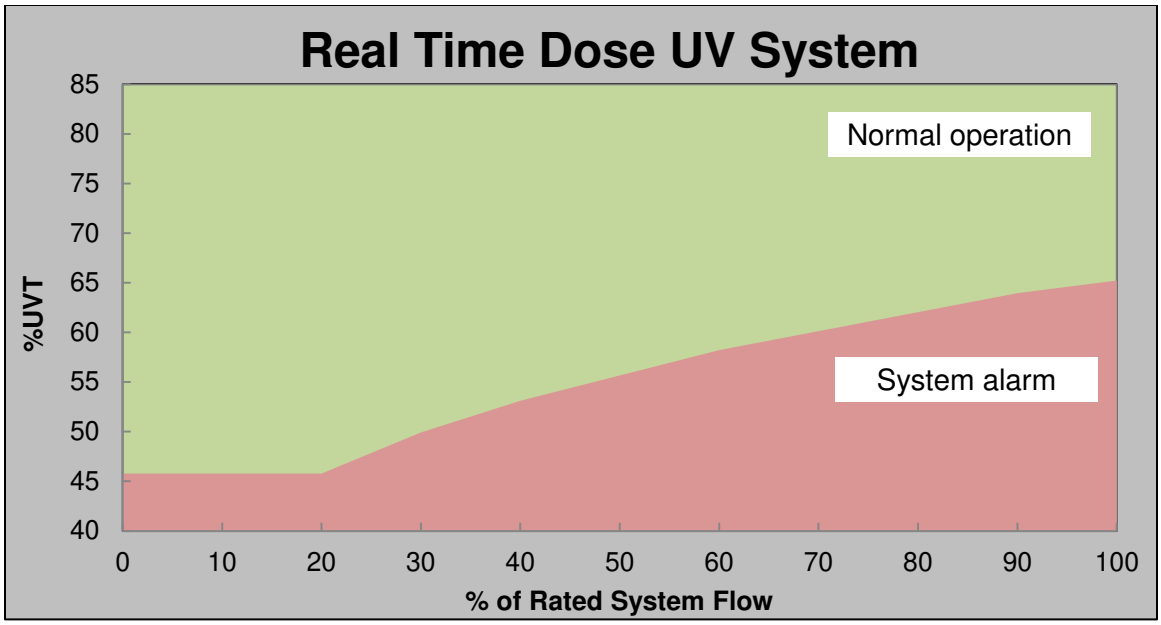
3.7.1 Real-Time UV Dose Monitoring

VIQUA's PRO systems come equipped with real-time UV dose monitoring which utilizes data from both the flow meter and the UV sensor.

Benefits

- More accurate assessment of true operating conditions.
- More time between maintenance.
- Lower probability of false alarms.



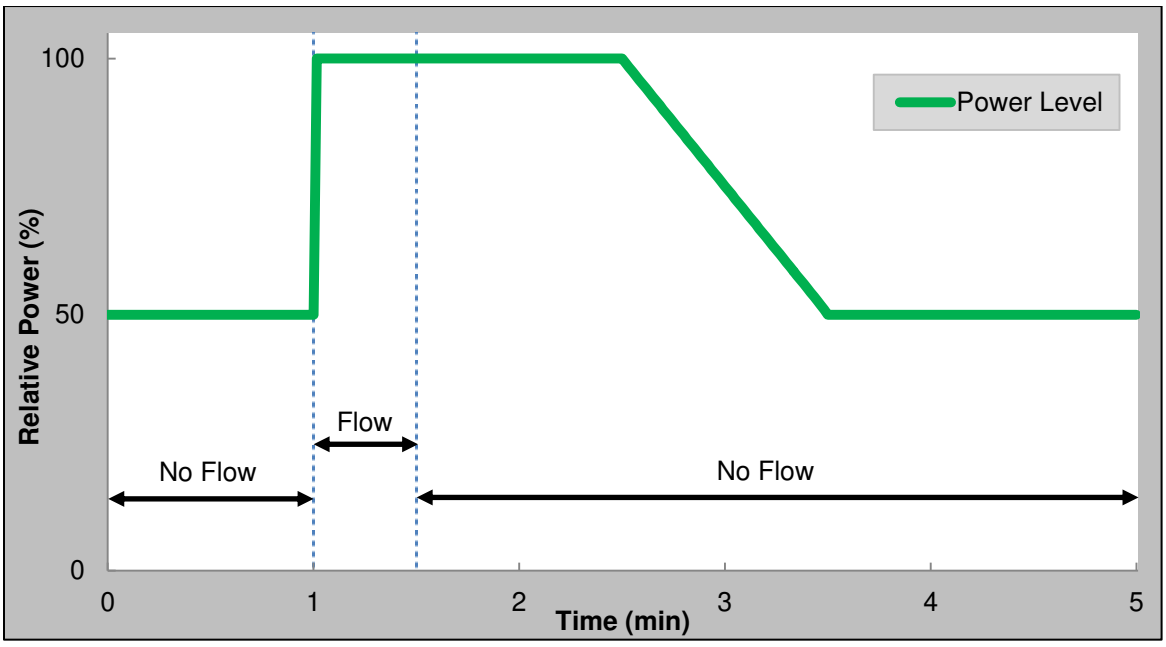


3.7.2 LightWise™ Technology

VIQUA's new LightWise™ technology allows the system's electronic controller to automatically reduce lamp power during periods of no water flow. The dimming capability ultimately reduces the rate of sleeve fouling.

Benefits

- Lower maintenance; up to 60% less maintenance.
- Lower energy consumption; estimated savings of 30%.
- Lower operating temperature; maintained below 40°C in typical no flow conditions.
- Increased electrical efficiency minimizes carbon footprint.



3.7.3 Adjustable Alarm Set Points

The PRO10, PRO20, and PRO30 systems are all capable of programmable low UV dose alarm set points of 40, 80, or 120 mJ/cm^2. After detecting a low UV dose, a visual and audible alarm will sound within the allowable response time (the time it takes for three void volumes to pass through the system, plus 3 seconds), as per NSF Standard 55 Class A protocol.

System	Dose Selection (mJ/cm^2)		
	40	80	120
PRO10	✓	✓	✓
PRO20	✓	✓	✓
PRO30	✓	✓	✓

Benefits

- Allows for system compliance with regional regulations.
- Ability to tailor low UV alarm set point to custom application.
- Reliable system response time to alarm situations.
- Visual and audible alarm activation.

3.8 Signals and Remote Capabilities

3.8.1 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 information. Without the Mini-SD, the COMMcenter™ will store the last 40 alarms that have occurred in memory.

Features

- Displays real-time dose measurements.
- 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.
- 8 GB Micro-SD card and Mini-SD adapter kit (270302-R) sold separately.

3.8.2 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)		
	COM. (Common)	The Electrical path between these contacts are open	The Electrical path between these contacts are closed
GREEN	N.C. (Normally Closed Contact)		

3.8.3 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

All PRO systems are tested and certified to NSF Standard 55 Class A, UL, CE, RoHS, and Low Lead standards.

NSF C US
System Tested and Certified by NSF International against CSA B483.1 and NSF/ANSI 55 for Disinfection Performance, Class A

c UL US LISTED

CE

RoHS COMPLIANT

Pb Pb-Free

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.

Component	Warranty
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 QUALITY PRINCIPLES

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 by disinfecting water using UV.

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

VIQUA manufactures each UV disinfection system to very high quality standards. Each system is subjected to rigorous functional testing prior to shipment.

VIQUA is an ISO9001:2015 registered company.

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