

A photograph of a Trojan UV3000 disinfection unit, showing multiple parallel UV tubes and electrical connections. The image is partially covered by a red overlay.

TROJANUV3000™B

# Wastewater Disinfection

TROJAN ™

 Water  
Confidence™

# TROJAN UV3000™ B

Robust, operator-friendly solutions designed for economical disinfection

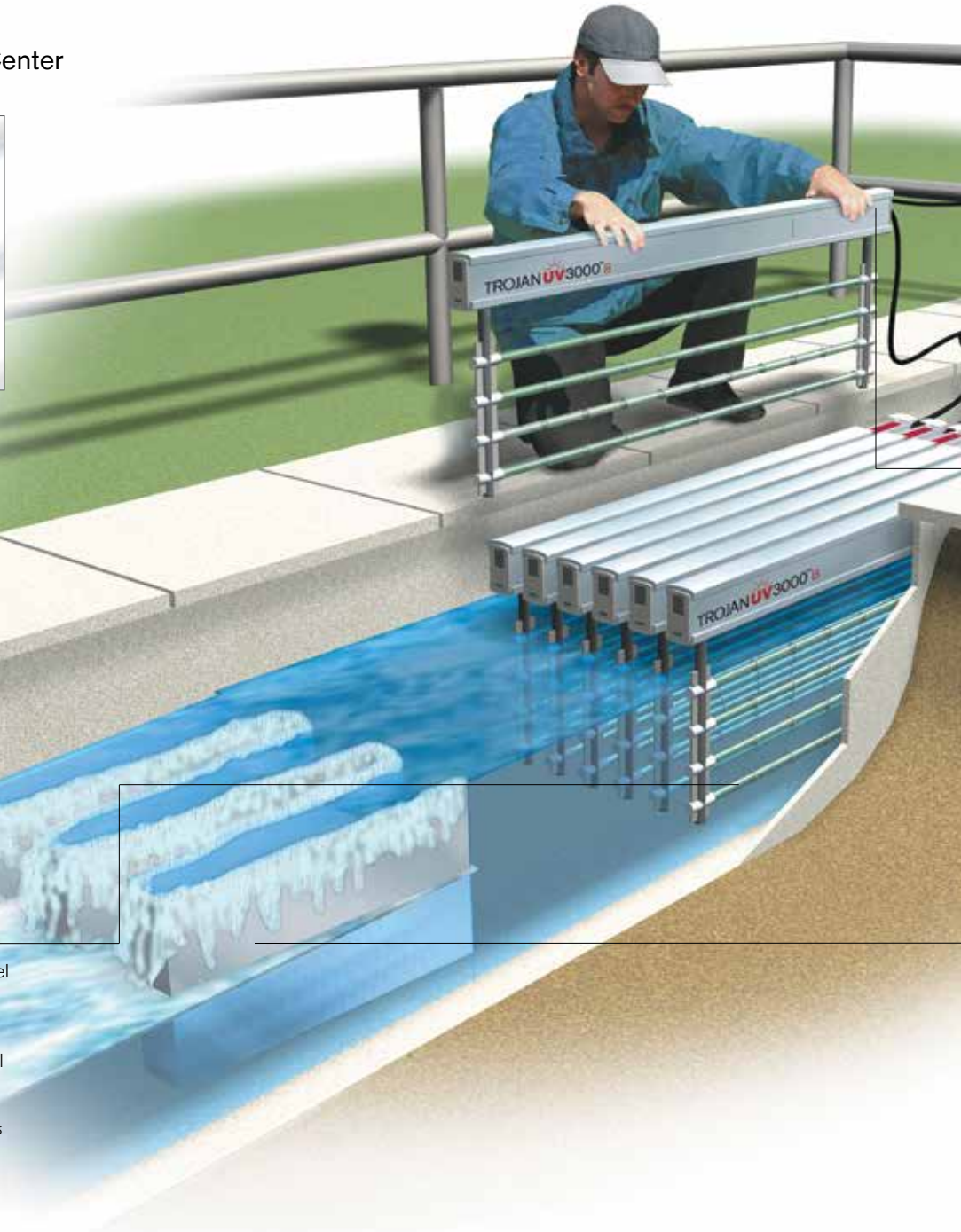
## System Monitor/Control Center



The System Control Center takes a signal from a submersible UV sensor, and provides digital output of UV intensity from each bank. Elapsed time display provides continuous readout of actual hours of operation (lamp hours).

## UV Modules

UV lamps are mounted on stainless steel frames. Lamps are enclosed in quartz sleeves and submerged horizontally and parallel to water flow. A bank is made up of multiple modules placed in parallel positions. All wiring, from ballasts to lamps, runs inside the module frame. A display showing individual lamp status is provided on top of each module.





## Power Distribution

The Power Distribution Center (PDC) is constructed of stainless steel and is mounted across the channel. The PDC distributes power to individual modules and allows electrical isolation of each module for easy service.

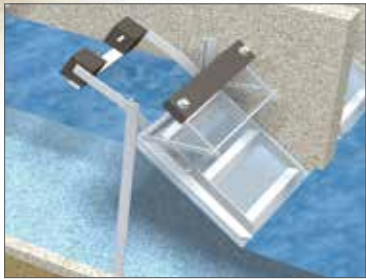


## Electronic Ballast



The electronic ballast is mounted within its own Type 6P (IP67)-rated watertight enclosure within the module frame and is cooled by convection.

## Water Level Control



Available with a fixed weir or Automatic Level Control (ALC) gate in the channel to maintain the appropriate water level over the lamps. Engineers will work with you to select the appropriate level control device for your application.



The System Control Center (SCC) provides control of all UV functions, tracks lamp hours, and uses a submersible UV sensor (one per bank) to monitor UV intensity. The SCC is capable of flow pacing – automatically turning banks of UV lamps off or on in response to changes in the flow rate in order to conserve power and prolong lamp life.



The optional Touch Smart controller provides more sophisticated controls over the basic controller adding the ability to control up to two channels with three banks in each, SCADA communications, data logging, redundant bank logic and remote on/off signal in addition to the standard basic controller features.

# Simple, Dependable UV Solutions

Proven, chemical-free disinfection from the industry leader

TROJAN **UV**3000™**B**

UV is the most effective, safe and environmentally friendly way to disinfect wastewater. It provides broad-spectrum protection against a wide range of pathogens, including bacteria, viruses and chlorine-resistant protozoa (such as *Cryptosporidium* and *Giardia*).

The TrojanUV3000™B is an example of a simple, robust and operator-friendly UV system used for the disinfection of wastewater. This highly flexible system has demonstrated effective and reliable performance around the world. The TrojanUV3000B offers increased capacity and is available with a controller that enables flow pacing to maximize operating efficiency and extend lamp life. The system turns UV lamp banks on and off automatically to ensure the required dose is met using the fewest lamps and least electricity.

The proven infrastructure of the TrojanUV3000B has been continuously refined to enhance friendly operation.



## Key Benefits

### TrojanUV3000B

**Increased operator, community and environmental safety.** Uses environmentally friendly ultraviolet light – the safest alternative for wastewater disinfection. No disinfection by-products are created and no chlorine compounds are transported, stored or handled by plant staff.

**Proven disinfection.** Based on actual dose delivery testing (bioassay validation). Verified field performance data eliminates sizing assumptions resulting from theoretical dose calculations.

**Reduced engineering and installation costs.** The system can be easily retrofitted into existing chlorine contact tanks and effluent channels, and comes pre-tested, pre-assembled and pre-wired to minimize installation costs.

**Designed for simplicity and reliability.** Systems are straightforward to operate and require minimal operator involvement, thanks to modular design and robust components.

**Operator-friendly maintenance.** Our lamps are guaranteed for 12,000 hours of operation and can be replaced without tools in less than three minutes per lamp. Modules are electrically separate, allowing a single module to be removed without disrupting flow or taking the system offline.

**Outdoor installation flexibility.** All components can be installed outdoors, eliminating the need and costs of a building, shelter and air conditioning for ballast cooling.

**Well suited to changing regulations.** Our systems do not have any negative impact on receiving waters, making them strategically sound choice for long-term treatment as regulations continue to become increasingly stringent.

**Guaranteed performance and comprehensive warranty.** Our systems include a Lifetime Disinfection Performance Guarantee.

# Advanced, Self-Contained UV Modules

Compact footprint simplifies installation and eliminates air conditioning costs

## Benefits:

- Space-saving, electronic ballasts are housed in the modules to minimize footprint size, installation time and costs
- Convection cooling of the ballasts eliminates costs associated with air conditioning or forced-air cooling
- Lamps are protected in a fully-submersible, Type 316 stainless steel frame
- All wiring and cables are safely enclosed inside the waterproof module frame – fully protecting them from effluent and UV light
- Modules are electrically separated from each other, allowing them to be individually removed for maintenance and spare modules quickly inserted to maintain maximum performance



*The advanced, self-contained modules incorporate convection-cooled ballasts and feature a UV lamp status indicator (below) for at-a-glance confirmation that all lamps are operating.*

- Streamlined modules minimize head loss and prevent buildup of debris on the lamps
- All module wiring is pre-installed and factory-tested



## Innovative Ballasts and Enclosures Provide Significant Advantages

|                               |  |
|-------------------------------|--|
| Module-mounted Ballasts       | <ul style="list-style-type: none"><li>▪ Take up less space and reduce footprint, minimizing installation time and costs</li></ul>  |
| Convection Cooling            | <ul style="list-style-type: none"><li>▪ Housing the ballasts in the module allows for natural convection cooling to dissipate the heat of the ballasts into the air</li><li>▪ The ballasts are kept sealed and protected</li><li>▪ No air conditioning or forced-air cooling required</li></ul>                                      |
| Clean, Water-tight Protection | <ul style="list-style-type: none"><li>▪ Some suppliers use external cabinets with forced-air cooling. This introduces dust and moisture onto circuit boards and other electronic components, greatly reducing the life of these components</li><li>▪ Internal housing in sealed modules keeps all components dry and clean</li></ul> |
| Internal Cabling              | <ul style="list-style-type: none"><li>▪ All lamp/ballast wiring is contained within the module frame. This configuration protects wires and cables from exposure to effluent, debris fouling and UV light</li><li>▪ Internal cabling allows all electrical connections within the module to be factory-tested</li></ul>              |

## Proven Performance, Components and Design

Validated through regulatory-endorsed bioassay testing

### Benefits:

- Performance data is generated from actual field testing (bioassay validation) over a range of flow rates, effluent qualities and UV transmittances
- Provides regulatory-endorsed physical verification that systems will perform as expected – ensuring public and environmental safety
- Most accurate assessment of system sizing needs
- Low-pressure lamps and ballasts have proven their outstanding reliability in thousands of installations
- Open-channel design allows cost-effective installation into existing effluent channels & chlorine contact basins
- Systems can be installed outdoors to reduce building capital costs
- Modular design is scalable for precise sizing, and expandable to meet new regulatory or capacity requirements



*Gravity-fed, open channel design delivers cost savings at installation through simple retrofits into existing effluent channels and chlorine contact tanks. Rugged, proven components make operation and maintenance extremely cost effective.*

## Designed & Built for Easy Maintenance

User-friendly design requires minimal service and operator involvement

### Benefits:

- Lamps are warranted for 12,000 hours
- Routine maintenance can be scheduled and completed without disrupting disinfection
- Replacement of UV lamps can be completed without tools and requires less than three minutes per lamp



*Lightweight, self-contained modules are operator-friendly and make routine maintenance quick and easy. Modules can be individually removed for periodic sleeve cleaning and lamp replacement after 12,000 hours. An optional, mobile cleaning rack simplifies maintenance procedures.*

## Flow Pacing Reduces O&M Costs

TrojanUV3000B system controller offers flow-pacing for increased operating efficiency

### Benefits:

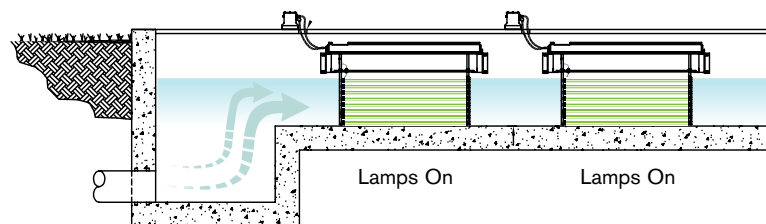
- The System Control Center (SCC) provides monitoring and control of all UV functions
- The SCC provides digital display of bank status, lamp hours, and UV intensity ( $\text{mW}/\text{cm}^2$ )
- The SCC allows the system to be flow paced – meaning the UV lamps of individual banks are turned on and off automatically in response to variations in flow rate (based on a flow meter signal)
- Flow pacing maximizes operating efficiency by matching UV output to disinfection requirements, and reducing electrical consumption during periods of low flow by turning lamps off (Figures 1 & 2)
- Flow pacing also increases the operating life of UV lamps, thereby reducing the frequency, expense and labor required for lamp replacement



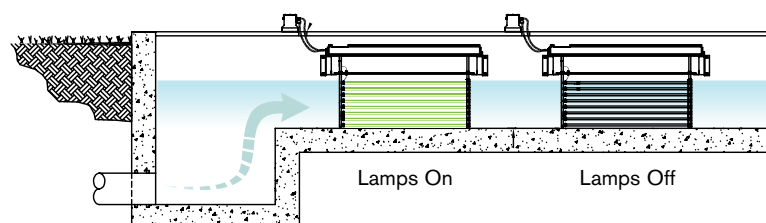
The optional Touch Smart controller provides more sophisticated controls over the basic controller adding the ability to control up to 2 channels with 3 banks in each, SCADA communications, data logging, redundant bank logic and remote on/off signal in addition to the standard basic controller features.

## Flow Pacing Optimizes System Efficiency

**Figure 1: Operation During Periods of High Flow**



**Figure 2: Operation During Periods of Low Flow**





| System Specifications            |  |
|----------------------------------|--|
| System Characteristics           | TrojanUV3000™B   |
| Typical Applications             | 1 – 5 MGD (158 – 789 m³/hr)  |
| Lamp Type                        | Low-pressure   |
| Ballast Type                     | Electronic; non-variable   |
| Input Power Per Lamp             | 87.5 Watts   |
| Lamp Configuration               | Horizontal, parallel to flow   |
| Module Configuration             | 4, 6 or 8 lamps per module   |
| Bank Configuration               | Up to 20 modules per bank  |
| Channel Configurations           |  |
| Lamp Banks in Series             | Up to 3  |
| Channel Options                  | Concrete (by others)   |
| Level Control Device Options     | ALC gate or fixed weir   |
| Enclosure Ratings                |  |
| System Monitor/Control Center    | 304 stainless steel  |
| Ballast Enclosure                | Type 6P (IP67)   |
| Ballast Cooling Method           | Convection; no air conditioning or forced air required                                   |
| Installation Location            | Indoor or outdoor  |
| System Monitoring & Controls     |  |
| Controller                       | Monitoring and bank control  |
| UV Intensity Monitoring          | Optional   |
| Flow Pacing                      | Optional   |
| Inputs Required                  | 4-20 mA flow signal for Flow Pacing  |
| Local Status Indication          | Lamp Age (hours)<br>UV Intensity (mW/cm²)<br>Bank Status (on/off)<br>Low Intensity Alarm |
| Remote Alarms                    | UV Intensity (4-20 mA)<br>Common Alarm (discrete)  |
| Location                         | Indoor or outdoor  |
| Maximum Distance from UV Channel | 20 ft. (6 m)   |
| Electrical Requirements          |  |
| Power Distribution               | Power Distribution Centre  |
| Quantity Required                | 1 PDC per bank   |
| Power Input                      | 120V; single phase 208V,<br>3-phase 240V; single phase                                   |

| TrojanUV3000™B Controller Capabilities |                           |                        |
|--|---------------------------|------------------------|
| Size Constraints                       |                           |                        |
|  | Basic Controller          | Touch Smart Controller |
| Max # of Channels                      | 1                         | 2                      |
| Slide Gate Control                     | No                        | Monitor Only           |
| Max Modules/Bank                       | 20                        | 20                     |
| Max Banks/Channel                      | 3                         | 3                      |
| Control/Alarm Constraints              |                           |                        |
| Screen Interface                       | 7 Segment Numeric Display | 7" Color Touch Screen  |
| Flow Pacing                            | Yes                       | Yes                    |
| Dose Pacing                            | No                        | No                     |
| Individual Lamp Status                 | No                        | No                     |
| Lead Bank Rotation                     | Automatic                 | Automatic or Manual    |
| Redundant Bank Logic                   | No                        | Yes *                  |
| Multiple Lamp Failure                  | No                        | No                     |
| Adjacent Lamp Failure                  | No                        | No                     |
| Module Failure Alarm                   | No                        | No                     |
| Bank Comm. Fail Alarm                  | No                        | No                     |
| Low Water Level ***                    | No                        | Yes                    |
| High Water Level ***                   | No                        | Yes                    |
| Remote System On/Off                   | No                        | DI                     |
| Remote Bank On/Off                     | No                        | -                      |
| Add additional bank                    | No                        | DI                     |
| USB Data Logging                       | No                        | Yes                    |
| Remote Monitoring Constraints          |                           |                        |
| SCADA                                  | No                        | Yes **                 |
| Bank Status                            | Yes                       | Yes                    |
| Common Alarm                           | Yes                       | Major, Minor           |
| Low UV Intensity Alarm                 | No                        | Yes                    |
| Bank UV Intensity Alarm                | No                        | SCADA                  |
| Average UVI Analog Out                 | No                        | Yes                    |
| Input/Output Constraints               |                           |                        |
| Discrete Inputs                        | 0                         | 8                      |
| Discrete Outputs                       | 4                         | 8                      |
| Analog Inputs                          | Flow                      | Flow and UVT ***       |
| Analog Outputs                         | 0                         | 2 (One (1) per Bank)   |

\*Note – redundant bank logic is driven by a single lamp failure OR low UVI alarm in a bank as there is no way to distinguish between one or many lamps failed

\*\*Note – Modbus Ethernet SCADA is standard, Modbus RTU is option, as an add-on. Other protocols are possible as a custom solution. All remote monitoring signals are available on SCADA. Remote capabilities - no control available over SCADA.

\*\*\*Note – level alarms require optional level sensor probe, UVT measurement requires optional UVT meter