



STRIKE I and II UV-LED Water Disinfection Module

PRODUCT MANUAL



Summary

This document is the product manual for the Strike I and II product family, including safety, product specification, installation and maintenance information

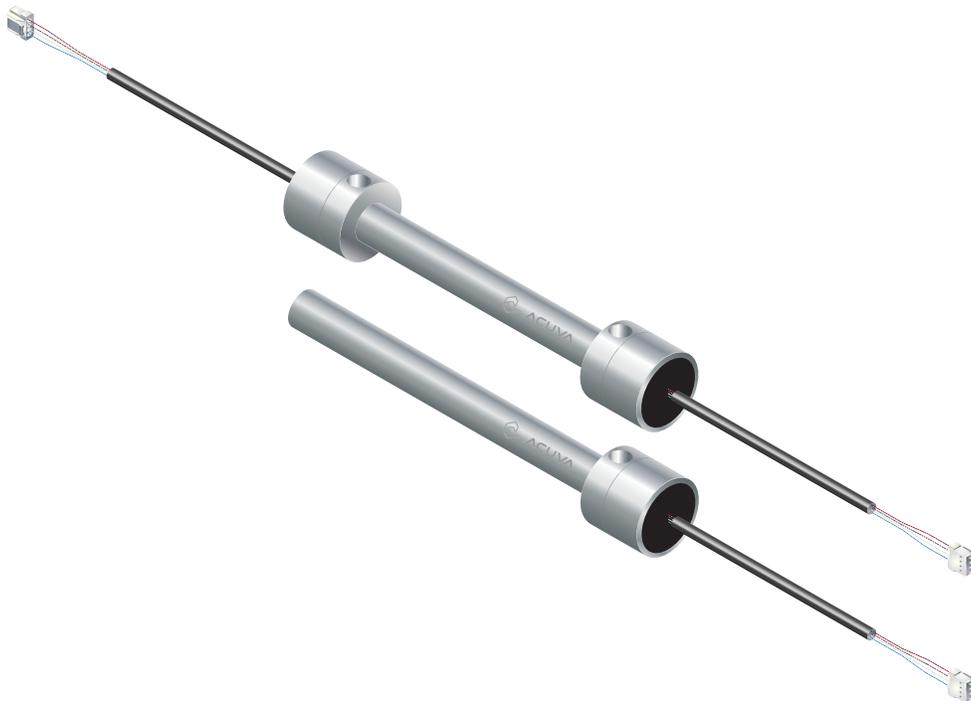
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Product Overview

Acuva's Strike platform of high-performance UV-LED modules features Acuva's patented IntenseBeam™ Technology and an advanced design that enables efficient disinfection and sterilization of drinking water for PoU applications and OEM integration.

Strike I and II modules are factory configurable for a range of flow, disinfection and lifetime specifications. This manual outlines mechanical and electrical interfaces and installation requirements for the Strike I and Strike II family of products.



Input Water Quality and Environmental Requirements

The quality of the input water is important as it influences the effectiveness of the system and the drinking water safety of the disinfected output water.

The input water should be from a potable water source within a range defined in **TABLE 1**. Acuva purifiers are effective for microbial (bacteria such as E. coli) disinfection, while a secondary filtration system is needed upstream to remove sediments, chlorine, and particulate contamination from water.

Parameter	Minimum	Typical	Maximum	Notes
pH	5.8	7.0	8.0	
UV Transmittance of Water	95%/cm	97%/cm	-	Evaluated at in 260nm-270nm band
Water Flow Rate	0.5 LPM	-	4.0 LPM	
Water Temperature	Above Freezing	30°C	40°C	
Hardness	< 120 (mg/L)			
Turbidity			< 1 NTU	
Manganese			< 0.05 mg/L	
Tannis			< 0.1 mg/L	
Iron			< 0.3 mg/L	

TABLE 1: Water quality requirements for proper disinfection

	Minimum	Typical	Maximum	Notes
Ambient Temperature	5°C	30°C	50°C	
Relative Humidity	40%	55%	75%	
Continuous Operation Time	-	No Limit	-	With water running
* Continuous Operation Time			1 minute	Without water running

TABLE 2: Indicates environmental operating parameters required for proper use of Strike devices.

* Possible device damage if operated without water – water is the device cooling mechanism and overheating can damage the unit

Product Information

Strike Mechanical Characteristics

The Strike family of modules feature stainless steel outer construction for structural strength, pleasing aesthetics and water safety.

The Strike I envelope includes a reactor tube and an electronics/optics head. Outer dimensions and location of features are indicated in **FIGURE 1**. (Electrical cable length not drawn to scale).

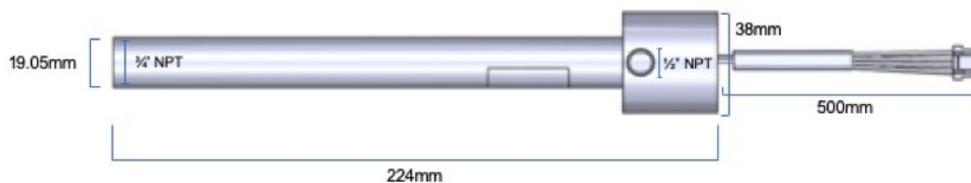


FIGURE 1: Strike I disinfection module mechanical envelope

The Strike I module includes a 3/8” NPT female thread on the water input and a 1/4” NPT female on water outlet.

The Strike II envelope includes two electronics/optics heads joined by a reactor tube. Outer envelope dimensions are indicated in **FIGURE 2**.

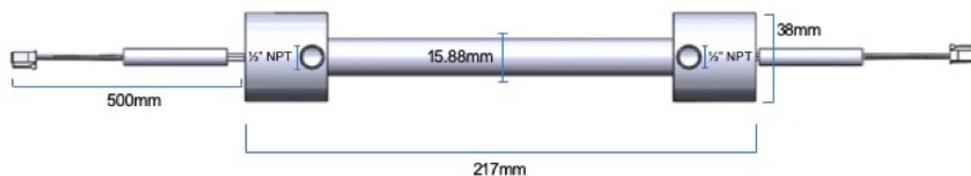


FIGURE 2: Strike II disinfection module mechanical envelope

The Strike II module includes 1/4” NPT female thread on both input and output.

Product Information

Strike Electrical Characteristics

The Strike modules electrically interfaces via a 4-wire terminated connector protected with an outer PVC jacket. See **FIGURE 1** and **FIGURE 2** for dimensions of the cable.

The electrical signal family of the Strike module is accessed via a connectorized, jacketed cable. See **FIGURE 3**. Strike I modules with a single opto-electronic head have one connectorized lead while Strike II modules with two opto-electronics heads have two identical connectorized leads.

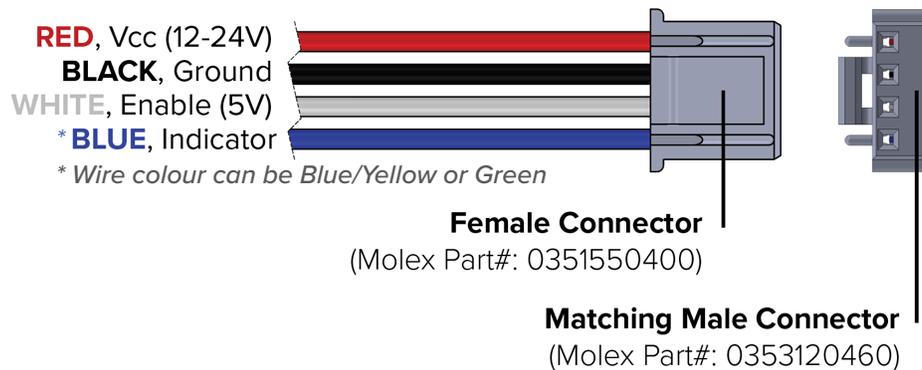


FIGURE 3: Strike family signal family and connector

The electrical characteristics of the Strike module IO are listed in detail in **TABLE 3**.

- VCC is the power input to the module.
- The enable is an input to the module to trigger the UV-LED to activate.
- The health indicator is an output from the module signalling the module's LED health status.
- Ground acts as the return for VCC and the reference for the indication and enable signal.

Product Information

Strike Electrical Characteristics Cont'd

Net	Condition	Value	Unit
VCC	Max. Input Voltage	30	V
	Min. Input Voltage	11	V
	Max. Current Draw VCC = 12V	0.5	A
	Min. Current Draw VCC = 24V	0.25	A
LED Health Indicator (IND) ¹	Normal Operation Output Voltage	VCC	V
	Fault Operation Output Voltage	0.150	V
	Maximum Normal Operation Current	3.5	mA
	Maximum Fault Current	-20	mA
Enable (EN) ²	Maximum Input Voltage for Operation	5.0	V
	Minimum Input Voltage for Operation	2.5	V

TABLE 3: *Electrical characteristics of Strike module*

¹IND net contains an internal 5.1kΩ pullup resistor

¹VCC will be present on the LED Health Indicator pin when the module is enabled and LED is healthy. LED Health Indicator will be 0.15V in all other conditions.

²EN net contains an internal 510Ω pulldown resistor

WARNING

Do not exceed maximum electrical ratings for any electrical IO position. Strike UV-LED electronics always require proper protections respecting these ratings. See section **ELECTRICAL INSTALLATION OVERVIEW STEPS** for details on proper electrical integration.

	Absolute Maximum Rating
Input Voltage	30V
Reverse Input Voltage	0.3V
Enable Pin Voltage	5.5V
Water Temperature	45°C
Ambient Temperature	55°C
Water Flow Rate	4.0 LPM
Electrostatic Discharge (ESD)	2.0 kV (HBM)

TABLE 4: *Absolute maximum electrical ratings*

Installation Guide

Overview Steps

1. Mount unit in desired position for integration. See section **MECHANICAL MOUNTING** for details.
2. Connect the water inlet/outlet lines using proper fittings. See details in section **PLUMBING**. Ensure fittings do not leak at operating pressures—water leaks can damage the Strike units.
3. Connect the electrical connectors (4-pin connector from each side) to a proper interface.
 - For electrical integrations using Acuva control PCBA 600-0213 see section **INSTALLATION WITH ACUVA SUPPLIED CONTROL PCBA**.
 - For installation direct in OEM equipment please, see section **INSTALLATION DIRECT INTO OEM PRODUCT**.
4. Flush UV module at rated flow rate for several minutes to ensure water entirely floods the disinfection unit.

Mechanical Installation Steps

MECHANICAL MOUNTING

Strike modules require proper orientation to entirely flood the reactor and prevent air pocket from becoming trapped in the module. The module can be mounted in either vertical or horizontal orientations according to **FIGURE 4**.

Installation Guide

Mechanical Installation Steps Cont'd

MECHANICAL MOUNTING CONT'D

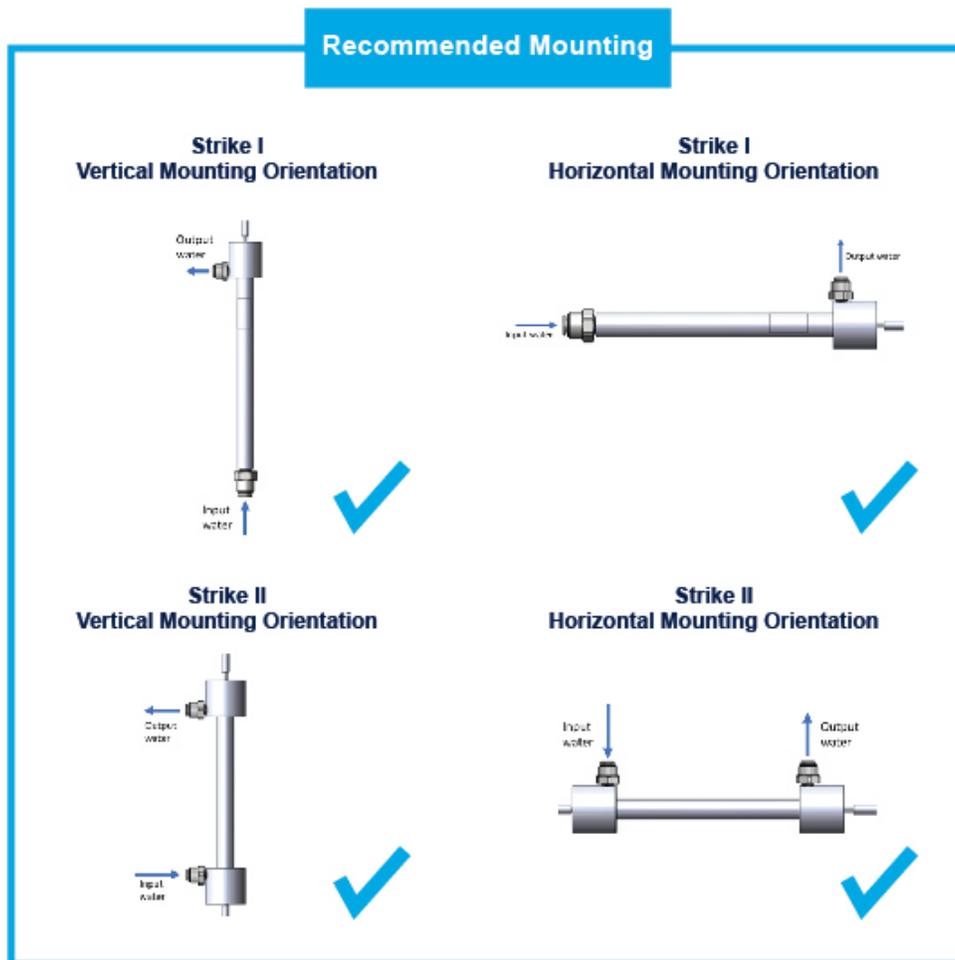


FIGURE 4: Recommended mounting of Strike modules

Equivalently, it is important to avoid mounting orientations that can possibly trap air bubbles in the Strike systems. Specifically avoid the mounting orientations shown in **FIGURE 5**

Installation Guide

Mechanical Installation Steps Cont'd

MECHANICAL MOUNTING CONT'D

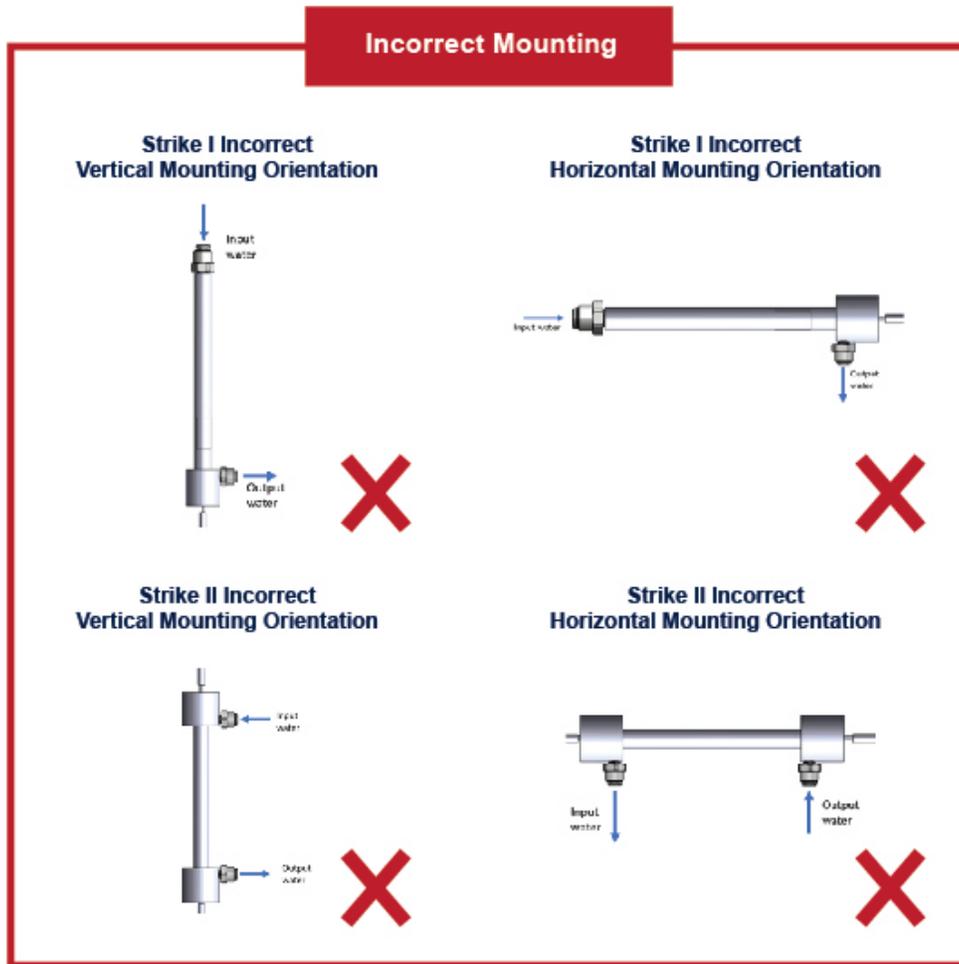


FIGURE 6: Incorrect mechanical mounting of Strike modules

Installation Guide

Electrical Installation Steps

INSTALLATION WITH ACUVA SUPPLIED CONTROL PCBA

Acuva strongly recommends interfacing the Strike modules electrically with an Acuva control PCBA part number 600-0213. Integration in this manner assures the user of easiest, trouble-free deployment of the Strike module as the Acuva designed control PCBA provides proper power provisioning, signal protection and easiest access via on-PCBA connectors to access indication signals.

As the Strike I & II UV-LED modules can disinfect on demand, a triggering mechanism is needed to toggle the enable pin of the Strike electronics to activate the LED when water begins to flow. As well, the user may find it beneficial to add visual health indicators or an audio buzzer to signal the health or error of the system. Paired with a connectorized flow switch the user is quickly able on/off functionality and visual or audio indications.

FIGURE 7 through **FIGURE 10** indicated block diagrams and photographs of the Strike and control PCBA integrations.

Acuva control PCBA 600-0213 operates with Strike I or Strike II module. See If required, request specification sheet document 600-0213SP_REVXX.pdf from Acuva technologies for details of this part.

SEE NEXT PAGE FOR DIAGRAMS

Installation Guide

Electrical Installation Steps Cont'd

INSTALLATION WITH ACUVA SUPPLIED CONTROL PCBA CONT'D

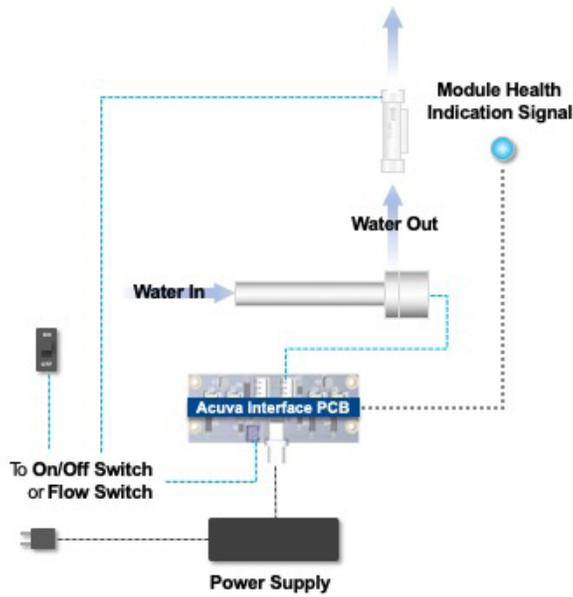


FIGURE 7: Strike I integrated with control PCBA block diagram

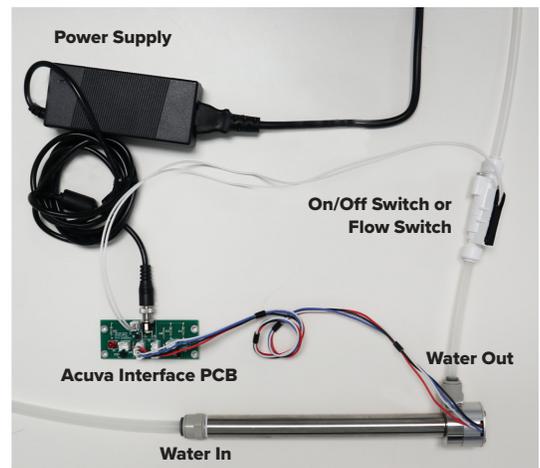


FIGURE 8: Strike I integrated with control PCBA

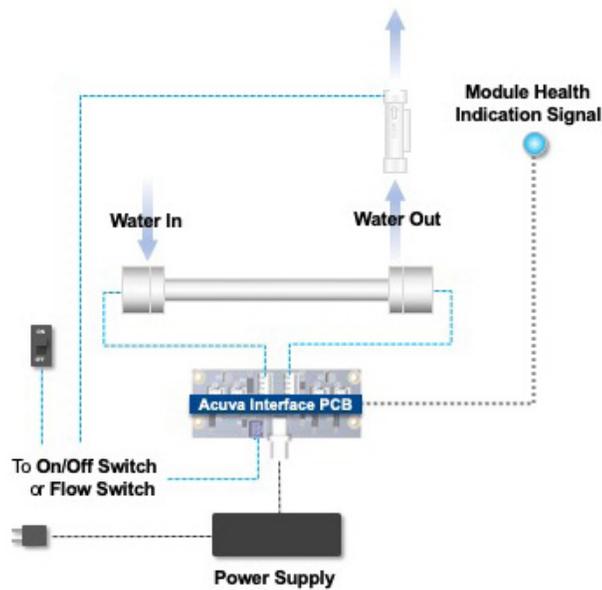


FIGURE 9: Strike II integrated with control PCBA block diagram

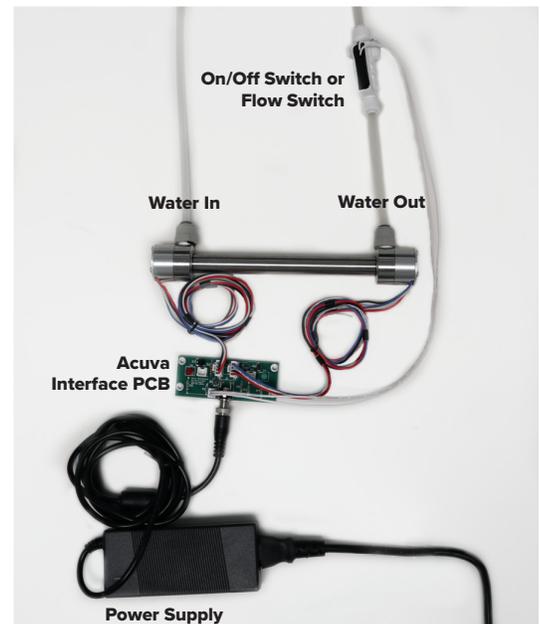


FIGURE 10: Strike II integrated with control PCBA

Installation Guide

Electrical Installation Steps Cont'd

INSTALLATION DIRECT INTO OEM PRODUCT CONT'D

Designator	Component	Description
VCC	Power Supply	12-24V
U1	78L05	5V Voltage Regulator
U2	Strike Module	UVC-LED Water Disinfection Unit
S1	Switch	Closes when water flowing
Q1	2N3904	Saturated during normal operation, conducting LED1
Q2	2N3904	Saturated during normal operation, shorting LED2
R1	1.50kΩ, 0.5W	Current set resistor for normal operation indicator LED1
R2	1.50kΩ, 0.5W	Current set resistor for fault operation indicator LED2
R3	2.70kΩ, 0.5W	Current set resistor for Q1 & Q2
R4	22.1kΩ, 0.125W	Q1 & Q2 Base pulldown resistor
LED1	Coloured LED	Lit when UV LED is working within normal parameters
LED2	Coloured LED	Lit when UV LED is in a fault condition

TABLE 5: Recommended components list for Strike I integration circuit.

TABLE 6 indicates the behavior of the LED health indication output of the application circuit as a function of other conditions.

Flow Switch	LED Health	LED1	LED2
Open	X	OFF	OFF
Closed	Healthy	ON	OFF
Closed	Fault	OFF	ON

TABLE 6: Truth table for interpretation of LED health output signal