Specification

Product Code: VW1002N-S00

Product	DUV Water disinfection test module
Document#	NKSUV-AF01-0006
Version	2.0
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NIKKISO GIKEN Co., Ltd	NKSUV-AF01-0006

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1. Product code

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2. Absolute maximum rating

Item	Symbol	Unit	Min.	Max.	Remarks
Operating environment temp.	T_{OPR}	deg C	0	35	Non condensing
Storing temp.	T_{STR}	deg C	0	45	Room inside Non direct sunlight Non condensing
Input constant current (DC)	I_F	mA	―	400	Typical constant current：350mA
Acceptable intake	W	W	―	2.8	―
Water temp.	T_{WTR}	deg C	―	35	―
Flow rate	Q	L/min	―	2	Clean water Specific gravity : 1 Degree of viscosity : 1mPa･s
Loss of pressure	P_L	kPa	―	2	―

3. LED characteristics (I_F = 350mA, Ts = 25℃, at BOL(Beginning of Life))

Item	Symbol	Unit	Min.	Typ.	Max.	Remarks
Product code	―	―	―	―	―	NIKKISO：VPS161
Forward voltage	V_F	V	4.5	5.6	7.0	―
Peak wavelength	λ_P	nm	275	280	285	―
Radiant flux	P_O	mW	20	25	―	―
Full width at half maximum	FWHM	nm	―	13	20	―

Ts：Temperature at solder point

4. Inspection

4-1) Item

Item	Method	Criterion	Remarks
Lighting check	Lighting on constant current	Lighting-up	After assembly
Water leak check	Hydrostatic pressure 0.5MPa×3 min.	Non-leakage	After assembly

Note1) Constant current: 350mA

Note2) Room temperature: Ta (25 deg C)

4-2) Measurement set-up

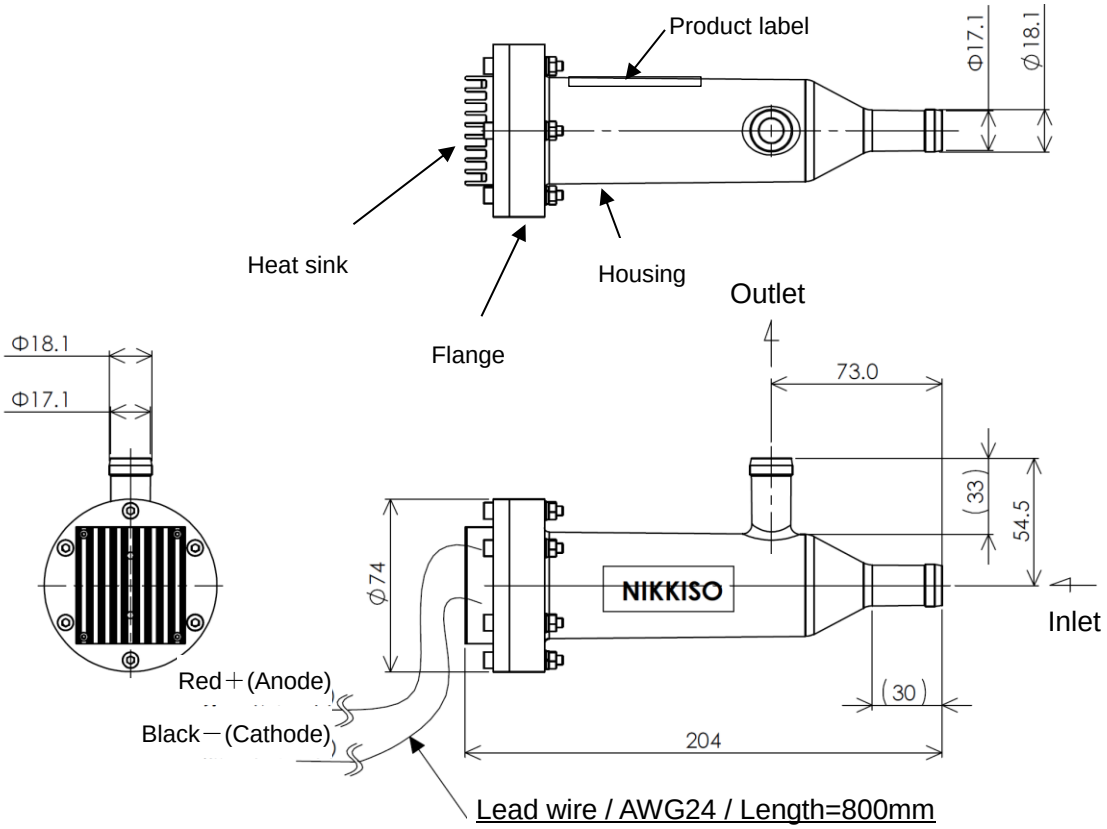
Item		Remarks
Power supply unit	Type	PSW-360L80 (TEXIO Technology Corporation)
	Operating mode	Constant current mode
Test pump	Type	T-508 (KYOWA Co., Ltd)
	Operating mode	Manual

5. Structural

5-1) Outline dimensions [Unit：mm, Tolerance：±0.2]

Weight：0.4kg

Recommended mounting direction：Inlet - Horizontal direction, Outlet - Vertical direction.

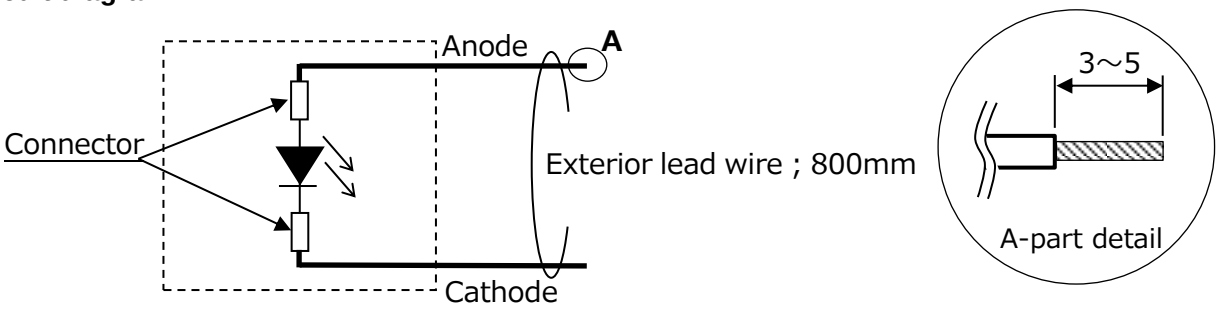


5-2) Main materials

Item	Material
Housing	Polypropylene (PP)
Flange	Aluminum (A5020 with Black alumite)
Heat sink	Aluminum (A5020 with Black alumite)
Lead wire	Coating：Polytetrafluoroethylene (PTFE) Conductive wire : Copper
LED	Ceramics
Bolt／Nut	SUS304
Wetted parts	PP, SiO2, PTFE, Fluorine-contained rubber, SUS304

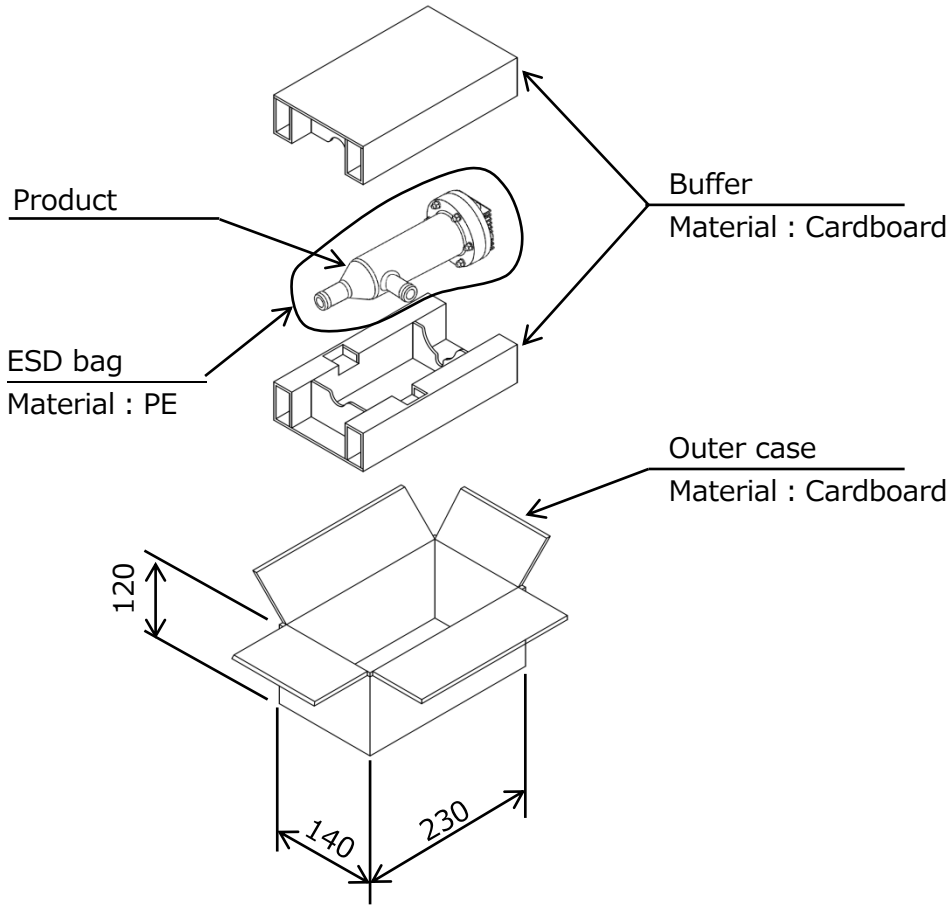
RoHS Directive (2011/65/EU)

6. Circuit diagram



7. Packing

Packing weight：0.6kg



8. Mounting / Handling

(1) Wiring connections

- Connect the constant current power supply to the red lead wire in the direction of the LED anode and the black wire in the direction of the arrow.
  (Do not turn on the constant current power supply until all wiring is connected.)
- The constant current power supply should be prepared separately by the customer.

(2) Piping connections

- Connect the piping with proper direction indicated in "5-1".
  (If the water flow is in the opposite direction, it may affect the performance.)
- Connect the piping so as not to be pulled out easily by using a braid hose or hose bolt.

(3) Operation

- Before turning on the product (UV-LED), connect all piping and wiring.
- Release air spooled up inside the product when running water.
- Run water through the product.
- Set the power supply to the rated value and apply power to the product (UV-LED).
- Turn off the power supply after irradiating deep ultraviolet rays to running water.

(4) Cautions

- Fix the product to a stand with supporter such as a belt for vibration due to water flow.
- Put in this product so as to radiate heat around the heat sink and the flange.
- This product, especially around the heat sink, may become hot during operation.
  (Be careful to burned)
- Tightening the product strongly may damage it.
- Avoid repeatedly screw to fittings.
- Do not use it in a place where external force such as bending, vibration is applied.

9. Cautions

(A) Storage

(1) Avoid storage in a place with high temperature and humidity, or with large temperature fluctuations, in order to prevent water condensation.

(2) Avoid exposure to direct sunlight during storage.

(3) Avoid storage in a dusty environment.

(4) Prolonged exposure to corrosive environment may cause the solder to tarnish. Control the storage atmosphere appropriately.

(5) Protect the module from static electricity during storage.

(6) The product can be returned and exchanged only within 3 months after ship-out from our factory, when appearance abnormality and lighting failure is found in acceptance inspections in a customer side.

(7) The box used for the packing is not water resistant. Do not expose it to water.

(8) Do not apply a load to the module or the packing during storage.

(9) When handling, do not drop or expose the module to strong external forces as it may cause damage.

(B) Handling/Operating

(1) Do not use in an explosive atmosphere, flammable atmosphere and locations where water falls onto. It might cause a fire, injury or electric shock.

(2) Installation, wiring connection, inspection, etc. should be done by a person with professional knowledge. You might get an electric shock or be injured.

(3) Do not move, wire or inspect the product when applying current. You might get an electric shock or be injured.

(4) Provide fuse, protection circuit, etc. to assure safety against injuries to human body or fires that may arise from failures of LEDs.

(5) Do not drive this product in places where no operator exists.

(6) Do not disassemble the module.

(C) Driving

(1) Use the module at the drive current of less than 350mA.

(2) Do not apply reverse voltage to the module as it may cause the UV-LED to fail.

(3) Take anti-static measures during wiring.

(4) This module becomes hot, especially at the heat sink and the surrounding parts. Even after the UV-LED is turned OFF, it remains hot for a while. Direct contact with skin may cause burn injuries, etc.

(5) Shut down the operation of your product and motor when extraordinary happenings occurred. It might cause a fire, injury or electric shock.

(D) UV

This product contains UV-LEDs that require the following attention.

(1) Do not look directly at the operating UV-LED as it may cause damage to the eyes. If doing so is unavoidable, be sure to wear ultraviolet light protective glasses.

(2) IEC62471 “Photobiological Safety of Lamps and Lamp Systems” defines exposure limits of electromagnetic radiation in the wavelength range from 200 to 3000 nm for each possible hazard (to the skin, eye, and retina). The ultraviolet light emitted from this product can be classified as creating the following hazards. It is recommended to understand the contents of the standard before using the product.

Relevant Hazards

a) Hazard to the skin

－4.3.1Es Actinic UV hazard exposure limit for the skin and eye

b) Hazard to the eye (cornea)

－4.3.1Es Actinic UV hazard exposure limit for the skin and eye

－4.3.2Euva Near-UV hazard exposure limit for the eye

c) Hazard to the retina

－4.3.3Lb Retina blue light hazard exposure limit

－4.3.4Eb Retina blue light hazard exposure limit – small source

(E) Others

(1) This product is designed to be used for general applications (industrial use and consumer product applications). The quality of this product is suitable for general applications. If you are considering using this product for special equipment that requires higher quality (nuclear power facility, submarine, space, aviation, medical, transportation, or disaster/crime prevention equipment, or other similar equipment), contact our sales representative in advance.

(2) The customer shall not reverse engineer by disassembling or analysis of this product without having prior written consent from Nikkiso.

(3) The specifications are subject to change without notice.

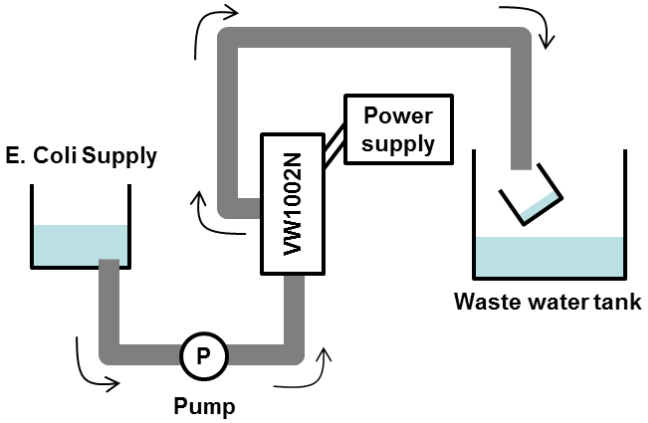
(4) The performance to inactivate microorganisms depends on the target species, strain, condition, and environment, and the piping condition may also affect it.

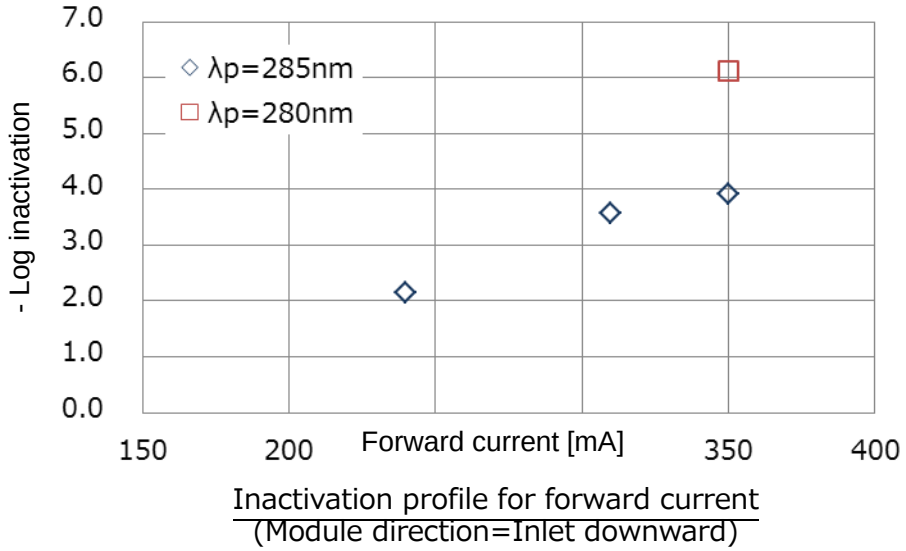
(5) This is the engineering sample. We shall not take any responsibility of any loss, damages and troubles.

[Reference] In house experimental results of E.Coli inactivation

（This characteristic is just a reference, and it does not guarantee the performance of the product.）

Experimental conditions

Item	Conditions
Ambient condition	Room temperature 25℃
Flow rate	2L/min
LED drive condition	①280nm，27mW@(I_F=350mA)，Continuous lighting. ②285nm，30mW@(I_F=350mA)，Continuous lighting.
Bacterial strain (Kind of coli, density)	Transmittance 95%以上@280±10nm NBRC 102203　10^6/mL（in PBS）
Cultivation method	Agar medium (E-MC35), Pour plate method (37±1deg C × 24 hours)
Log inactivation	-Log(N_X/N_0)　N_0 : Number of CFU before UV exposure (cfu/mL) N_X : Number of CFU after UV exposure (cfu/mL)
Experimental setup	



Inactivation profile for forward current
(Module direction=Inlet downward)