VS TECHNOLOGY
MACHINE VISION OPTICS

Power Supply for LED Lighting

VPS-2460-4S

Operation Manual

Thank you for purchasing a VST product.
To use this LED power supply with optimum performance and safety,
please read this manual thoroughly before starting operation.
Keep this manual for the whole product lifetime.

The following warning symbols are used in this manual.
Be sure to fully understand the contents.

CE UKCA

⚠ WARNING	A warning denotes a hazard that can cause severe injury or death.
⚠ CAUTION	A caution denotes a hazard that can cause injury or damage of equipment.

1. For your safety

⚠ WARNING	
	Do not open the chassis to avoid electric shock. High-voltage parts are inside.
	Use appropriate AC power cord conforming to the standards in the country or region where this product used. 1) AC100-120V : SVT/AWG18/3m max. withstand voltage 125V min. (UL-approved) 2) AC220-240V : H05W-F/AWG18/3m max. withstand voltage 250V min. (EU-approved)
	Plug in AC power cord directly to the outlet. Do not use a table tap with many other cords at the same time to prevent fire or electrical shock.
	Earth ground the product. If you do not, it may cause an electric shock when you touch both a part with earthing potential and the power supply at the same time.
	Do not touch or plug the AC power cord with wet hand. It may cause an electric shock.
	Whenever trouble occurs, such as smoke, smell, noise or abnormal heat, stop the operation immediately and turn off the power and unplug the power cord.
	Use only LED lighting unit made by VS Technology (Thailand) Co., Ltd. If you use with other lighting unit, over current may cause a fire or heat.

⚠ CAUTION
1. USE the extension or remote cables 3m maximum to prevent power drop by voltage reduction or malfunction by noise.
2. Installation of the product 1) Place horizontally in a well ventilated space on the rubber feet at the bottom of the unit. 2) Do not topple or lay on its side. 3) Do not put on unstable or vibrational place. 4) Do not use in environment with humidity, dusty, high temperature or fire. 5) Keep liquids away.
3. Do not look at the LED directly. If you see the LED long time, your eyes may be damaged.
4. Cleaning Use wet cloth twisted well. Never use inflammable liquids such as alcohol, benzene or thinner. Turn off the power and unplug the cord from the outlet while cleaning to avoid any injury or damage of the unit.
5. Dispose the product conforming to the law in the region where the product is used.
6. Anti-static measures must be taken in advance to prevent electrostatic damage to the product.

2. General Description

VPS-2460-4S is a power supply for VST series or LED lighting unit made by VS Technology (Thailand) Co., Ltd.

It can be used with input voltage range with AC100 to 240V and output total wattage maximum 60W.

each channels can be controlled separately.

Remote control is also available separately in each channels.

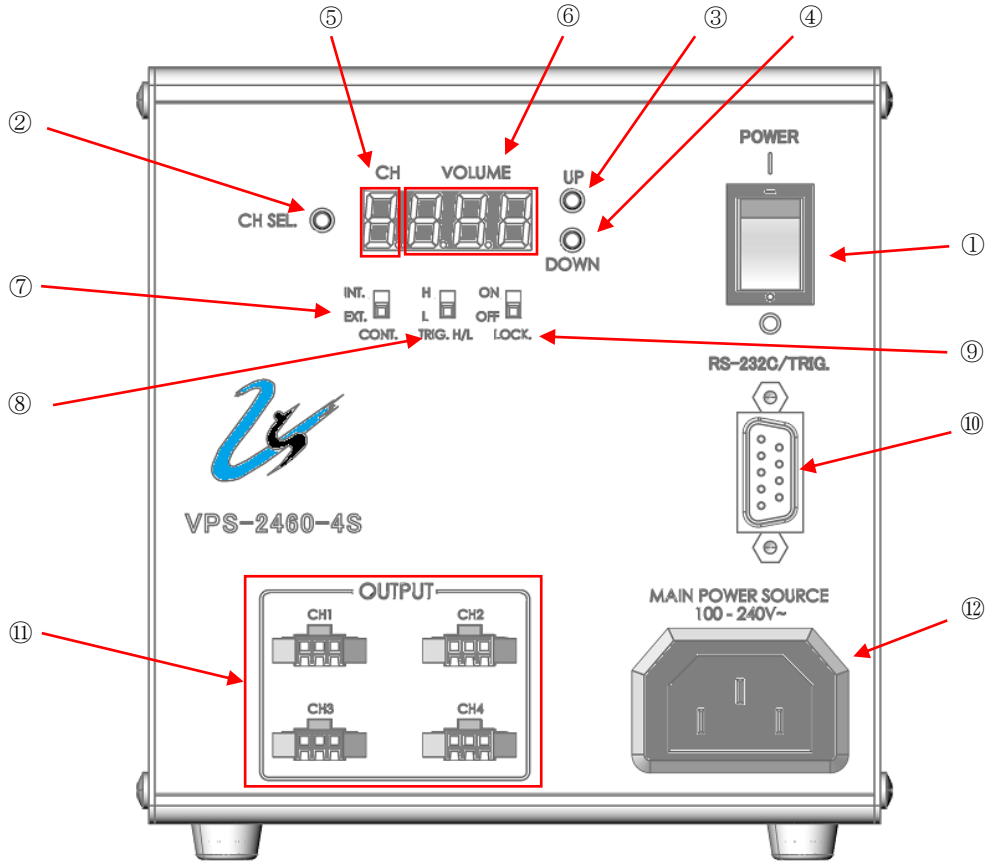
3. Confirming package contents

名称	数量
Main unit	1
AC power cord *Use appropriate AC power cord conforming to the standards in the country or region where this product used.	(Optional)
This operation manual	1

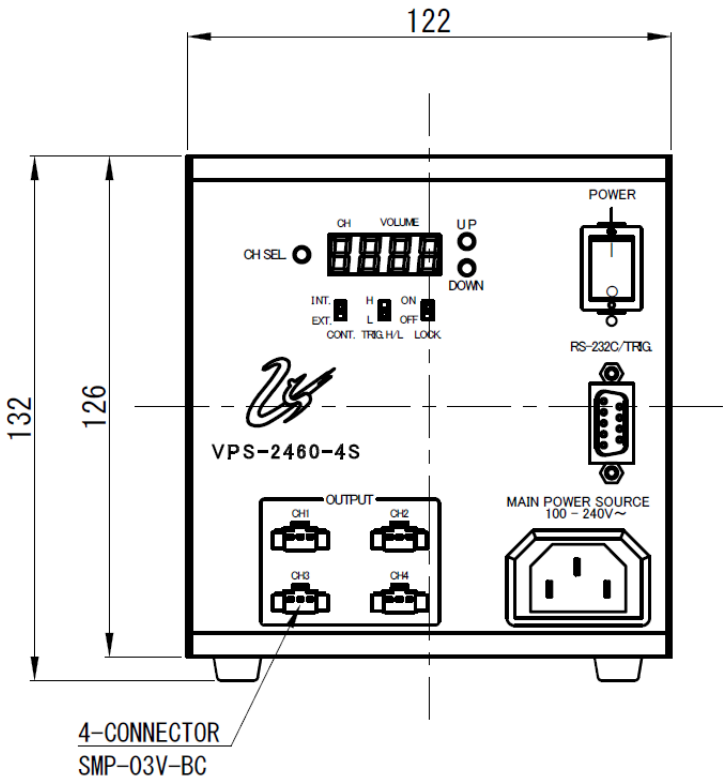
4. Specification

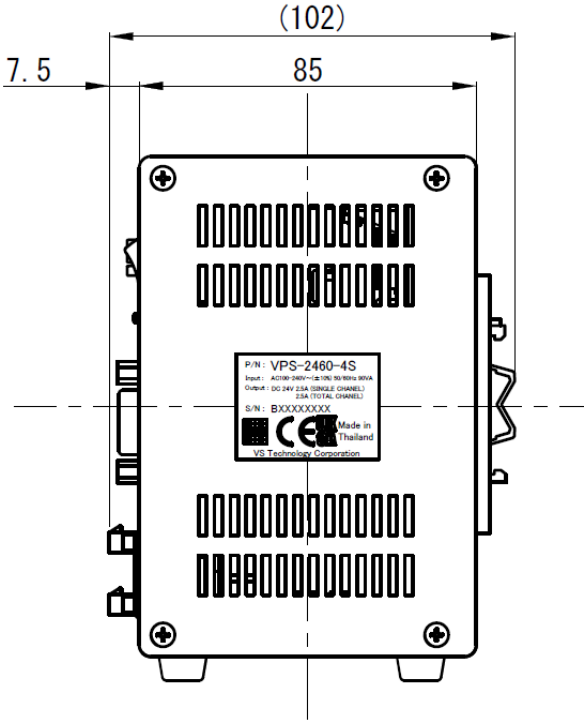
Model	VPS-2460-4S
Input Voltage	AC 100 - 240V (rated) ±10% 50/60Hz
Power Consumption	90VA
Inrush Current(A)	30/60 (AC115/230V) at cold start
AC Power Cord	3m (max.) cord with a protective earth terminal
Rated output voltage	4 Channels DC24V (between output and GND)
Rated output current	2.5A(Single channel), 2.5A (Total for 4 channel)
	Total for 4 Channel
Rated output power	60W (Single channel), 60W (Total for 4 channel)
Input connector	AC input 3-pin inlet EN 60320-1 certified C14 type x 1
Output connectors	SMP-03V-BC(JST) 1 : output＋ 2 : NC 3 : output－
External control connector	External trigger input /RS-232C(Compliant) connector(D-Sub 9Pin) Setting sharing of lighting intensity and lighting mode (Connect with PC with optional cable)
Lighting Intensity Control	INT.: Control manually by volume knobs
	EXT.: Remote control by external RS-232C(Compliant)
Lighting Intensity Memory	Auto save(4 million times for each channel)
Lighting method	PWM (97.6KHz)
Overcurrent protection	Operates at 105% or higher of the rated current
Insulation resistance/ withstand voltage	Between input and FG (frame ground): AC1500V /minute (10mA), DC500V 50MΩ (min.)
Operating Environment	Temperature: 0～40℃ Humidity: 20～85%(without condensation) Altitude: 2000m Max. Pollution level: 2 Protective ground class Ⅰ Installation category Ⅱ(restricted to use in indoor environment)
Storage Temperature/ Humidity	Temperature: -15～60℃ / Humidity: 20～85% RH (without condensation)
Cooling Method	Natural air cooling
Dimensions	W122mm x D85mm x H126mm (Remove projections)
Weight	Approx.1000g
Environmental regulations	RoHS compliant
European Standards (CE Marking)	EN61326-1
	EN61010-1

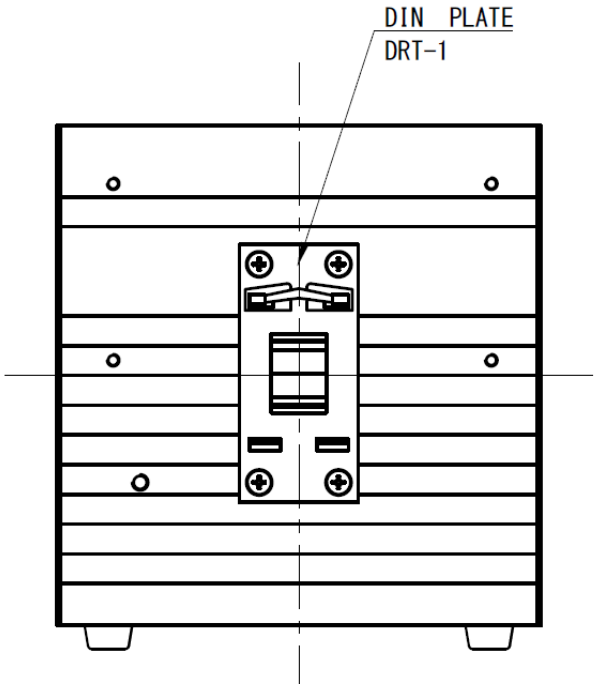
5. Dimensions and Functions



①	Power switch	Turn the power on and off.
②	Channel Selection button	Select a channel.
③	Intensity button “UP”	Lighting intensity up. Press and hold to speed up.
④	Intensity button “DOWN”	Lighting intensity down. Press and hold to speed up.
⑤	Digital display(CH)	Display channel settings. When you press the channel selection button, the number changes from 1 to 4 (CH1 to CH4).
⑥	Digital display(VOLUME)	Display of light intensity settings or light mode settings. Pressing intensity button “UP” or “DOWN” changes the 3-digit display from 0 to 255. In EXT mode, ″.URT″ is displayed.
⑦	INT/EXT mode select switch	Select internal(INT) or external(EXT) control mode.
⑧	Trigger logic switch	Select Active H / Active L.
⑨	Lock switch	Disables all push button operations.
⑩	External control connector	The lighting unit can be operated with an external trigger input. Refer to 8. External Input Trigger. RS-232C (compliant) input. Refer to 7. Control by external signal
⑪	Output connectors	Lighting unit power supply.
⑫	AC Inlet	Connects the power source to the Control Unit.


122
132
126
CH
VOLUME
UP
CH SEL
DOWN
INT.
EXT.
H
L
ON
OFF
CONT. TRIG.
H/L
LOCK
POWER
RS-232C/TRIG.
VPS-2460-4S
OUTPUT
CH1
CH2
CH3
CH4
MAIN POWER SOURCE
100 - 240V~
4-CONNECTOR
SMP-03V-BC


(102)
7.5
85
P/N : VPS-2460-4S
S/N : BXXXXXXX
Made in Thailand
VS Technology Corporation


DIN PLATE
DRT-1

6. Operation

(1) Connections

Confirm the power switch is OFF (on “0” side).
Connect the LED lighting unit to output connector on front panel of the product.
Connect 3P socket of the AC power cord to power supply inlet on front panel of the product and connect 3P plug of the AC power cord to outlet.

⚠ CAUTION	Connect an outlet with grounding. If it is not grounded, the power supply will not be ensured electrical safety performance.

(2) Power on

Turn the power switch to ON (on “I” side). ※Do not operate the key until the display lights up.

(3) Output channel connection

The output connector is SMP-03V-BC (JST) 1: Output + 2: NC 3: Output.

Please connect our lighting products directly.

This function does not detect the connection of the lighting unit. If the lighting unit is not connected,

set the minimum output level to prevent problems.

(4) External control(RS232C)

When controlling from an external device, connect the D-sub cable to the external control connector.
If you change to EXT or turn on the power with EXT, the ON / OFF setting of all channels will be turned OFF.
Set ″INT./EXT.″ To the EXT side. For details of D-sub cable, refer to 8. External input trigger.
※Do not use a USB conversion cable, etc. as it may cause malfunction or failure.

(5) External trigger (input)

Available in all modes. Connect a cable to the D-sub connector before use.
For details, refer to 8. External Input Trigger.

(6) Lock switch

Lock on allows you to disable the push switch function.
※This function is to prevent light intensity change when touching the push switch by mistake after setting.
It is recommended to lock while driving.

(7) Trigger logic switch(H/L)

Select Active H / Active L. Change the logic of external control.
For details, refer to 9. Output Signal.

(8) Error indication

If a current exceeding the rating is detected, an error is displayed on the front panel.
This function works regardless of ″INT./EXT.″. It will return when the power is off.

(9) Lighting Intensity Memory

This unit automatically memorizes the lighting intensity and is retained even when the power is turned off.
Only the latest intensity status of each channel is remembered. It will be rewritten each time it is changed.
Even if the memory exceeds the specification limit (4 million times for each channel), it can be used by entering the lighting intensity.

7. Control by external signal

⚠ Caution	Use a signal cable of 3m or less. Do not apply voltage exceeding the rating.

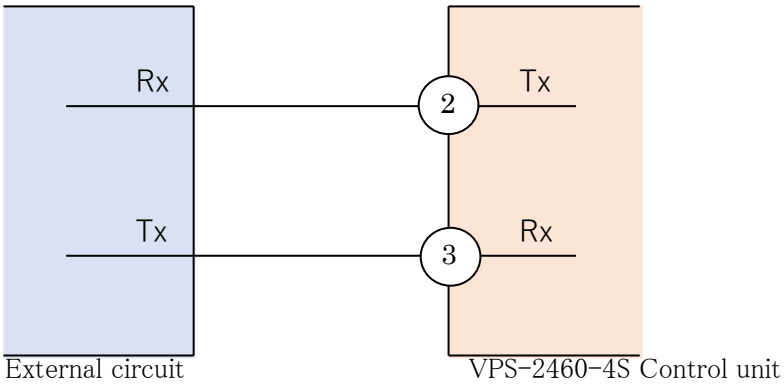
(1) Communication specification

connector (D-sub)

No.	Signal
2	Tx
3	Rx
5	GND

Communication protocol	RS-232C Compliance((ASCII))
Baud rate	38,400 bps
Data length	8 bits
Parity bit	None
Stop bit	1 bit

Connection example



(2) Command format

Transmission data(*1)

Function	Header	Channel	Transmission Command		ID	Check sum	Delimiter
			Instructions	Data(*2)			
Lighting Intensity Setting	@	00～03 See "Channel Specification" FF:All channels (ON/OFF Only)	F	000～255 (Data length:3Byte) (000:Min、255:Max)	00	00～FF See "Check sum"	<CR><LF>
ON/OFF Setting			L	0: OFF, 1: ON (Data length:1Byte)			
ON/OFF Setting(ALL)		FF:All channels	A	0000～1111 (Data length (*3)) 0:OFF、1:ON			
Setting Status Check			M(*4)	–			

*1:Please send data within 4 seconds from 'header to delimiter'. If 4 seconds or more, a timeout error occurs and command data is ignored.

*2:Set all the digits in Decimal Number. If the data lengths do not match, an error occurs.

*3:Valid data length is the number of CH. The most significant bit is 1CH.

*4:The unit sends the set values for all channels after receiving the command.

*5:When sending a continuous transmission, be sure to send it after receiving the reply command.

Received data(*1)

Function	Header	Channel	Received Command				ID	Check sum	Delimiter
			OK		NG				
Command acceptance confirmation signal	@	Send back sent data	O	-	N	01:Command Error 02:Check sum Error	00	00～FF See "Check sum"	<CR><LF>

*1:If a timeout error occurs, or if the send data settings are out of range, there is no receive data

Function	Header	Channel(*1)	Received Command				ID	Check sum	Delimiter
			Lighting intensity		ON/OFF				
Setting Status check result	@	00～03 See "Channel Specification"	F	000～255	L	0: OFF 1: ON	00	00～FF See "Check sum"	<CR><LF>

*1:Receive commands are sent for the number of channels.

Channel Specification				
Channel	CH1	CH2	CH3	CH4
Setting value	00	01	02	03

It is an error for more than Ch number.

Check sum

The command code is added, and the lower 2 bytes (hexadecimal number) are used as a checksum.

Example:Set channel 2 illumination intensity to 125

	Header	Channel		transmissionCommand						Check sum
	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8	Byte 9	
Character	@	0	1	F	1	2	5	0	0	DF

*1:Example of checksum calculation

@01L100 ⇛ 0x40+0x30+0x31+0x4C+0x31+0x30+0x30 = 0x17E

The checksum is the least significant 2Byte, so 7E.

(3) Setup steps

- Connect PC and controller with optional cable etc.
- Make sure that the main power is on.
- Set INT./EXT. Mode selector to EXT.

- Setting of lighting intensity

Specify the channel and set the lighting intensity.

Setting Example	Transmission data	Received data (OK)	Received data (Check sum NG)
Set CH3 lighting intensity to 75	@02F07500E4<CR><LF>	@02O0051<CR><LF>	@02N0200B2<CR><LF>

- Lighting on / off setting

Please specify the channel and set the lighting mode.

Setting Example	Transmission data	Received data(PASS)	Received data(Command NG)
ALL ch Lighting ON	@FFL100A9<CR><LF>	@FFO007B<CR><LF>	@FFN0100DB<CR><LF>
CH2 Lighting ON	@01L1007E<CR><LF>	@01O0050<CR><LF>	@01N0100B0<CR><LF>

- Lighting on / off setting(ALL)

Set the lighting mode for all channels.

Setting Example	Transmission data	Received data(PASS)	Received data(Check sum NG)
CH2・CH4 Lighting ON CH1・CH3 Lighting OFF	@FFA0101002F<CR><LF>	@FFO007B<CR><LF>	@FFN0200DC<CR><LF>

- Status check

After confirming the transmitted data, information about all channels is transmitted.

Setting Example	Transmission data	Received data(PASS)	Received data(Command NG)
Status check	@FFM0079<CR><LF>	@00F125L1005B<CR><LF> : @FFO007B<CR><LF>	@FFN0100DB<CR><LF>

(4) Error condition

If an error occurs, an error code is received regardless of the data sent.

Function	Header	Channel	Received Command		Check sum	Delimiter
			Error			
Common to all settings	@	FF:ALL Channel	E	1: Overcurrent detection error	00～FF See "Check sum"	<CR><LF>

To cancel the error condition, the power must be turned off.

-Error example

When an overcurrent detection error has occurred

Error example	Transmission data (*1)	Received data
Overcurrent detection error	@xxxxxx <CR><LF>	@FFE142<CR><LF>

*1:Ignore the data after @.

8. External Input Trigger

(1) External trigger input

LED lighting unit ON / OFF can be operated by external input.

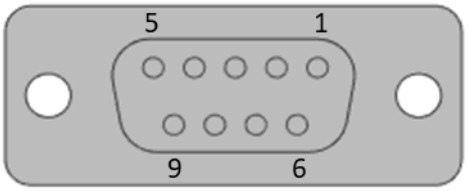
Operation changes depending on the setting of trigger logic switch.

For details, refer to 9. Output Signal.

(2) Connector Layout

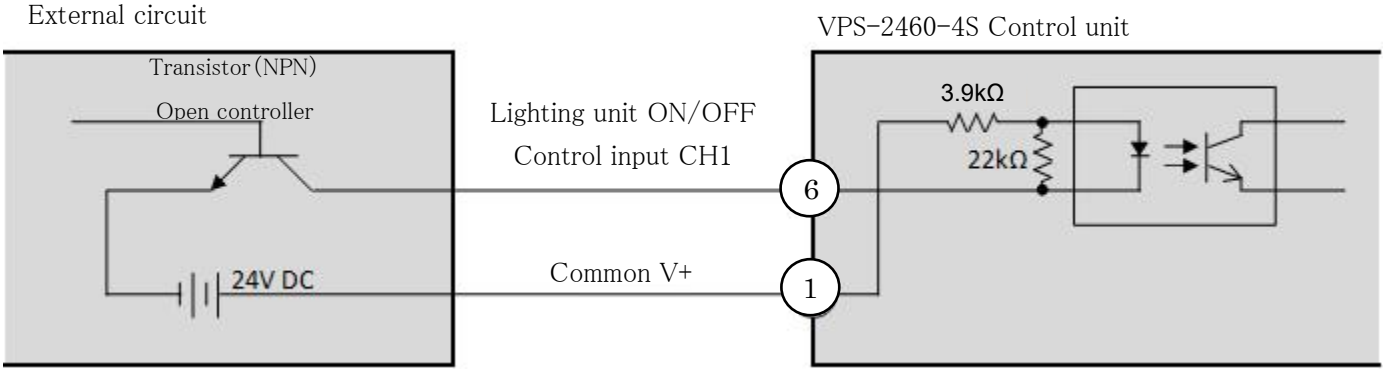
External Trigger Input Connector Plug

Connecter : DB9F



NO.	Signal
1	Common V+(5 to 24V)
2	Tx signal
3	Rx signal
4	NC
5	GND
6	Lighting unit ON/OFF control inputCH1
7	Lighting unit ON/OFF control inputCH2
8	Lighting unit ON/OFF control inputCH3
9	Lighting unit ON/OFF control inputCH4

(3) Example External trigger signal connection

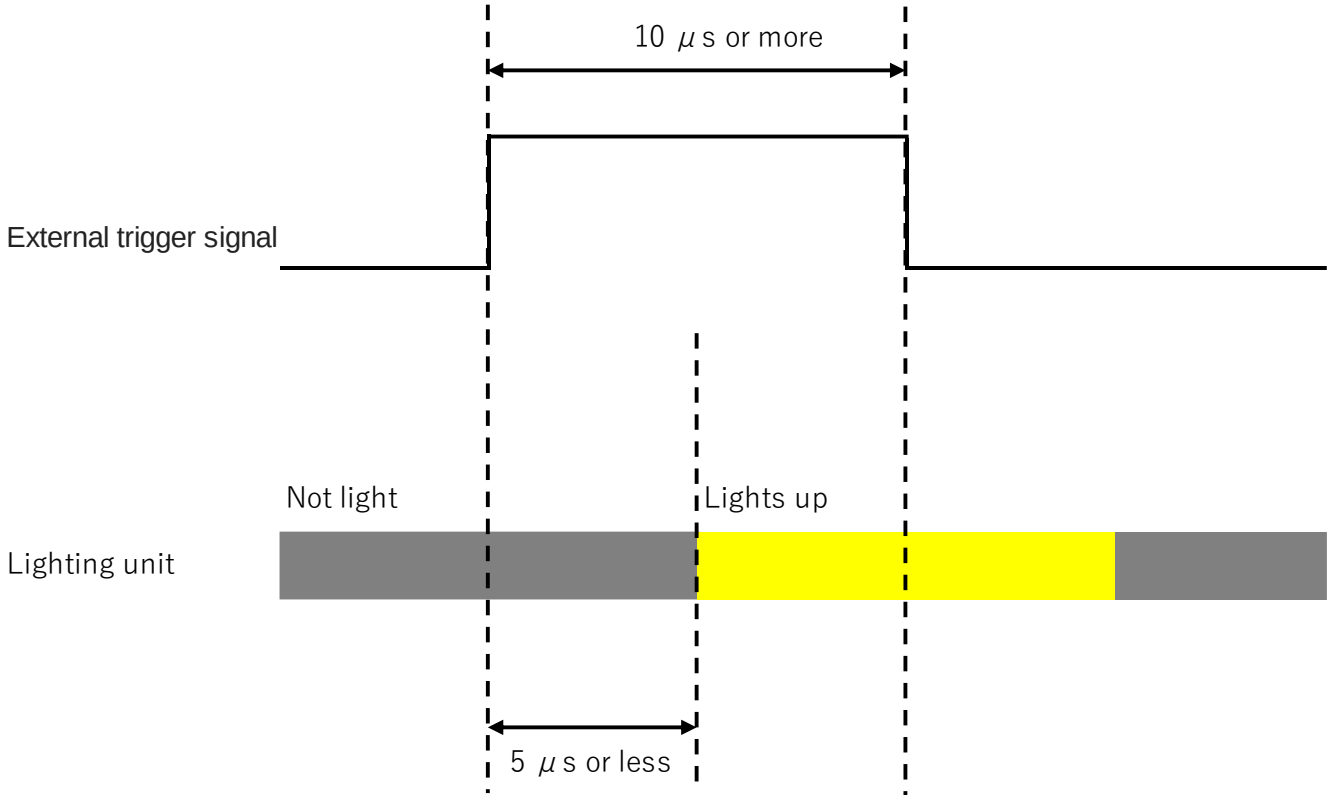


Recommended Input voltage	ON/OFF Reaction time	Input impedance
5VDC to 24 VDC	Max 10μs	3.9kΩ(per terminal)

(4) Trigger input timing chart

The pulse width of the ON signal needs to be 10 μs or more. The lighting unit lights up with a delay of up to 5 μs.

Example At trigger H input



9. Output Signal

The output varies depending on the control pattern.

The external trigger sets the same potential as Common to “H” and the potential below it to “L”.

To prevent failure, do not input a voltage higher than Common to the external trigger. 0V (GND) is recommended for ″L″.

(1) For external signal control (EXT)

The ON/OFF setting has the highest priority.

ON/OFF setting	Trigger logic switch	External trigger(6 to 9pin)	Output signal
ON	H	H/Open	LED lighting unit ON
		L	LED lighting unit OFF
	L	H/Open	LED lighting unit OFF
		L	LED lighting unit ON
OFF	–	–	LED lighting unit OFF

(2) When not using external signal control (INT)

Trigger logic switch	External trigger(6 to 9pin)	Output signal
H	H/Open	LED lighting unit ON
	L	LED lighting unit OFF
L	H/Open	LED lighting unit OFF
	L	LED lighting unit ON

(3) When external signal control is not used and no external trigger is connected (INT)

Trigger logic switch	Output signal
H	LED lighting unit ON
L	LED lighting unit OFF

10. Environmental regulations

(1) EU RoHS

Laws and regulations (EU Directive 2011/65 / EU) have been enforced that prohibit or restrict the use of six hazardous substances in sales and distribution within the European Union (EU).
The six hazardous substances are Lead、Mercury、Cadmium、Hexavalent Chromium、Polybrominated biphenyl(PBB)、Polybrominated diphenyl ether (PBDE).
European RoHS added four phthalic acid substances on July 22, 2019.
The four additional substances refer to four phthalate esters (DEHP, BBP, DBP, DIBP).

Lead (PB)	Mercury (HG)	Cadmium (Cd)	Hexavalent Chromium (Cr Ⅵ)	PBB	PBDE	DEHP	BBP	DBP	DIBP
1000ppm Max	1000ppm Max	100ppm Max	1000ppm Max	1000ppm Max	1000ppm Max	1000ppm Max	1000ppm Max	1000ppm Max	1000ppm Max

(2) China RoHS

China RoHS directive is formally known as “Management Methods for Controlling Pollution by Electronic Information Products”, which was implemented on March 1st, 2007 in China.
After that, the Administrative Measures for the Restriction of the Use of Hazardous Substances in Electrical and Electronic Products is hereby released, and comes into effect from the date of July 1st, 2016.
China RoHS restricts the same six substances as EU RoHS.
To clearly disclose contents of the 6 restricted substances listed below.

Usage deadline for environmental protection	Product name	Lead(*1) (PB)	Mercury (HG)	Cadmium (Cd)	Hexavalent Chromium (Cr Ⅵ)	PBB	PBDE
	Power Supply for LED Illumination	×	○	○	○	○	○

○: The amount of this toxic or hazardous substances contained in all of the homogeneous materials for this product is below the limit requirements in the China National Standard GB/T 26572-2011.
×: The amount of this toxic or hazardous substances contained in at least one of the homogeneous materials used of this product is above the limit requirements in the China National Standard GB/T 26572-2011.
*1: Lead is excluded in EU RoHS.

11.Optional Accessories

External trigger input cable

Model : DS9M-DS9FTR-3,DS9M-OW-3

Connector : D-sub(9pin)

12.Warranty

For VS Technology LED Lighting products only.

Warranty	(1) Warranty Period The warranty period for power supplies and controllers is one year from the date of delivery. The warranty period for LED lighting products is two years from the date of product delivery. However, the warranty for LED irradiance and illuminance is one year. (at least 50% of the final inspection value before shipment.)

(2) Warranty coverage

In the unlikely event of a defect or malfunction arising from the product itself under normal use within the warranty period, VS Technology Co., Ltd. will, in good faith, replace or repair the defective parts free of charge.

However, the following malfunctions are not covered by the warranty, even within the warranty period.

○ Malfunction or damage caused by conditions, environment, handling, or use of the product other than those described in the instruction manual and specifications.

○ Defects or damages caused by changes in structure, performance, specifications, etc. made by the customer after the date of delivery of the product.

○ Defects or damage caused by use of the product for purposes other than those for which it was designed.

○ Malfunctions and damage caused by salt wind, gas, earthquake, flood, fire, lightning, collision, or other natural or human-caused damage and malfunctions.

(3) Abandonment

VS Technology Co., Ltd. shall not be liable for incidental damages (e.g., business related expenses, business interruption).

≪NOTICE≫

If you have any questions or concerns, please do not hesitate to contact VS Technology Co., Ltd.

For repair or after-sales service, please contact the VS Technology Co., Ltd. office or the sales representative where you purchased the product.

When requesting service, please provide us with the following information.

Please feel free to contact us if you have any question.

Model Name

Serial No.:

Date of purchase: . . .

State of trouble:Please provide detailed information

Your name, address, telephone number, email-address

VS TECHNOLOGY

MACHINE VISION OPTICS