CREATIVE CUSTOMER SATISFACTION

User Manual

HYPER LED Light Source

PFB2-20SW-F-SJT Series

CE

Warranty Information Included	Warranty information on this product is provided on the back cover of this User Manual. Be sure to read it.

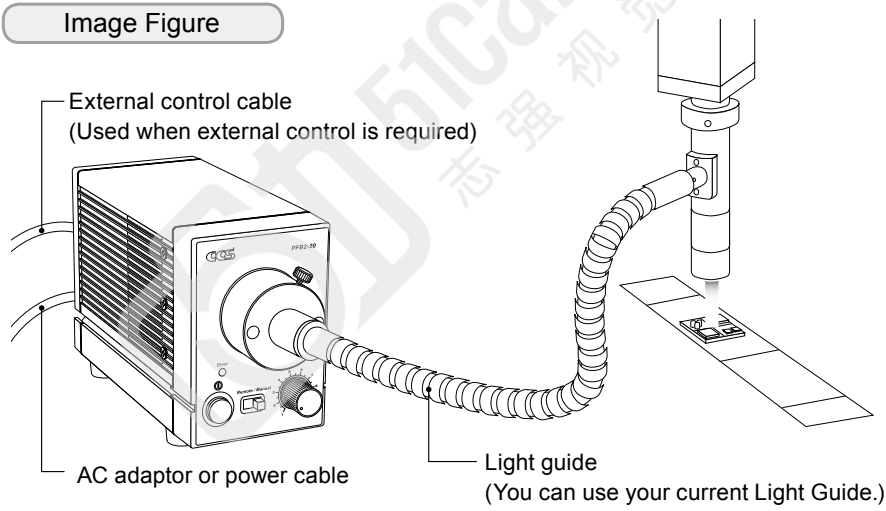
Thank you for purchasing a CCS product. In order to properly use this product, please read this User Manual before using and keep it for future reference.

Introduction

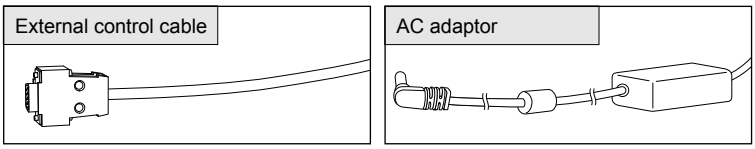
Features

- This HYPER LED Light Source Unit is mainly used as a light source for image processing and industrial inspection. It is used with a Light Guide attached. This enables a high output and the selection of a lighting pattern that is suitable for the application.
- This HYPER LED Light Source Unit is compatible with 17 different models of Light Guides. (Refer to the HYPER LED Light Source Lineup on page 2.)
- The light intensity is controlled using a variable current control method.
- The light intensity can be manually controlled by adjusting the intensity control knob, or can be externally controlled using a PLC or image processing device.
- The light intensity can be controlled or turned light ON/OFF through external control.

Image Figure

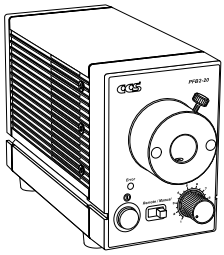


Optional item, sold separately



Checking the Product and Its Accessories

Before installing the product, please check that all the items shown below are included in your product package. If any of these items are missing, please contact CCS Inc. (please refer to the back cover).

LED Light Source Unit (Main Unit)	User Manual
	

HYPER LED Light Source (PFB2-20SW-F-SJT Series) Lineup

Seventeen models with differently shaped light guide adaptors are available in the product lineup. The user can select a model which is suitable for the light guide being used.
(Refer to page 9 for a table of applicable models for various Light Guide dimensions.)

Models			
PFB2-20SW-F-SJT-MO	PFB2-20SW-F-SJT-SH1	PFB2-20SW-F-SJT-DJ4	PFB2-20SW-F-SJT-VL
PFB2-20SW-F-SJT-NP	PFB2-20SW-F-SJT-SH2	PFB2-20SW-F-SJT-TE	PFB2-20SW-F-SJT-IT
PFB2-20SW-F-SJT-MI	PFB2-20SW-F-SJT-DJ1	PFB2-20SW-F-SJT-CS1	
PFB2-20SW-F-SJT-HY	PFB2-20SW-F-SJT-DJ2	PFB2-20SW-F-SJT-CS2	
PFB2-20SW-F-SJT-SU	PFB2-20SW-F-SJT-DJ3	PFB2-20SW-F-SJT-TF	

Do not use the product in the following conditions.

- Conditions or an environment not described in this User Manual.
- For nuclear power control, railways, aircraft, any other vehicles, combustion equipment, medical applications, amusement devices, or safety devices.
- Situations in which there is a large and foreseeable risk to life and/or property, particularly applications demanding a high level of safety.

Important Equipment Safety Information

Incorrect usage of the product may result in fire, electric shock, or other serious damage. Please ensure to follow the conditions below.

Symbol descriptions

Warning	Indicates that incorrect usage may result in serious injury or death.
Caution	Indicates that incorrect usage may result in injury or property damage.

Symbol examples

 FIRE HAZARD	△ symbols indicate cautions (also including danger and warning). Specific examples are shown in diagrams. (The diagram on the left indicates fire warning).
 DISASSEMBLY PROHIBITED	⃠ symbols indicate prohibition. Specific examples are shown in diagrams. (The diagram on the left indicates prohibition to disassemble).
 UNPLUG	● symbols indicate required actions. Specific examples are shown in diagrams. (The diagram on the left indicates unplugging a power cord).

Please read "Symbol examples" carefully for safe usage of products.

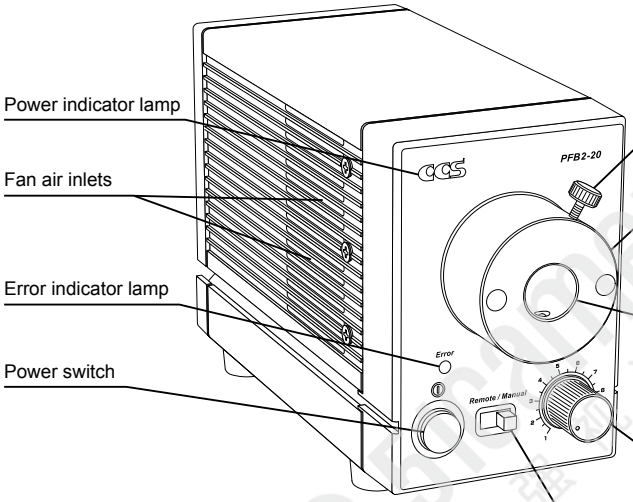
	Warning
 MANDATORY ACTIONS	LED light radiation may cause corneal or retinal abnormalities if you look directly at the light. To prevent harmful light exposure, never look directly at the LED light.
 DISASSEMBLY PROHIBITED	Do not disassemble or modify the product. Doing so may result in fire or electric shock.
 FIRE HAZARD	Turn the power supply OFF when connecting or disconnecting the product and peripherals. Failure to do so may results in fire or electric shock.
 DO NOT SUBJECT TO MOISTURE	Make sure that the product is free of moisture or any liquid. Exposure to water may result in fire, electric shock, or product failure.
 DO NOT TOUCH WITH WET HANDS	Do not touch the terminals, plugs, or switches with wet hands. Doing so may result in electric shock.
 SHOCK HAZARD	Do not touch the power supply cords or connect peripheral devices during lightning. This may result in electric shock.
 UNPLUG	If abnormal condition occurs, such as fuming, high product temperature, smell, noise, or so on, stop using the product immediately, and turn the power OFF. A fire or electric shock may result if the product is kept used.

	⚠ Caution
 FIRE HAZARD	Always use one of the following power cord when using the AC adaptor. 100 to 120V range: SVT or SJT type, AWG18, length: 3m max., dielectric strength: 125V min. 200 to 240V range: H05VV-F type, AWG18, length: 3m max., dielectric strength: 250V min.
 FIRE HAZARD	Do not place product under direct sunlight or in a high humidity environment. Doing so may result in fire due to internal temperature rise.
 PROHIBITED	Always place product on a stable and flat location. Not doing so may result in the product falling or toppling, which may cause bodily injury.
 MANDATORY ACTIONS	Please use designated power sources with stable voltage. Sharing a power source with inverters, motors, etc. may cause malfunction.
 MANDATORY ACTIONS	Make sure that the light guide to be connected matches the product's specifications and dimensions. Using a light guide that does not match the product's specifications and dimensions may result in product failure.
 MANDATORY ACTIONS	Do not bundle product cables with high-voltage lines or power lines. Doing so may cause the product to malfunction. Keep the product cables as far away from such lines as possible.
 MANDATORY ACTIONS	Do not bend or jam cables when wiring product. Doing so may result in product failure.
 MANDATORY ACTIONS	Before moving product, disconnect cables. Damaging the cables may result in fire or electric shock.
 PROHIBITED	Do not disconnect cables or disassemble product while operating. Doing so may result in product failure.
 MANDATORY ACTIONS	Make sure to hold and pull from the plugs when disconnecting the cables. Not pulling from the plugs may damage the cable and result in fire or electric shock.
 MANDATORY ACTIONS	Use a dry cloth to remove dust or other foreign matter from the plug electrodes of power supply cables. Failure to do so may result in fire.
 PROHIBITED	Do not drop or subject the product to impact. Doing so may result in product failure.
 PROHIBITED	To avoid product surface discoloration or deterioration, do not wipe product with volatiles such as paint thinner or benzene.

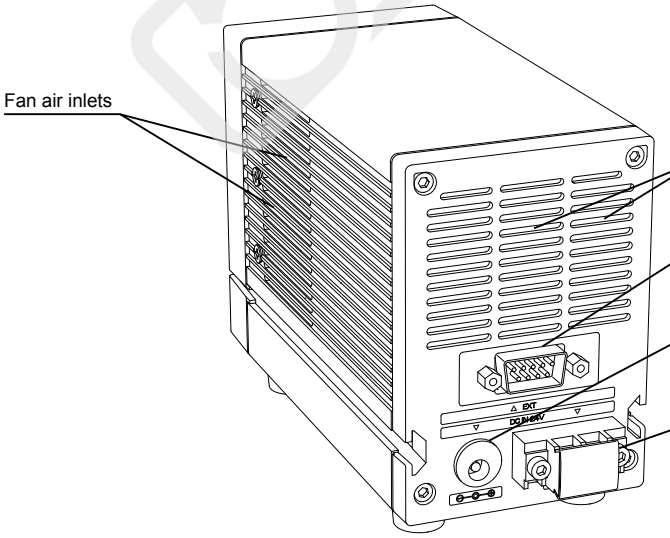
Name and Function of Each Part

Light Source Unit

Front

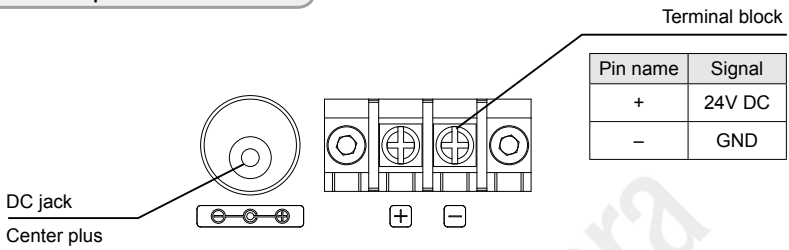


Rear



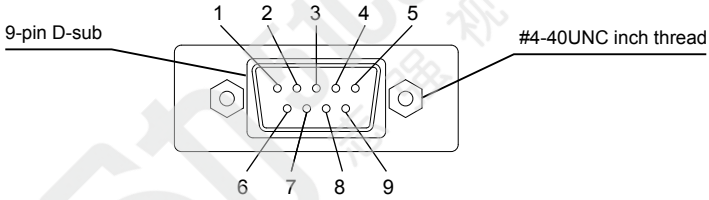
Connectors

Power Input Connector



Pin name	Signal
+	24V DC
–	GND

External Control Connector



Pin number	Signal	Function
1	NC	Not connected
2	RXD	Send command
3	TXD	Receive command
4	NC	Not connected
5	GND	Connect to external ground
6	NC	Not connected
7	RTS	Connect to pin 8
8	CTS	Connect to pin 7
9	NC	Not connected

An optional CCS external control cable EXCB2-9-9-3-ST (a 3m long cable with a connector) is sold separately.
The user may prepare a shielded control cable as long as the length does not exceed 3m.

Installation

Installation Environment

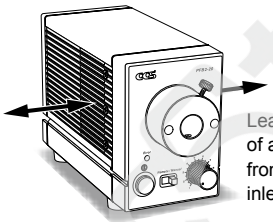
⚠Caution Please use products in locations with following conditions. Incorrect installation location may cause product failure.

- On a flat and stable location with minimal vibration.
- Well ventilated places with minimal dust.
- Places free from corrosive or combustible gas.
- Places away from water faucets, boilers, humidifiers, air conditioners, heaters, or stoves.
- Places that are not subject to sudden temperature changes.

⚠Warning Do not block the fan air inlets or fan exhaust outlets. Insufficient ventilation may cause heat to accumulate inside the product and result in a fire.

MANDATORY ACTIONS

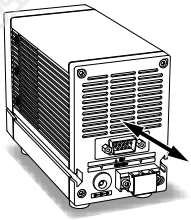
Do not place any objects within 50mm from the fan air inlet.



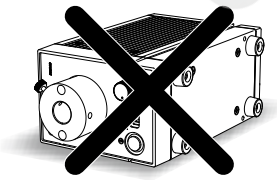
Leave a space of at least 50mm from the fan air inlet

MANDATORY ACTIONS

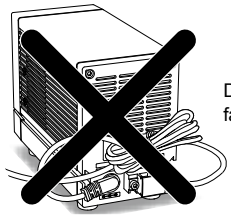
Do not place any objects within 50mm from the fan exhaust outlet.



Leave a space of at least 50mm from the fan exhaust outlet



Do not place the product on its side.

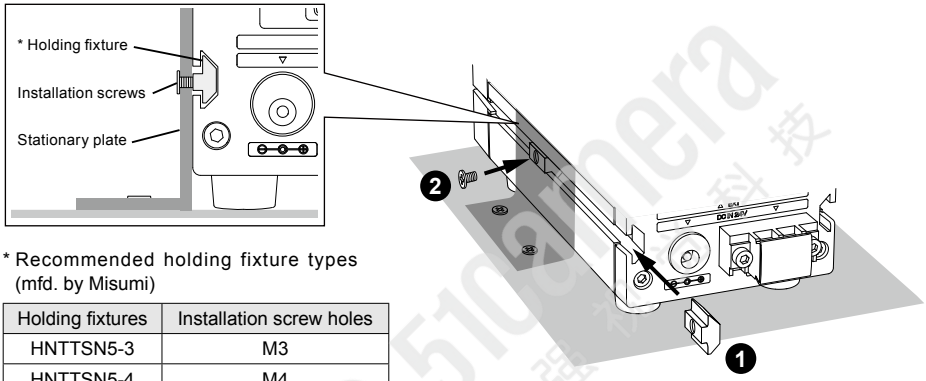


Do not block the fan.

Making the Unit Secure

Securing the Side

1. Insert holding fixture into the slit on the side of the unit.
2. Tighten the installation screws to secure the unit.
   Note: The holding fixture, installation screws, and stationary plate must be provided by the user.

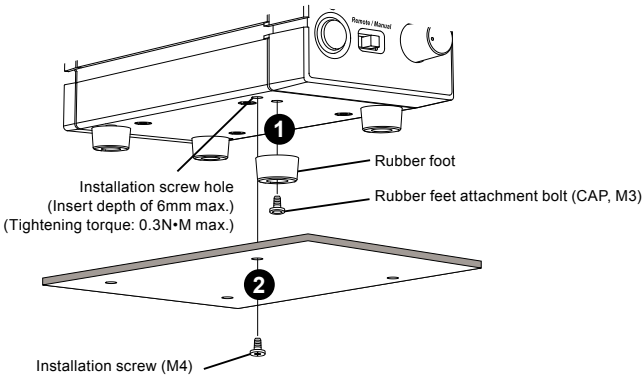


* Recommended holding fixture types (mfd. by Misumi)

Holding fixtures	Installation screw holes
HNTTSN5-3	M3
HNTTSN5-4	M4
HNTTSN5-5	M5

Securing the Bottom

1. Remove the rubber feet from the bottom of the unit.
   Use a hex wrench to remove the rubber feet attachment bolts.
2. Tighten the installation screws to secure the unit.
   Note: The installation screws must be provided by the user.



Connecting Cables

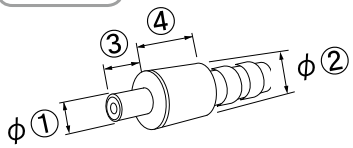
⚠Warning Before connection, make sure that the power is turned OFF. Making connections with the power ON may result in a fire or electric shock.

Insert the Light Guide

Checking the Light Guide

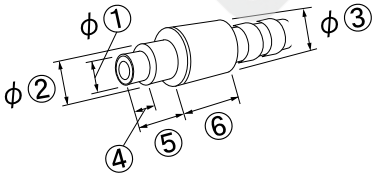
Check the model of the PFB2-20SW-F-SJT that you purchased and then select an applicable Light Guide from the following table.

Type 1



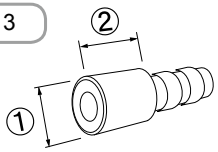
Light guide dimensions				Applicable models PFB2-20SW-F-SJT
Insertion tip diameter (mm)		Insertion tip length (mm)		
①	②	③	④	
15	25 to 32	37	30 to 48	-MO
15	25 to 35	31	23.5 to 80	-NP
15	20 to 31	21	30 to 40	-MI
15	25 to 40	20	30 to 70	-HY
15	18	22.2	17.8	-VL
15	25 to 30	30	25 to 30	-TF
15.87	18	12.7	18.5	-TE
18.24	22	25	32.5	-SH2
7.92	10.72	12.7	14.2	-DJ1
14.27	15.6	12.7	19.6	-DJ2
11.13	15.86	12.7	25.45	-DJ3
4.72	6.35	12.7	14.2	-DJ4
8	14	12	12 to 23	-CS1
22	35	33	40	-CS2

Type 2



Light guide dimensions						Applicable models PFB2-20SW-F-SJT
Insertion tip diameter (mm)			Insertion tip length (mm)			
①	②	③	④	⑤	⑥	
13	20	25	15	30	30	-SU
15.9	18.2	22.1	6.4	18.3	32.7	-SH1

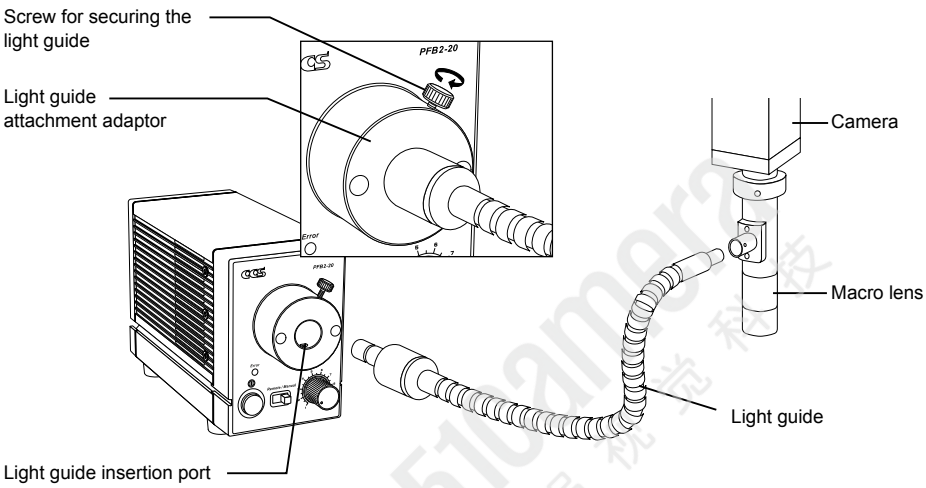
Type 3



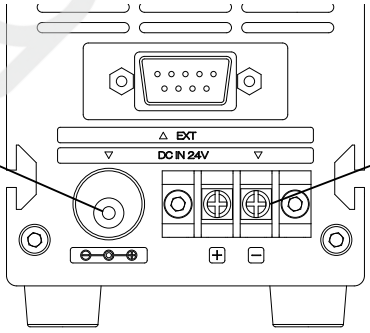
Light guide dimensions		Applicable models PFB2-20SW-F-SJT
Insertion tip diameter (mm)	Insertion tip length (mm)	
①	②	
15.875	31.65	-IT

Connecting the Light Guide

Insert the light guide into the insertion port, then tighten the screw to secure the light guide.



Connecting the Power Cable or AC Adaptor



Using an AC adaptor

Connect the AC adaptor to the DC jack. (The optional AC adaptor is sold separately.) Refer to page 12.

Using a power cable

Connect a power cable to the terminal block. (The power cable must be provided by the user.) Refer to page 11.

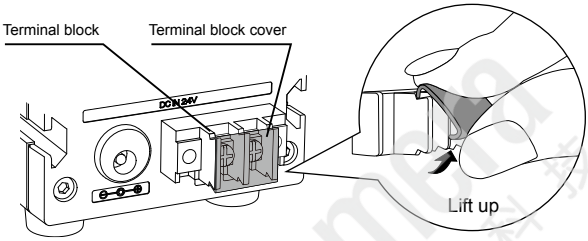
⚠Caution Do not connect a power cable and AC adaptor at the same time.

Connecting Cables

Using a Power Cable

Connect a power cable from a 24V DC source to the terminal block on the back of the unit. (The power cable must be provided by the user.)

1 Detach the terminal block cover.



2 Loosen the screw with a Philips screwdriver, attach the power cable, and retighten the screw.

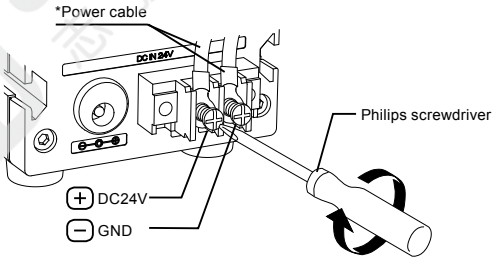
⚠Caution Do not connect the power cable with the positive and negative terminals reversed.

***Power cable**

Be sure to connect properly with insulated crimp terminals.

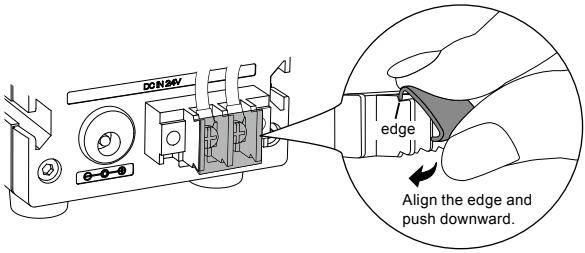
Recommended crimp terminal:

NICHIFU M3 crimp terminals with insulating sheath
Ring or "Y" TMEV 1.25-3



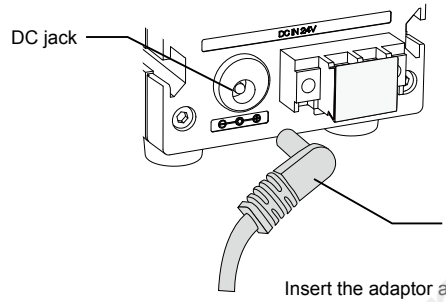
3 Attach the terminal block cover.

⚠Caution Always attach the terminal block cover to prevent short-circuits between the positive and negative terminals. Short-circuits can damage peripheral devices.



Using an AC Adaptor

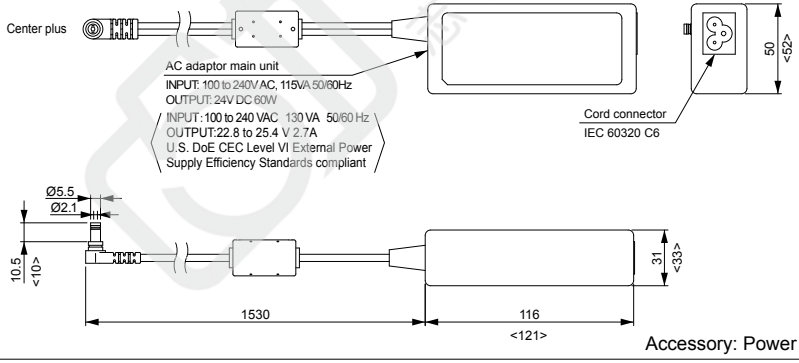
Connect the AC adaptor (optional item, sold separately) to the DC jack on the rear side.



Outside drawing of the AC adaptor (optional item, sold separately)

Model: ADP2460-PFB-JT
ADP2460-PFB-JTLV6* (Ready for the standards in the U.S.)
* Use this product when you use the AC adaptor in the U.S.

Unit: mm
< >: ADP2460-PFB-JTLV6 specs.



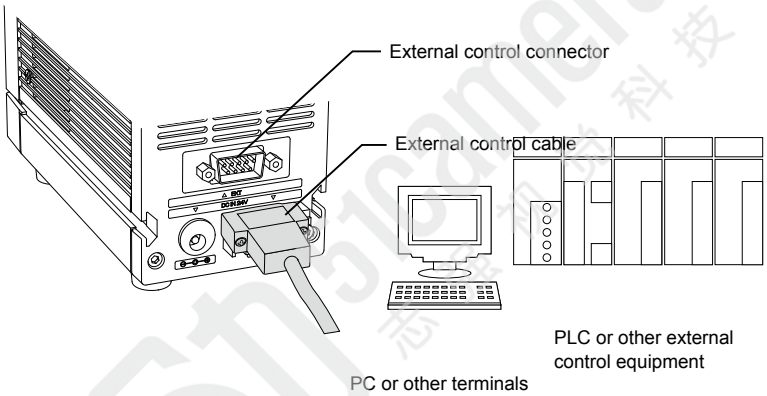
Accessory: Power cord

⚠Caution Do not use any AC adaptor other than the above models. Doing so may result in product failure. Use of the LED Light Source with any AC adaptor other than the above models is not covered under warranty.

Connect the External Control Cable (Used when external control is require)

1. Make sure that the product and external control equipment are turned OFF.
2. Refer to the page 6 connector configuration table, and connect to the external control equipment.
3. Connect the external control cable (optional item, sold separately) to the external control connector on the back of the product.

Note: External noise can cause unstable operation. Use the product in an environment with as little noise as possible.

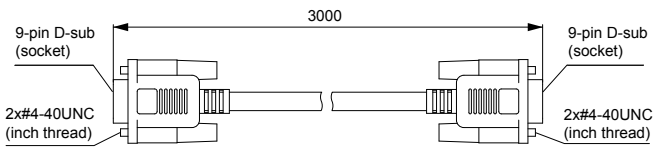


Outside drawing of the external control cable (optional item, sold separately)

Unit: mm

Model: EXCB-9-9-3-ST

Conforms to EIA-232.



CN1		CN2
①	-------	①
②	-------	②
③	-------	③
④	-------	④
⑤	-------	⑤
⑥	-------	⑥
⑦	-------	⑦
⑧	-------	⑧
⑨	-------	⑨
Frame		Frame

Preparation Capture Images

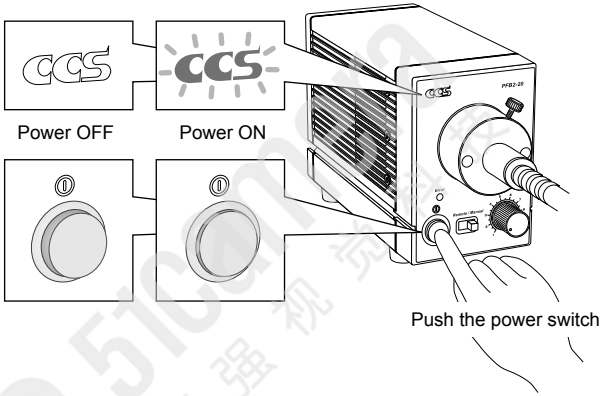
⚠Warning Do not look into the light guide insertion port with the power turned ON. Depending on the light radiant quantity, there is a danger that this could have an adverse effect on the eye.

Turning Power ON and OFF

Push the power switch to turn the power ON.

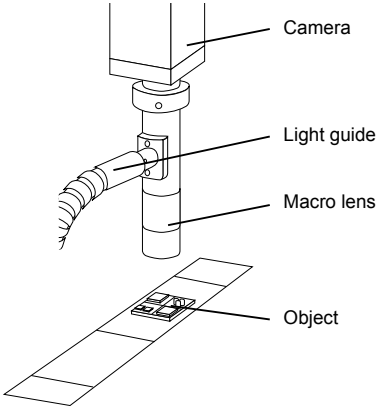
Push the switch again to turn the power OFF.

When the power is turned ON, the power indicator lamp lights.



Preparation Capture Images

1. Turn ON the power.
2. Select the lens, and focus imaging devices such as cameras, microscopes, etc. to inspection objects.
3. Adjust radiant quantity to optimize images.



Be sure to read the User Manuals for all peripheral devices before using them.

Manual Operation

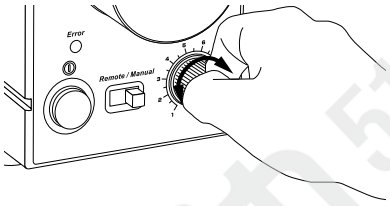
Check the Mode

Set the Remote/Manual selection switch to the Manual position.

Remote / Manual

Control Light Intensity

Adjust the intensity control knob on the front panel to set the light intensity. The light intensity control is stepless from a minimum intensity of 1 to a maximum intensity of 10.



Note: The light intensity of this product is very faint when the intensity control knob is set to the minimum intensity. The product uses a high-intensity LED, which may sometimes flicker or go OFF when the intensity control knob is set to the minimum intensity or close to the minimum intensity. This results from the characteristics of the LED, and does not indicate a failure.

Remote Operation

Check the Mode

Set the Remote/Manual selection switch to the Remote position.
Note: Do not switch during communications.

Remote / Manual

Use External Control

Connect the external control cable and send a command with reference to the following “List of Functions” and “Communication Specifications” in page 17.

* This product does not have data storage function. When cycling the power supply, it is reset and light intensity setting or so is required again.

List of Functions

Type	Function	Details	Send command	Receive command (OK)	Receive command (NG)
Set	Light intensity setting	Sets the light intensity data	F nnn (nnn = 000 to 255) 000: Minimum light intensity value 255: Maximum light intensity value (default : 000)	O	N nn (nn is the error number) Refer to page 18 "Errors".
	Light ON/OFF control	Turns the light ON and OFF	Ln (n = 0/1) 0: Light OFF,1: Light ON (default : 1)	O	
	Software reset	Restores the default values	R	O	
Confirm	Knob light intensity value check	Confirms the light intensity value that was set manually	QV	O nnn (nnn = 000 to 255)	
	Command light intensity value check	Confirms the light intensity value sent by the command	QF	O nnn (nnn = 000 to 255)	
	Firmware version	Confirms the firmware (the software that controls the unit) version	V	O nnn (nnn is the version number)	
	Status inquiry	Confirms status, including abnormal LED temperatures, LED open failures, and fan shutdown.	QS	Onnn (n=0/1 0: Normal, 1: Error) Status is given in the following order starting from the left: abnormal LED temperature, LED failure, fan status.	

Note:The light intensity of this product is very faint when the intensity control knob is set to the minimum intensity. The product uses a high-intensity LED, which may sometimes flicker or go OFF when the intensity control knob is set to the minimum intensity or close to the minimum intensity. This results from the characteristics of the LED, and does not indicate a failure.

Note: An External Control Cable is available as an option (9-pin D-sub EIA-232 standard).
Refer to Connect the external control cable on page 13.

Communications Specifications

Protocol

Data bit length	8 bits
Stop bit	1
Parity check	None
Baud rate	9600bps

Text string

ASCII code

Command formats

Transmit command

Header	Prefix	Command	Write flag	Check sum		Delimiter	
@	00 (fixed)	Transmit command *	0 (fixed)	Upper	Lower	CR	LF

Receive command

Header	Prefix	OK/NG command	Check sum		Delimiter	
@	00 (fixed)	Receive command *	Upper	Lower	CR	LF

* Refer to the page 16 "List of functions".

Check sums

The term "check sums" means what is obtained by converting command character strings to ASCII code, and converting the value for lower 1 byte of the sum of header to check sum position into 2-byte ASCII code.

Example: Light intensity setting command

Header	Prefix	Command	Write flag	Check sum		Delimiter	
@	00	F 125	0	A	E	CR	LF

Conversion to ASCII code

Header	Prefix	Command	Write flag	Check sum		Delimiter	
40 H	30 H 30 H	46 H 31 H 32 H 35 H	30H	41 H	45 H	CR	LF

Sum 1AE H — AE H

A E

The lower 1 byte is converted to 2-byte ASCII code

Errors

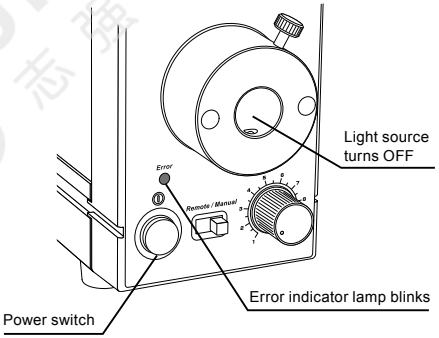
Command Transmission Failure

If a command is not transmitted properly, the incoming command will display an error number. Confirm the details of the error using the table below and take appropriate measures.

Error number	Details		
00	Command error	Not in the proper transmit command format.	Refer to "page 17 Command formats".
01	Check sum error	The check sum values are not correct.	Refer to "page 17 Check sums".
02	Communications error	One of the following communications errors occurred. [Overrun] The next data was written before the current data was written. [Framing error] The stop bit was not detected.	Confirm that the external equipment you are using and the system within this product are compatible. Confirm that the protocols are compatible.

Malfunction Detection Functions

If errors listed below occur, the error indicator lamp blinks. To clear the error, remove the cause of the error and then cycle the power supply.

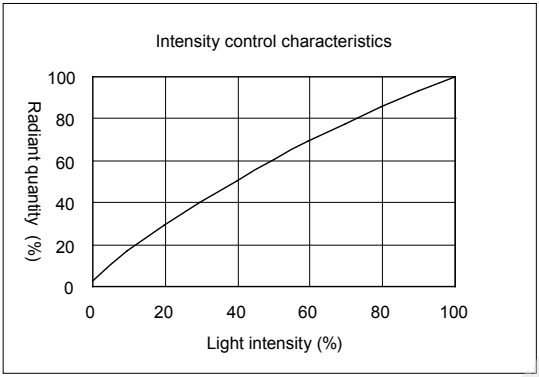


Error	Details
Abnormal LED temperature error*1*2	An abnormal LED temperature occurred.
LED failure error*1	The LED blowout error detection function operated.
Fan status error*1	The fan stopped operating.
System clock shutdown error*2	The internal circuit oscillator malfunctioned.

*1 The errors can be detected by the send command (QS) externally. Refer to the page 16 "List of functions" for details.

*2 The light source turns OFF and the error indicator lamp blinks. Immediately turn the power switch and the power supply on the supply side OFF, and please contact CCS Inc. (please refer to the back cover).

Intensity Control Characteristics (reference graph)



Note:
Attach a straight light guide with a join diameter of 8 mm and measure the value at a position 50mm from the end of the fiber (values are not guaranteed).

Light ON/OFF Response Delay Time (reference values)

Delay time (max.)	
Delay time before light ON after receipt of ON/OFF control command	3800µs
Delay time before light OFF after receipt of ON/OFF control command	1000µs

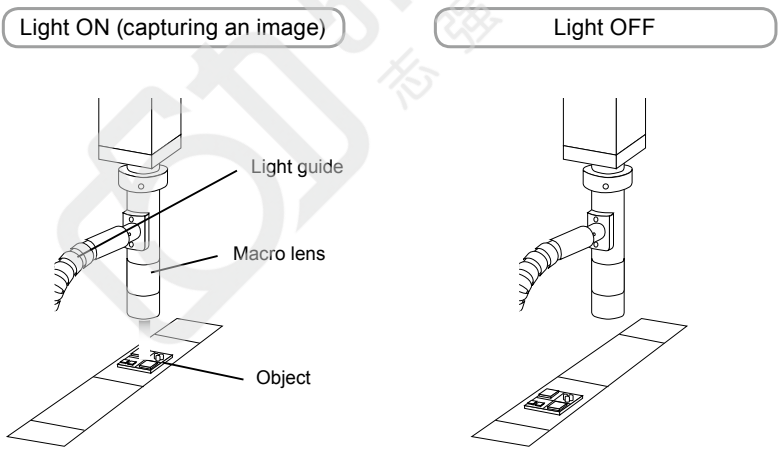
Efficient use of LED Light Source

If the LED is used at high temperatures, the lifetime of the LED light source is shortened.

LED light source have the property of degrading radiant quantity and accelerating deterioration through heat generation of the LED itself.

For long-life operation

- Keep the light intensity as low as possible.
  As a guide, set the light intensity control levels to approximately 50% or less.
- Turn the light ON only when capturing images.
  The LED light source is a form with strong switching. It is possible to reduce heat generation, maintain stable radiant quantity, and lengthen the lifetime of the LED light source by using an light ON/OFF signal to turn the light ON only when capturing images.



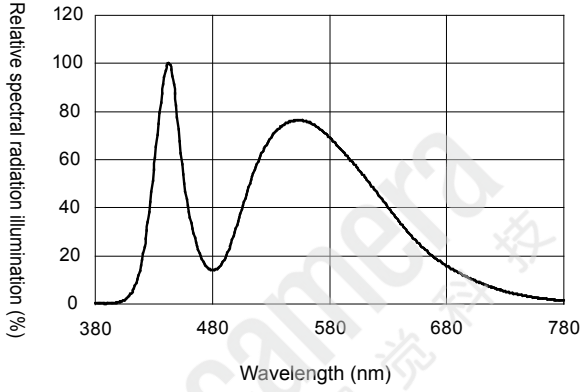
Example: Turn the light ON only when inspecting the object, then turn it OFF when the inspection is finished.

Troubleshooting

If you have any problems during product usage, please look up the cause in this chart. If the situation does not improve, or an unexpected situation occurs, please contact CCS Inc. (please refer to the back cover).

Symptom	Items to check for fixing the problem	
	Manual mode	Remote mode
Lights not illuminating	Is the power cable securely inserted into the terminal block on the back of the product and on the supply side? **(→Reference page: 11)**	
	Is the AC adaptor inserted firmly into the DC jack on the rear side and a wall socket? **(→Reference page: 12)**	
	Is the power switch turned ON? Check the front power switch **(→Reference page: 14)**	
	Are all power sources turned ON? Check the power sources to which the power cable is connected.	
		Make sure that the light ON/OFF control is not in the OFF position. **(→Reference page: 16)**
Lights unable to control	Is the selection switch on the front panel set to the Manual position? **(→Reference page: 15)**	Is the selection switch on the front panel set to the Remote position? **(→Reference page: 16)**
		Is the external control cable fully inserted into the external control connector? **(→Reference page: 13)**
The light flickers or goes OFF when the intensity control knob is set to the minimum intensity	The light may sometimes flicker or go OFF when the intensity control knob is set to the minimum intensity or close to the minimum intensity. This results from the characteristics of the LED, and does not indicate a failure. Increase the setting of the intensity control knob if a problem occurs.	
Unable to use light ON/OFF control	Is the external control cable fully inserted into the external control connector? **(→Reference page: P13)**	
The unit does not turning OFF even if the power switch is turned OFF.	There is a possibility of product failure. Please stop usage immediately and turn OFF the power switch. Please do not attempt to use or repair the product, since it is dangerous, but contact CCS Inc. (please refer to the back cover).	
Malfunctioning	Please use designated power sources with stable voltage. Sharing power sources with inverters, motors, etc., may cause malfunction.	
	Do not bundle product cables with high-voltage lines or power lines. Doing so may cause the product to malfunction. Keep the product cables as far away from such lines as possible.	
	Do not bend or jam cables when wiring product. Doing so may cause product failure.	
	If the situation does not improve after following these instructions, or other conditions arise, please contact CCS Inc. (please refer to the back cover).	
Fuming,extreme temperature,smell, noise,or other abnormality	There is a possibility of product failure. Please stop usage immediately and turn OFF the power switch. Please do not attempt to use or repair the product, since it is dangerous, but contact CCS Inc. (please refer to the back cover).	

Main Specifications

Product name	HYPER LED Light Source
Model	PFB2-20SW-F-SJT-xx (xx: depends on the light guide attachment adaptor)
LED color	White
LED wavelength properties (reference values)	
Illumination	130,000 lx min. * Attach a straight light guide with a join diameter of 8mm and measure the value at a position 50mm from the end of the fiber.
Relative color temperature (typ.)	6,000K
Lighting method	Constant lighting
Drive method	Constant-current system
Light intensity control method	Variable current control
The number of channels	1 Channel
Light intensity control	Manual: Continuous control using the intensity control knob Remote: 256-step light intensity using RS-232C communications command (default value: 0) Using the Remote/Manual switch on the front panel
Light ON/OFF control	Using the RS-232C communications command
Lighting delay (max.)	3800 µs (ON time)

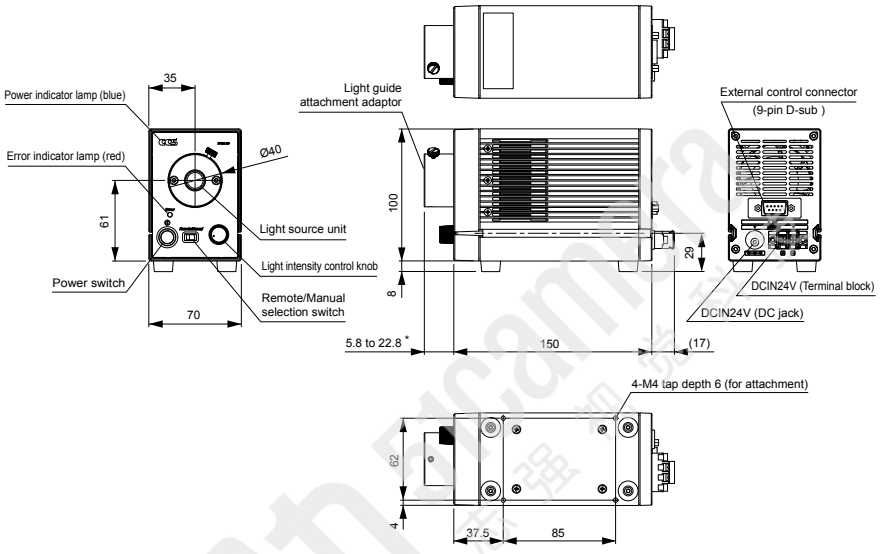
Main Specifications

Error detection	An error indicator lamp on the front panel flashes (0.5 sec) and output stops <Error details> • LED open failure detected • LED abnormal temperature detected • Fan shutdown detected (The output will not stop.) • Microcontroller oscillator shutdown detected *Recovery by cycling power supply
Error detection output	The RS-232C communications command returns error command Note: In the case of a microcontroller oscillator shutdown error, communications are not possible, so the only indicator is the flashing lamp.
Input protection	Fuse
Input voltage (rated)	24V DC
Input voltage (range)	21.6 to 26.4V DC
Power consumption (typ.)	15W
Insulation resistance voltage (input-FG)	Insulation resistance: 500V DC, 1M Ω min. Withstanding voltage: 250V AC for one minute, cutoff current: 10 mA max.
Operating environment	Temperature: 0 to 40°C, Humidity: 20 to 85%RH (No condensation)
Storage environment	Temperature: -20 to 60°C, Humidity: 20 to 85%RH (No condensation)
Vibration resistance	Acceleration: 19.6 m/sec^2, frequency: 10 to 55 Hz, cycle: 3 minutes, for 1 hour each in X, Y, and Z direction
Cooling method	Forced air cooling, Intake vents: sides, Exhaust vents: rear
CE marking	EMI standard: Complies with EN 61000-6-4 EMS standard: Complies with EN 61000-6-2
Environmental regulation	RoHS compliant
Dimensions	W 70 mm x D 150 mm x H 100 mm (not including connectors, knobs, legs, and other projections)
Material, coating, surface processing	<table><tr><th></th><th>Case</th><th>Front and rear panels</th></tr><tr><td>Surface processing</td><td>Black alumite</td><td>–</td></tr><tr><td>Material</td><td>Aluminum</td><td>ABS resin</td></tr></table>
Weight	1.2 kg max.
Accessories	User Manual

Dimension Diagram (mm)

Unit: mm

PFB2-20SW-F-SJT-xx



Note: The dimensions of the light guide attachment adaptor vary for each series.
For the dimensions of each series, please contact CCS Inc.

Accessing the download page

Access the CCS website on the Internet at http://www.ccs-grp.com/.

Select Machine Vision Applications - Products or New Product Information - PFB2-20SW-F-SJT, and then download the required dimensional drawings.

Note: You will have to register as a CCS Member to be able to download the drawings.
If you are not already registered as a member, go to the registration page.

Environmental Regulation

EU RoHS Directive

The RoHS Directive is short for the "restriction of use of certain hazardous substances in electrical and electronic equipment." As a directive, it restricts the use of specific hazardous substances for new electrical and electronic equipment marketed in the EU on or after July 1, 2006, and restricts the use of six substances, which are (1) lead, (2) mercury, (3) cadmium, (4) hexavalent chromium, (5) polybrominated biphenyl (PBB), and (6) polybrominated diphenyl ether (PBDE).

*Standards for "RoHS Directive-Compliant Products"

Lead	Mercury	Cadmium	Hexavalent chromium	PBB	PBDE
1000ppm max.	1000ppm max.	100ppm max.	1000ppm max.	1000ppm max.	1000ppm max.

(Items that are exempted in the RoHS Directive are excluded from these standards.)

China RoHS Directive

China RoHS Directive is formally known as "Management Methods for Controlling Pollution by Electronic Information Products", which was implemented on March 1, 2007 in China. Same as EU RoHS Directive, this regulation restricts the usage of six substances such as lead, mercury, cadmium, hexavalent chromium, polybrominated biphenyl (PBB), and polybrominated diphenyl ether (PBDE). This regulation requires electronic information products which are manufactured or imported, and sold in China, to clearly disclose contents of the 6 restricted substances listed below.

Name and amount of toxic and hazardous substances or elements

Usage Deadline for Environmental Protection	Product name	Toxic or Hazardous Substances and Elements					
		Lead (Pb)	Mercury (Hg)	Cadmium (Cd)	Hexavalent chromium (Cr(VI))	PBB	PBDE
10	Integrated lights and control units	×	○	×	○	○	○

○: Indicates that this toxic or hazardous substances contained in all the homogeneous materials for this part, according to SJ/T11363-2006 is within the limit requirement.
×: Indicates that this toxic or hazardous substance contained in all the homogeneous materials for this part, according to SJ/T11363-2006, is over the limit requirement.
*Lead and cadmium are excluded in EU RoHS.

Usage deadline for environmental protection
The number used in this logo is based on "Management Methods for Controlling Pollution by Electronic Information Products" and related regulations from People's Republic of China. It shows the product usage duration in years for environmental protection. After finishing a product usage, the product needs to be re-used or discarded appropriately following local law and regulations, complying with safety and usage caution.

产品中有毒有害物质或元素的名称及含量

环保使用期限	产品	有毒有害物质或元素					
		铅（Pb）	汞（Hg）	镉（Cd）	六价铬(Cr(VI))	多溴联苯(PBB)	多溴二苯醚（PBDE）
10	照明・电源一体型	×	○	×	○	○	○

○：表示该有毒有害物质在该部件所有均质材料中的含量均在 SJ/T11363-2006 标准规定的限量要求以下。
×：表示该有毒有害物质至少在该部件的某一均质材料中的含量超出 SJ/T11363-2006 标准规定的限量要求。
（注）铅和镉中的“×”，因欧洲 RoHS 没限定，故用“○”表示。

环保使用期限
此标志的数字是根据中华人民共和国电子信息产品污染控制管理办法以及有关标准等，表示该产品的环保使用期限的年数。遵守产品的安全和使用上的注意，在产品使用后采取适当的方法根据各地法律，规定，回收再利用或进行废弃处理。

Warranty Information

EXCEPT FOR THE EXPRESS WARRANTIES STATED IN THIS DOCUMENT, CCS MAKES NO ADDITIONAL WARRANTIES, EXPRESS, IMPLIED, OR STATUTORY, AS TO ANY MATTER WHATSOEVER. IN PARTICULAR, ANY AND ALL WARRANTIES OF MERCHANTABILITY OR FITNESS FOR PARTICULAR PURPOSE ARE EXPRESSLY EXCLUDED. EXCEPT AS EXPRESSLY SET FORTH HEREIN, CCS MAKES NO WARRANTIES WITH RESPECT TO THE PRODUCTS.

WARRANTY PERIOD:
TWO YEARS (ONE YEAR FOR RADIANT QUANTITY), STARTING FROM CCS Inc. SHIPPING DATE.

CCS Inc. WILL REPAIR OR REPLACE THE PRODUCT FREE OF CHARGE IF IT SHOULD FAIL TO FUNCTION OR IF THE RADIANT QUANTITY OF THE PRODUCT SHOULD DROP TO 50% OR LESS OF ITS INITIAL RADIANT QUANTITY WITHIN THE SPECIFIED WARRANTY PERIOD.
IF EITHER OF THESE CONDITIONS OCCURS, PLEASE TAKE THE PRODUCT TO YOUR CCS SALES REPRESENTATIVE.

WARRANTY TERMS

1 CCS Inc. WILL REPAIR OR REPLACE THE PRODUCT FREE OF CHARGE IF IT SHOULD FAIL TO FUNCTION UNDER USE ON OUR SPECIFIED CONDITION IN ACCORDANCE WITH THE INSTRUCTION GUIDE AND OTHER WRITTEN CAUTIONS DURING THE INDICATED WARRANTY PERIOD OF TWO YEARS.

2 CCS Inc. WILL REPAIR OR REPLACE THE PRODUCT FREE OF CHARGE IF ITS RADIANT QUANTITY SHOULD DROP TO 50% OR LESS OF ITS INITIAL RADIANT QUANTITY UNDER USE ON OUR SPECIFIED CONDITION IN ACCORDANCE WITH THE INSTRUCTION GUIDE AND OTHER WRITTEN CAUTIONS DURING THE INDICATED WARRANTY PERIOD OF ONE YEAR.

3 CCS Inc. WILL CHARGE A REPAIR FEE UNDER THE FOLLOWING CONDITIONS:

1) IF THE PRODUCT HAS BEEN SUBJECTED TO MISUSE, UNAUTHORIZED REPAIRS, OR MODIFICATION FROM ITS ORIGINAL DESIGN.
2) IF THE PRODUCT HAS BEEN DAMAGED FROM IMPACTS DUE TO INAPPROPRIATE HANDLING.
3) IF DAMAGE TO THE PRODUCT RESULTS FROM EXTERNAL CAUSES INCLUDING ACCIDENTS, FIRE, POLLUTION, RIOTS, COMMUNICATION FAILURES, EARTHQUAKES, THUNDERSTORMS, WIND AND FLOOD DAMAGE, OR ANY OTHER ACT OF PROVIDENCE, OR FROM ANY EXTRAORDINARY CONDITIONS SUCH AS ELECTRICAL SURGES, WATER LEAKAGE, CONDENSATION, OR THE USE OF CHEMICALS.
4) IF THE DAMAGE RESULTS FROM CONNECTION TO ANY POWER SUPPLY OR TO ANY EQUIPMENT WHICH CCS Inc. DOES NOT MANUFACTURE OR DOES NOT SPECIFY FOR USE.

4 CCS ASSUMES NO LIABILITY FOR ANY PURCHASER'S SECONDARY DAMAGE (DAMAGE OF EQUIPMENT, LOSS OF OPPORTUNITIES, LOSS OF PROFITS, ETC.) OR ANY OTHER DAMAGE RESULTING FROM A FAILURE OF OUR PRODUCT.

THIS WARRANTY INFORMATION PROVIDES THE SCOPE OF CCS'S PRODUCT WARRANTY WITHIN THE SPECIFIED PERIOD, AND DOES NOT INDICATE OR IMPLY ANY FURTHER GUARANTEE BEYOND THE WARRANTY TERMS.

CONTACT CCS FOR INQUIRIES OR INFORMATION ON REPAIRS TO THE PRODUCT AFTER THE EXPIRATION OF THE WARRANTY.

NOTE: THE RADIANT QUANTITY REFERS TO THE WATTAGE OF PHYSICAL ENERGY RADIATED FROM A LED. IT REFERS TO THE RADIATION LUMINOSITY OF THE LED MEASURED UNDER CONDITIONS SPECIFIED BY CCS OR THE RADIATION ILLUMINATION OF THE LED UNDER SPECIFIED IRRADIATION CONDITIONS. CCS SPECIFIES THE RADIANT QUANTITY FOR EACH LED LIGHT BECAUSE THE MEASUREMENT AND IRRADIATION CONDITIONS VARY FROM THE FORM, THE APPLICATION AND THE IRRADIATION WAVELENGTH.

Ask any product queries to the following address or to your nearest CCS representative.

CCS Inc.

Headquarters Shimodachiuri-agaru, Karasuma-dori, Kamigyo-ku,Kyoto 602-8011 Japan
Phone : +81-75-415-8284 Fax : +81-75-415-8278 E-mail : intlsales@ccs-inc.co.jp

Use our website to find your nearest CCS representative. http://www.ccs-grp.com/mvad

Descriptions in this User Manual are based on information available as of February 2016. KZ03475-T001-005