LUMIGREEN

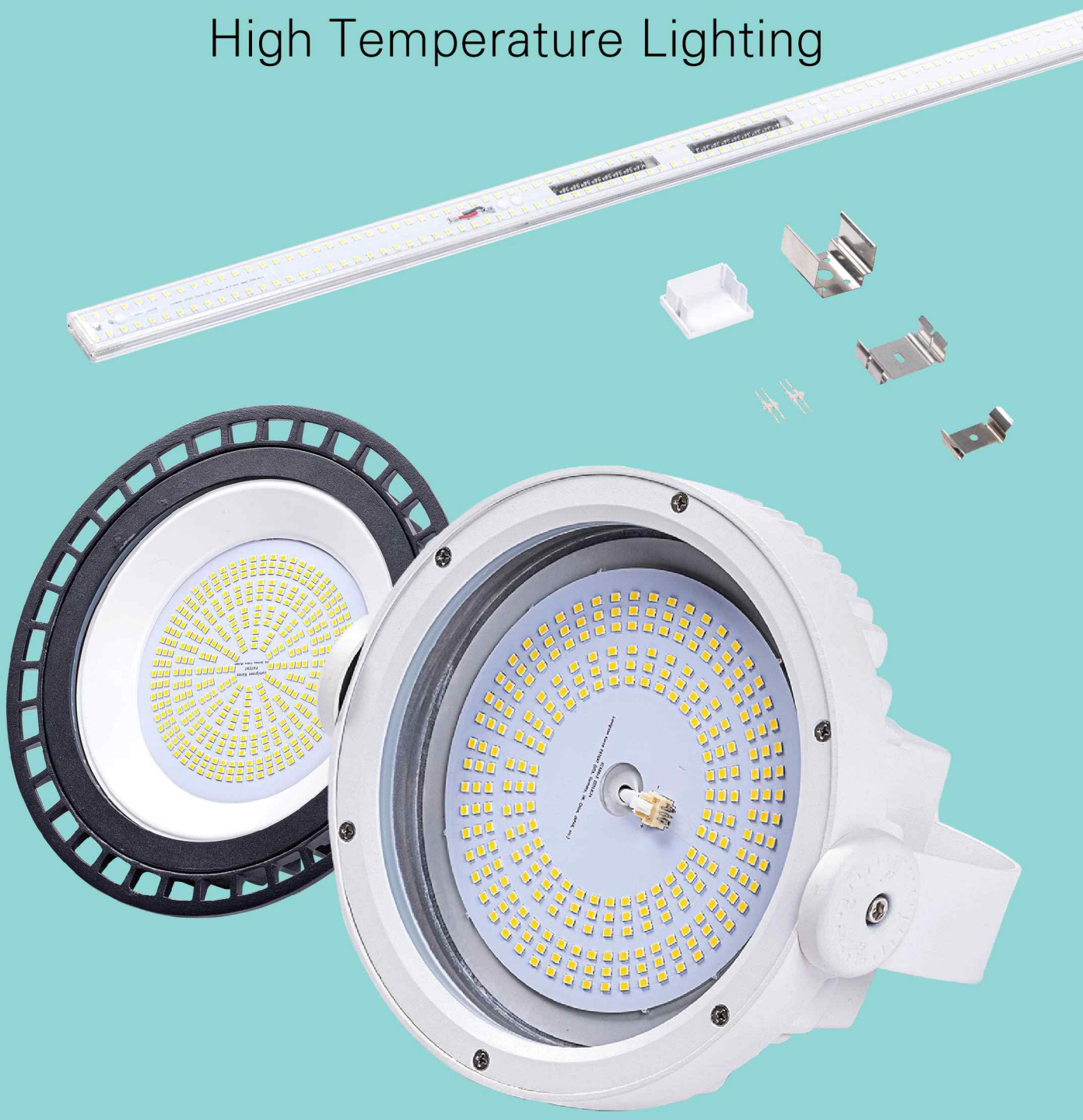
VOL.2

LUMIGREEN CATALOGUE

Line Lighting

High Bay Lighting

High Temperature Lighting



lumigreen.co.kr

LUMIGREEN

Advanced Technology for Human life

Lumi Green Household • Commercial LED Lighting
Protects eyes and saves energy through Perfect Dimming

1. Protects eyes by mimicking the properties of natural light

• Lumi Green's patented Eyesight Protection LED Chip has attained the highest possible safety rating of Risk Group 0 (Exceptional Group: It does not lead to any photobiological hazard) in International Electrotechnical Commission's Photobiological Safety Standard (IEC 62471)

2. Perfect dimming control and energy saving through patented LED driver technology

• Lumi Green's patented LED driver technology allows for flicker-free dimming control, even at extremely low brightness

• Perfect Dimming can be achieved simply by installing a Lumi Green LED and replacing the switch with a dimmer, not requiring any complicated wiring or electric work

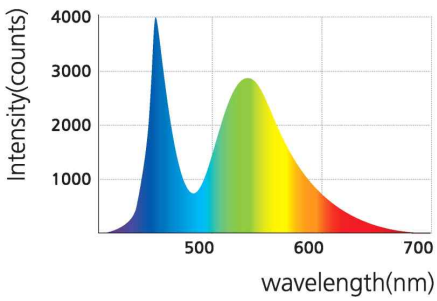
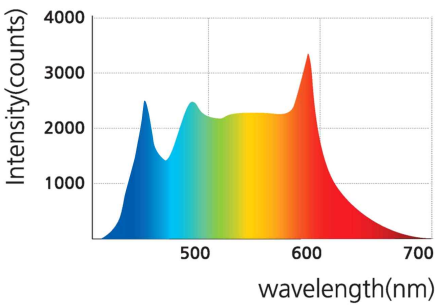
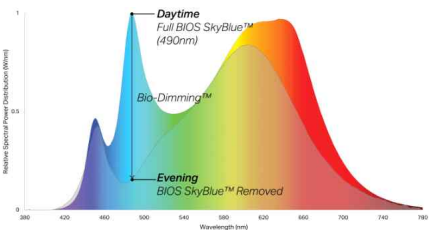
▌Major customers

Build Together 대우건설 | 한신공영(주) | CATHOLIC UNIVERSITY OF KOREA | 한국야쿠르트

Eyesight Protection LED Lighting Patent

〈Patent Registration in South Korea, USA, Germany, France, UK, Japan and more〉

• Attained the highest possible safety rating of Risk Group 0 in International Electrotechnical Commission's Photobiological Safety Standard (IEC 62471) for the first time domestically, which assesses the photobiological hazard of lighting that may affect the skin and the eye
• Reinforces bluish-green wavelengths and true-red wavelengths to minimize the hazards of blue light
• Distinguishes itself from other typical LED lighting through technology that allows for maximizing CRI while minimizing wavelengths that cause skin problems
• Achieves world's highest level of luminous efficacy through patented LED driver technology, which is typically low in lighting that offers high CRI

Typical LED Lighting	Lumi Green Eyesight Protection Natural Light LED Lighting	Bios(NASA Spin-off Lighting Company) BIO Biological Dynamic
		 * Ref : bioslighting.com
• Energy from the bluish-green wavelength (498nm), essential for eyesight protection, is very low • High energy from the blue wavelengths, with very low energy from the red wavelengths	• Sufficiently reinforces bluish-green wavelength (498nm), essential for eyesight protection • Energy from the red wavelengths is larger than energy from the blue wavelengths • Bluish-green wavelength(498nm) aidsrhodopsin activities	• LED that was released with a similar light spectrum as Lumi Green's LED • Focuses on greenish-blue wavelength (490nm) over the most important bluish-green wavelength (498nm) to avoid patent disputes

Reasons why Bluish-green wavelength(498nm) is important

▶ Bluish-green wavelength (498nm) makes up the largest energy in sunlight, which facilitates rhodopsin activities in the rod cell, aiding visual activities.

▶ When rhodopsin is exposed to light, it sends signals to the brain allowing us to see the object. During this process, rhodopsin undergoes bleaching and regeneration constantly, but regeneration rate becomes increasingly limited with age.

▶ Rhodopsin absorbs light with the highest efficiency at bluish green wavelength (498nm), which is the reason why Lumi Green's eyesight protection patent puts emphasis and reinforces the bluish-green wavelength (498nm).

▶ Bios, a NASA spin-off company, released a eyesight protective LED lighting by reinforcing greenish-blue wavelength (490nm) over bluish-green wavelength (498nm) to avoid patent disputes.

▶ This proves the validity and usefulness of Lumi Green's eyesight protection patent.

Perfect Dimming

- Lumi Green's Perfect Dimming avoids the need for complicated and expensive DALI (Digital Addressable Lighting Interface) and can create low ambient light environment with just a dimmer and LED lighting
- Smooth, natural dimming control can be achieved without visible flickering, instabilities and sudden peaks in luminous intensity while dimming

Lumi Green Line Lighting vs Typical Line Lighting

	Lumi Green Line Lighting	Typical Line Lighting
Converter	Integrated Converter (Allows for more detailed space management)	Separate Converter (Needs to be connected separately)
Power supply	Requires power supply every 30m (Additional wiring, electric work not required)	Requires power supply every 5m

- Can be manufactured up to length of 5m with a single aluminum LED profile, which can be extended if needed
- Guarantees 3 year life span and high energy efficiency with Lumi Green's LM SMPS Driver technology

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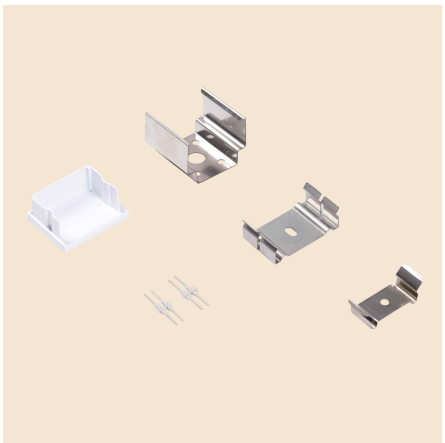
LED Line Lighting

High reliability and Perfect Dimming enabled by Lumi Green's LM SMPS LED Driver



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LED Line Lighting (Line-RA)

High reliability and Perfect Dimming enabled by Lumi Green's LM SMPS LED Driver

3 YEARS GUARANTEED | FLICKER FREE | Eyesight Protection LED Chip | Perfect dimming

Field of Application	Office, Hospital, School, Hotel, Home

MODEL	LLK-RA10D	LLK-RA18D	LLK-RA36D
Power Consumption	10 W	18 W	36 W
CCT	3,000 K / 4,000 K / 5,000 K / etc.		
Total Lumen	1,300 lm	2,340 lm	4,680 lm
Luminous Efficacy	130 lm/W		
CRI(Ra)	Ra 96		
Beam Angle	110°		
Input Voltage	AC 220V 50Hz/60Hz		
Power Factor	〉0.9		
Surge Protection	Line-Line 500V, Line-FG 1KV		
Size	Width(W) 28 x Heigh(H) 10.5 mm		
	Default module length : 300 mm, 400 mm, 500 mm, 600 mm, 1200 mm Custom-made : 900 mm, 1000 mm, 2000 mm, 2400 mm		
Weight	110 g	180 g	350 g
Product Material – Body	PC		
Product Material – Cover	PC		
IP	IP 45		
Installation Type	Indirect / Built-in / Direct / Pendant		
Operating Temperature	-20 ℃ ~ 40 ℃		
Rated Life Time	50,000 hours		

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LED Line Lighting (Line-RB)

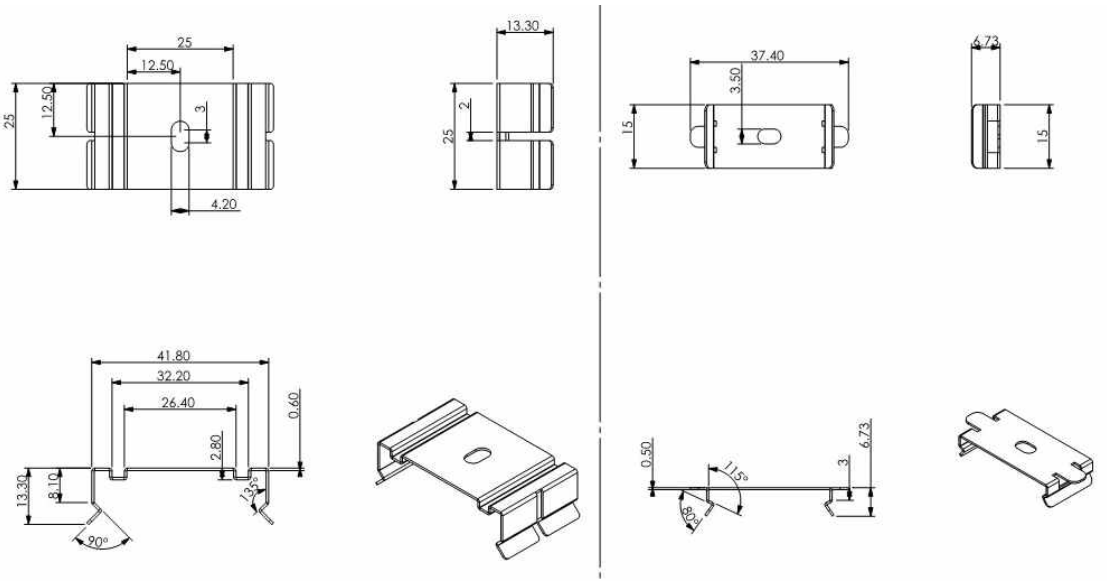
High reliability and Perfect Dimming enabled by Lumi Green's LM SMPS LED Driver

3 YEARS GUARANTEED | FLICKER FREE | Eyesight Protection LED Chip | Perfect dimming

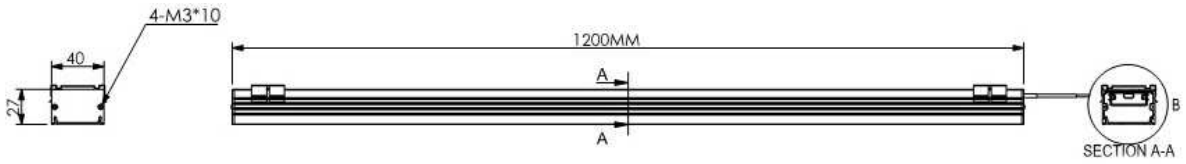
Field of Application	Office, Hospital, School, Hotel, Home

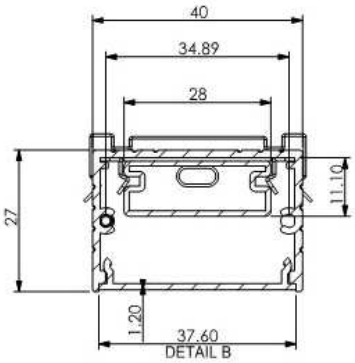
MODEL		LLK-RB8D	LLK-RB15D	LLK-RB30D
Power Consumption		8 W	15 W	30 W
CCT		3,000 K / 4,000 K / 5,000 K / etc.		
Total Lumen		1,120 lm	2,100 lm	4,200 lm
Luminous Efficacy		140 lm/W		
CRI(Ra)		Ra 96		
Beam Angle		110°		
Input Voltage		AC 220V 50Hz/60Hz		
Power Factor		⟩0.9		
Surge Protection		Line-Line 500V, Line-FG 1KV		
Size		Width(W) 16 x Heigh(H) 13 mm		
		Default module length : 300 mm, 400 mm, 500 mm, 600 mm, 1200 mm Custom-made : 900 mm, 1000 mm, 2000 mm, 2400 mm		
Weight		60 g	100 g	200 g
Product Material	Body	PC		
	Cover	PC		
IP		IP 45		
Installation Type		Indirect / Built-in / Direct / Pendant		
Operating Temperature		-20 ℃ ~ 40 ℃		
Rated Life Time		50,000 hours		

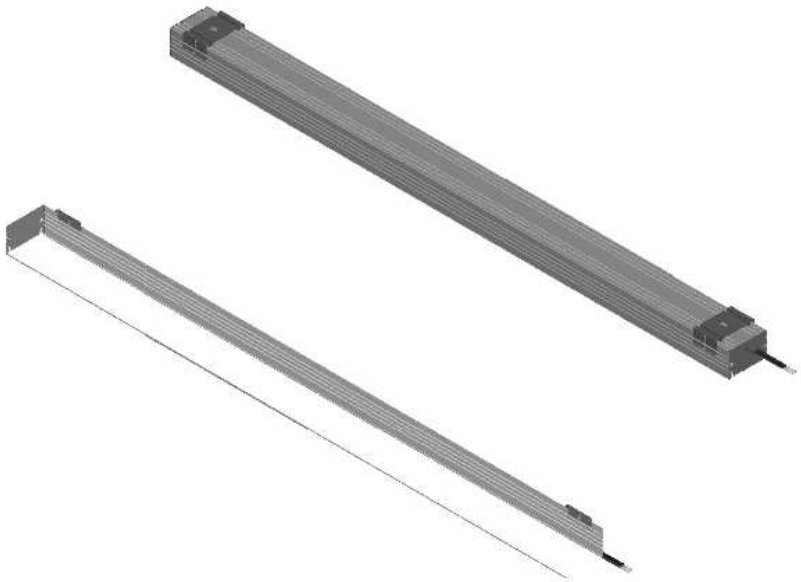
▌Fixed Clips(for LED profile / Line lighting)

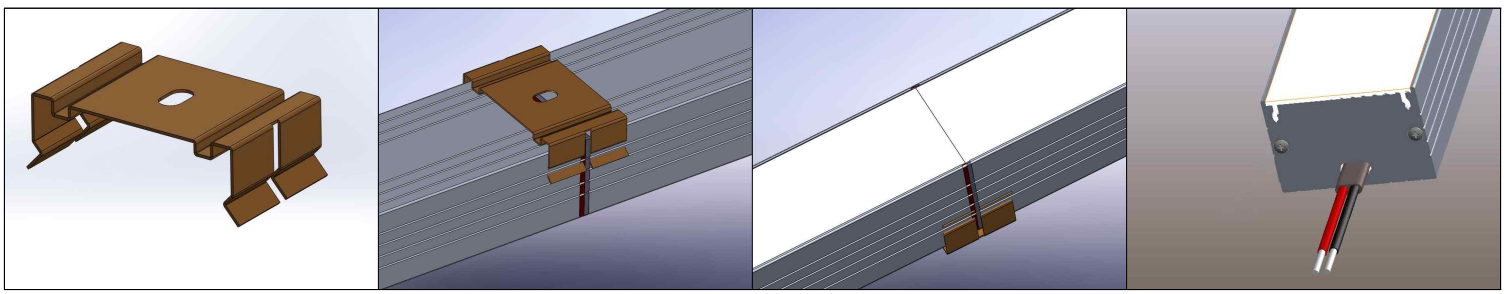


▌Aluminum LED Profile

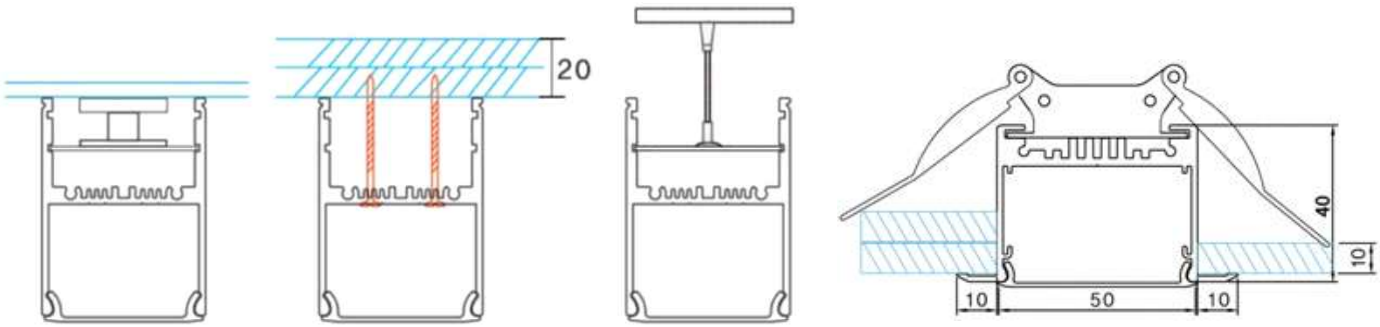








▌LED Profile Section View



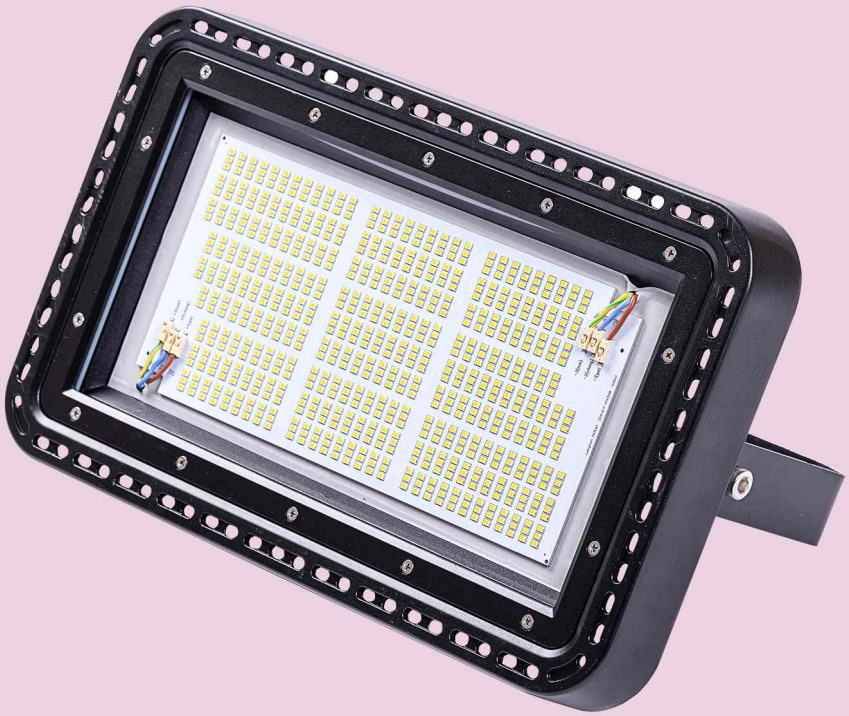
Dimmable 6 inch LED Downlights

High reliability and Perfect Dimming enabled by Lumi Green's LM SMPS LED Driver

3 YEARS GUARANTEED | FLICKER FREE | Eyesight Protection LED Chip | Perfect dimming

Field of Application	Office, Hospital, School, Hotel, Home

MODEL		LDK-SB20D (Triac Dimming)
Power Consumption		20 W
CCT		4,000 K
Total Lumen		2,000 lm
Luminous Efficacy		100 lm/W
CRI(Ra)		Ra 96
Beam Angle		110°
Input Voltage		AC 220V 50Hz/60Hz
Power Factor		〉0.9
Surge Protection		Line-Line 500V, Line-FG 1KV
Size		Φ186"~H48mm
Weight		290 g
Product Material	Body	Aluminum-die-casting
	Cover	PC
Finishing material		Powder coating
IP		IP 45
Installation Type		Built-in
Operating Temperature		-20 ℃ ~ 40 ℃
Rated Life Time		50,000 hours



Lumi Green Industrial LED Lighting saves unnecessary Labor and Energy costs

1. Long life-span of 100,000 hours saves maintenance costs

• Lumi Green's SMPS LED Driver uses an adaptive control actuation circuit that combines constant voltage and current that are optimal for the LED, to provide a longer operating life of more than 100,000 hours with a high lumen retention rate

• Component level protection circuit guarantees high reliability and stability which greatly reduces repair costs in the case of failures at high temperature environment

2. World's highest level of luminous efficacy(max190 lm/W) allows for saving significant energy costs

• High luminous efficacy of Lumi Green LED Lighting allows for less lighting to be installed for the same brightness, which not only reduces the initial investment costs but also lower s power consumption by 40% compared to existing products

• Provides 65% brighter working environment than the standard set for High Efficiency Appliance Certification, which can effectively prevent safety accidents

▮Major Customers

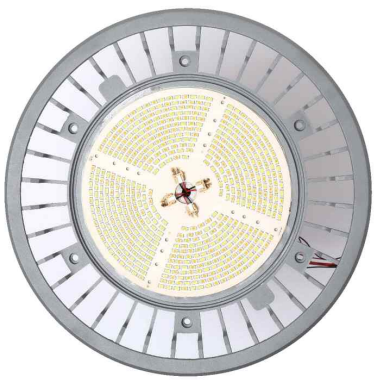
한국야쿠르트 · seha corp · 아세아제지 · 주식회사 고려제지 · paldo 색다른 즐거움 팔도 · KOMIPO 한국중부발전 · 한국제지 Hankuk Paper · Hansol 한솔제지 · MOORIM · YK Steel(주) · JEONJU PAPER

Characteristics of LM SMPS LED Driver Patent Technology

〈 Patent Registration in South Korea, USA, Germany, France, UK, Japan and more〉

- Long life-span and high lumen retention rate through adaptive control actuation circuit that combines constant voltage and current that are optimal for LED
- High stability and reliability through component level protection circuit
- Reduction of re-purchase and re- installation costs resulting from product defects and failures
- No need to shut down the factory for re-installation, maintenance or repairs
- Exceptional electrical properties that satisfy all global standards

High PF	Low ATHD	Low Inrush current	Low ripple Current



Reliability Test LED Driver life-span of 100,000 hours and more(2015)

Test Method 〈Run product for 5000 hours in a 100°C Chamber〉	
Early lumen	142 lm/w, (test sample of Seoul Semiconductor LED × 5 LEVEL
After 2,500 hours	1110 lm/w, Normal activation, 72,500 hours at 35°C standard
After 5,000 hours	100 lm/w, Normal activation, 145,000 hours at 35°C standard

◀ Photographs after 5,000 hours of testing

◀ Internal temperature of SMPS estimated to be over 133°C

Durable High Temperature Lighting 60℃- 100℃ & Humid Environments

• Lumi Green's High Temperature Flood Light TA/TB series is the world's first LED lighting product that offers life time of 30,000 hours at working temperatures between 60 to 80℃. This allows significant savings in energy and costs incurred from frequent lighting replacements

• Ensures high reliability, long life span in high heat, humid conditions by utilizing LM-SMPS LED Driver(Patent Registration: South Korea, USA, Japan, China, and Europe) circuit that is made of semiconductors and capacitors that are not affected by high temperature

• Product Warranty
Average Working Temperature 60˚C ~ 80˚ C : 3 years
Average Working Temperature 90˚C ~ 100˚C : 1 year

▌LED Profile Section View

Classification	Lumi Green's High Temperature Flood Light (LHK-TA40)	Fluorescent Lamp 100W(Self ballasted)	Note
Power Consumption	40 W	*100 W	Electricity saving 60 W
Luminous Efficacy	137 lm/W	65 lm/W	•
Total Lumen	5,480 lm	6,500 lm	•
Life Time	50,000 h	4,000 h	L70 rated LED life time at average temperature of 70˚C
CRI(Ra)	84 Ra	80 Ra	
CCT(K)	5,000 K	6,500 K	6500 K induces severe glare
Fixture Efficiency	95%	60%	Reflected characteristics of lamp and fixture
S/P Ratio	1.80	2.20	Considered the characteristics of light source and color temperature
**Pupil Lumen	9,370 lm	8,580 lm	•
Lumen maintenance after a year of usage	96%	70%	At average temperature of 70˚C
***Pupil Effective Lumen	8.995 plm	6,006 plm	•

* Power consumption including ballast load
** Pupil Lumen= Photopic Lumen x S/P Ratio
Pupil lumens measure the light that stimulates the rods in the eyes to determine scotopic lumen output and the total visually effective number of lumens
One can calculate the pupil lumens by multiplying the photopic lumens by the scotopic/photopic value (S/P)
The S/P ratio is the ratio of luminous quantity in Scotopic wavelengths to luminous quantity in Photopic wave lengths for the lamp spectral power distribution

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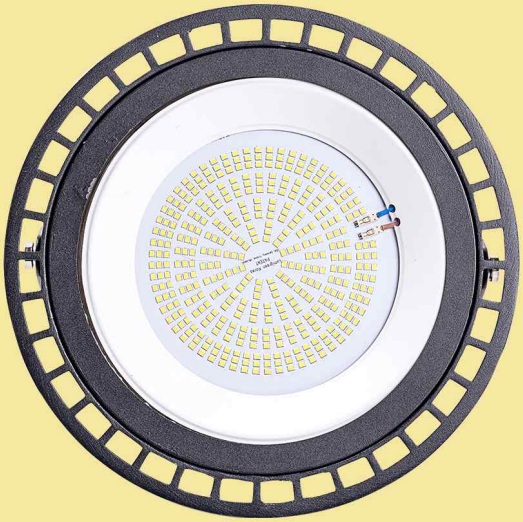

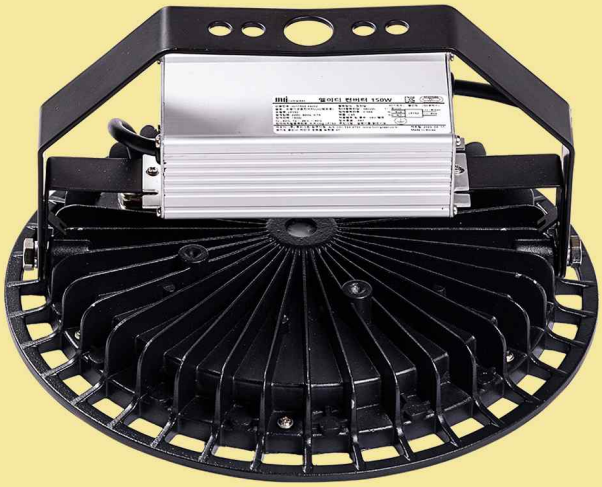

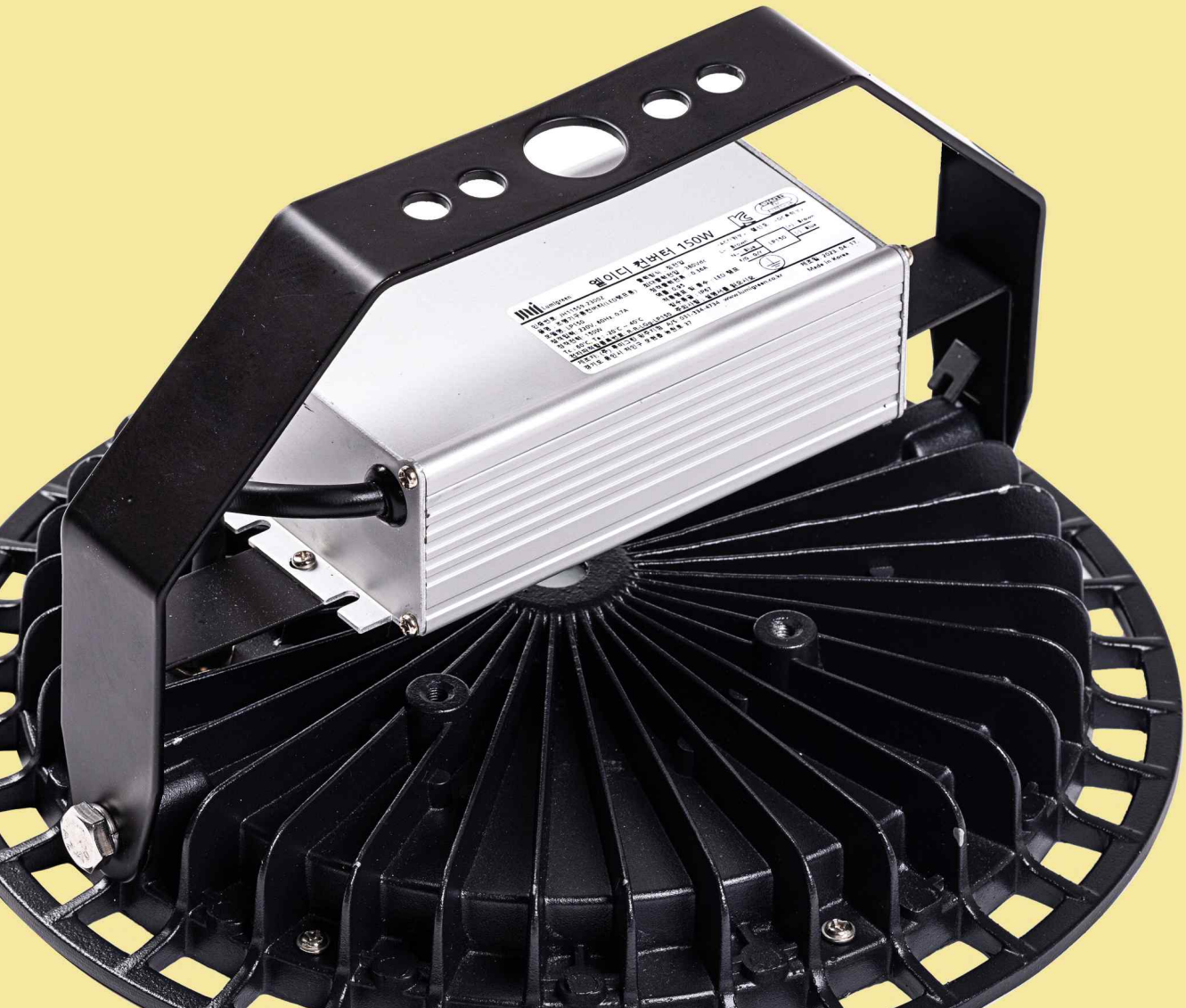

High Efficacy LED High-bay Lighting of 135 lm/W

High reliability and ultra light weight LED high bay enabled by Lumi Green's LM Linear LED Driver

3 YEARS GUARANTEED | FLICKER FREE | IP 66

Field of Application	Factories, Warehouses, Storage House, Gymnasiums Large Markets, Sports Centers, etc.

MODEL		LFDK-BB100	LFDK-BB150
Power Consumption		100 W	150 W
CCT (K)		5,000 K	
Total Lumen		13,500 lm	20,500 lm
Luminous Efficacy		135 lm/W	
CRI (Ra)		Ra 84	
Beam Angle		110°	
Input Voltage		AC 220V 50Hz/60Hz	
Power Factor		〉0.95	
Surge Protection		Line-Line 5KV, Line-FG 5KV	
Size		Φ280 × H170 mm	Φ330 × H195 mm
Weight		2.6 kg	3.4 kg
Product Material	Body	Aluminum-die-casting	
	Cover	Toughened glass / PC	
Finishing Material		Power Coating	
IP		IP 66	
Installation Type		Bracket / Chain	
Operating Temperature		-20 ℃ ~ 50 ℃	
Rated Life Time		50,000 hours	

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High CRI LED High-bay Lighting of 160 lm/W

High reliability and ultra light weight LED high bay enabled by Lumi Green's LM Linear LED Driver

3 YEARS GUARANTEED | FLICKER FREE | IP 66

Field of Application	Factories, Warehouses, Storage House, Gymnasiums Large Markets, Sports Centers, etc.

MODEL		LFDK-EB100	LFDK-EB150
Power Consumption		100 W	150 W
CCT (K)		5,000 K	
Total Lumen		16,000 lm	24,000 lm
Luminous Efficacy		160 lm/W	
CRI (Ra)		Ra 96	
Beam Angle		110°	
Input Voltage		AC 220V 50Hz/60Hz	
Power Factor		〉0.95	
Surge Protection		Line-Line 5KV, Line-FG 5KV	
Size		Φ280 × H170 mm	Φ330 × H195 mm
Weight		2.4 kg	3.2 kg
Product Material	Body	Aluminum-die-casting	
	Cover	Toughened glass / PC	
Finishing Material		Power Coating	
IP		IP 66	
Installation Type		Bracket / Chain	
Operating Temperature		-20 ℃ ~ 50 ℃	
Rated Life Time		50,000 hours	

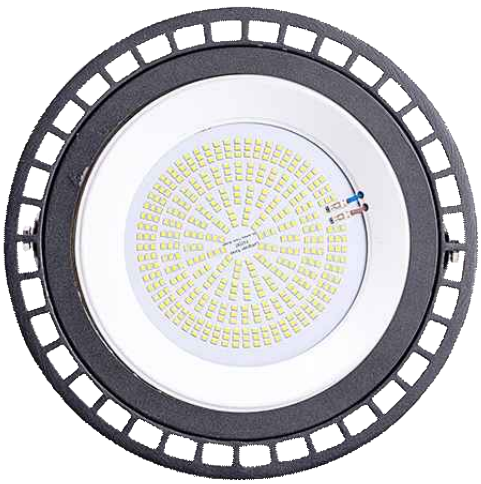
Ultra-high Efficacy LED High-bay Lighting of 190 lm / W

High reliability and ultra light weight LED high bay enabled by Lumi Green's LM Linear LED Driver

3 YEARS GUARANTEED | FLICKER FREE | IP 66

Field of Application	Factories, Warehouses, Storage House, Gymnasiums Large Markets, Sports Centers, etc.

MODEL		LFDK-HB100	LFDK-HB200
Power Consumption		100 W	200 W
CCT (K)		5,000 K	
Total Lumen		19,000 lm	38,000 lm
Luminous Efficacy		190 lm/W	
CRI (Ra)		Ra 84	
Beam Angle		110°	
Input Voltage		AC 220V 50Hz/60Hz	
Power Factor		〉0.95	
Surge Protection		Line-Line 5KV, Line-FG 5KV	
Size		Φ330 × H195 mm	Φ330 × H195 mm
Weight		3.2 kg	3.4 kg
Product Material	Body	Aluminum-die-casting	
	Cover	Toughened glass / PC	
Finishing Material		Power Coating	
IP		IP 66	
Installation Type		Bracket / Chain	
Operating Temperature		-50℃ ~ 50℃	
Rated Life Time		50,000 hours	



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High CRI LED High-bay Lighting of 180 lm/W

High reliability and ultra light weight LED high bay enabled by Lumi Green's LM Linear LED Driver

3 YEARS GUARANTEED | FLICKER FREE | IP 65

Field of Application	Factories, Warehouses, Storage House, Gymnasiums Large Markets, Sports Centers, etc.

MODEL		LFDK-HB300
Power Consumption		300 W
CCT (K)		5,000 K
Total Lumen		54,000 lm
Luminous Efficacy		180 lm/W
CRI (Ra)		Ra 84
Beam Angle		110°
LED Manufacturer		SAMSUNG / Seoul Semiconductor
Input Voltage		AC 85 ~ 264V
Input Current		Max 1.36A(@220Vac)
Power Factor		〉0.96
Input Frequency		50/60 Hz
Surge Protection		Line-Line 8KV, Line-FG 12KV
Converter Type		Constant Current (CC)
Converter Manufacturer		Lumi Green Co., Ltd / Made in Korea
Size		L430 × W260 × H235 mm
Weight		8 kg
Product Material	Body	Aluminum-die-casting
	Cover	Toughened glass / PC
Finishing Material		Power Coating
IP		IP 65
Installation Type		Ceiling Bracket
Operating Temperature		-50 ℃ ~ 50 ℃
Rated Life Time		100,000 hours

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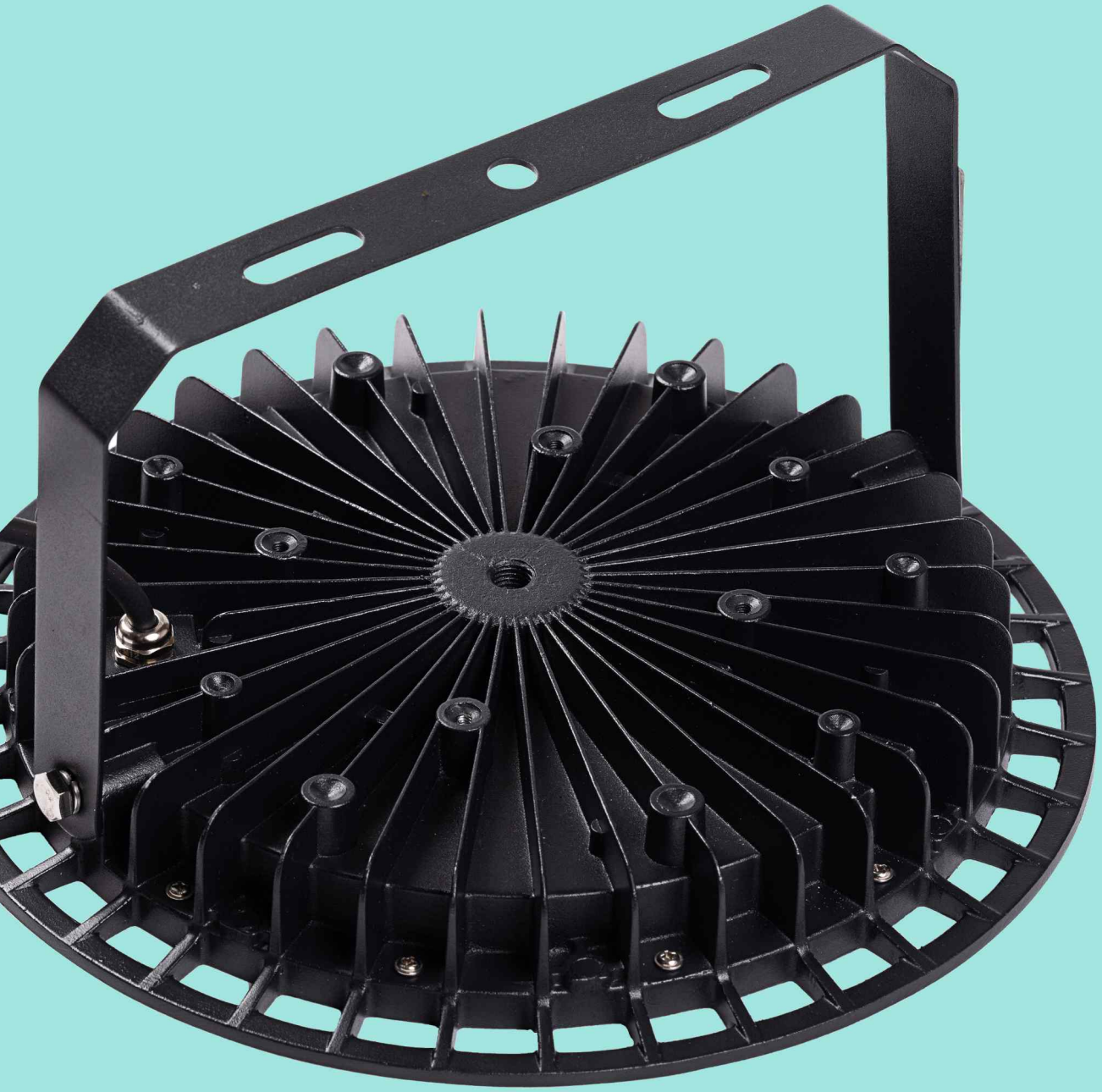

Semi High Temperature LED Lighting for 60°C working environment
(Prevents failure even when temporarily exposed to higher temperatures)

Excellent performance at high, low temperature environments enabled by LM SMPS LED Driver

2 YEARS GUARANTEED | FLICKER FREE | IP 65

Field of Application	High / Low temperature, humid factory environment

MODEL		LHK-ST80D (Semi High Temperature LED Lighting, Triac Dimming)	LHK-ST100D (Semi High Temperature LED Lighting, Triac Dimming)
Power Consumption		80 W	100 W
CCT (K)		5,000K	
Total Lumen		11,200 lm	12,000 lm
Luminous Efficacy		140 lm/W	120 lm/W
CRI (Ra)		Ra 84	
Beam Angle		110°	
Input Voltage		AC 220V 50Hz/60Hz	
Power Factor		⟩0.80	
Surge Protection		Line-Line 5KV, Line-FG 5KV	
Size		Φ280 × H175 mm	Φ330 × H195 mm
Weight		1.6 kg	2.2 kg
Product Material	Body	Aluminum-die-casting	
	Cover	Toughened glass / PC	
Finishing Material		Power Coating	
IP		IP 66	
Installation Type		Bracket / Chain	
Operating Temperature		-20℃ ~ 60℃ (Withstand up to 90℃ temporarily)	
Rated Life Time		50,000 hours	

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LHK-TA40A
80℃ working environment

LHK-TB40A
90℃ working environment

LHK-HT100
100℃ working environment

High Temperature LED Lighting(for 80℃, 90℃, 100℃ working environment)

Excellent performance at high, low temperature environments enabled by LM SMPS LED Driver

1 / 2 YEARS GUARANTEED | FLICKER FREE | IP 66

Field of Application	High / Low temperature, humid factory environment

MODEL		LHK-TA30A (80℃)	LHK-TA40A (80℃)	LHK-TB40A (90℃)	LHK-HT100 (100℃)	LHK-HT100 (100℃)
Power Consumption		30 W	40 W	40 W	60 W	100 W
CCT (K)		5,000 K				
Total Lumen		3,900 lm	5,200 lm		14,000 lm	
Luminous Efficacy		140 lm/W	130 lm/W		230 lm/W	140 lm/W
CRI (Ra)		Ra 84				
Beam Angle		108°			110°	
Input Voltage		AC 220V 50Hz/60Hz				
Input Current		Max 0.45A(@220Vac)				
Power Factor		〉0.80			〉0.75	
Input Frequency		50/60 Hz				
Surge Protection		Line-Line 5KV, Line-FG 5KV				
Size		Φ225 × H147 mm		Φ275×H200 mm	L430 mm x W260 mm x H220 mm	
Weight		2.5 kg		4.2 kg	7 kg	
Product Material	Body	Aluminum-die-casting				
	Cover	Toughened glass / PC			Toughened glass	
Finishing Material		Power Coating				
IP		IP 65			IP 66	
Installation Type		Bracket / Chain				
Operating Temperature		-20℃ ~ 80℃	-20℃ ~ 80℃	-20℃ ~ 90℃	-20℃ ~ 100℃	-20℃ ~ 100℃

▌Lumi Green Industrial LED is applied to the Japanese automobile industry

韓벤처, 日도요타 생산공장 밝힌다

루미그린, LED조명 2만개 공급… 발열 줄인 회로기술이 강점

국내 신생 벤처기업이 독자적으로 개발한 LED 조명이 일본의 글로벌 자동차 기업인 도요타의 생산 공장을 밝힌다.

경기도 성남시에 있는 루미그린이 유항재 루미그린 대표(55)가 2013년 연구개발(R&D)에 착수해 개발한 LED 조명을 올해 5월 도요타 생산 공장에 공급 제품(190W·115W) 등록을 마치고 이달부터 순차적으로 연간 2만개 이상 납품한다. 한국 벤처기업에서 만든 LED 조명이 일본 나고야와 규슈 지역에 위치한 도요타의 생산 공장 20여 곳을 밝히는 셈이다. 이는 앞선 1년여의 시험 검증을 통과한 결과다.

루미그린은 지난해 6월 도요타의 자회사로 일본의 대표 경차 브랜드인 다이하쓰 제조 공장에 제품을 공급한 적이 있다. 다이하쓰는 기존에 설치한 LED 조명이 자주 고장을 일으키자 새로운 제품을 물색하다 루미그린 LED 조명의 다양한 장점에 끌려 선택한 것으로 전해졌다.

루미그린 LED 조명은 수명이 10만시간 이상으로 매우 긴 데다 고장률은 100만분의 1 이하로 매우 낮은 것으로 파악됐다. 게다가 가장 중요한 '광효율'이 1W당 165루멘(lm)으로, W당 100lm을 조금 웃도는 기존 글로벌 회사들의 제품보다도 30% 안팎 뛰어난 것으로 나타났다. 광효율은 소비되는 전기량(전력) 대비 빛의 밝기가 어는 정도인지 알려주는 물리적인 양을 말하는 개념으로, 현재 글로벌 조명업계의 관심사는 '누가 더 좋은 광효율을 구현할 것인가'에 있다.

이처럼 루미그린 LED 조명이 뛰어난 성능을 구현하는 비결은 '회로' 기술에 있다.

발열이 많은 LED 특성을 감안해 고온의 환경에서도 내부 부품을 완벽히 보호하도록 하는 설계 기술로 특허를 받았다. 그만큼 전기적 특성이 우수하다. 특히 배선 기구(스위치)나 릴레이를 사용해 조명기구를 온·오프할 때 순간적으로 흐르는 큰 전류를 뜻하는 '돌입전류(inrush current)'가 매우 낮다.

유항재 대표가 개발한 LED 조명을 선보이고 있다.

유항재 대표는 "돌입전류의 크기와 흐르는 시간이 LED 조명에 영향을 미치는데, 루미그린 LED 조명에 장착되는 회로는 다른 회사들 제품에 비해 돌입전류가 10분의 1에 불과할 정도로 매우 낮은 게 특징"이라며 "고장이 거의 없어 수명이 매우 길면서 광효율까지 우수한 이유가 바로 여기에 있다"고 했다. 루미그린은 독특한 회로 제조기술에 힘입어 기존 LED 조명의 인쇄회로기판(PCB)에 장착되는 10개 이상인 콘덴서(전기저장장치)를 4개로 대폭 줄여 조명의 전체 무게도 2kg 이내로 경량화하는 데 성공했다.

도요타는 다이하쓰에서 1년여의 실전 테스트를 거쳐 루미그린의 제품 특성을 확인하고 일본 전역에 있는 20개 이상의 자동차 생산 공장에 루미그린 LED 조명을 순차적으로 장착할 것으로 전해졌다.

유 대표는 "조명은 교체 수요가 발생하는 대로 우리 제품을 사용하는 만큼 올해 연간 2만개에서 매년 점차 늘어나게 될 것"이라면서 "앞으로 도요타가 거느리고 있는 수많은 일본 협력업체도 공략해 나갈 것"이라고 덧붙였다.

루미그린은 일본 수출이 본격화하는 내년께 500억원 안팎의 매출을 내다보고 있다.

성남/민석기 기자

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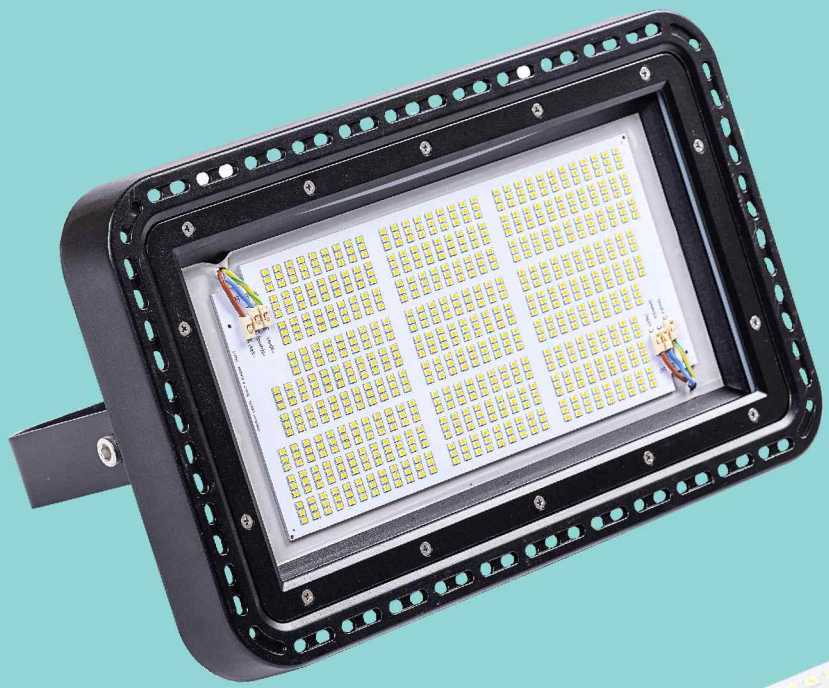

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