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## HyLED X Series LED Surgical Lights

# Lighten your work



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# Better Vision

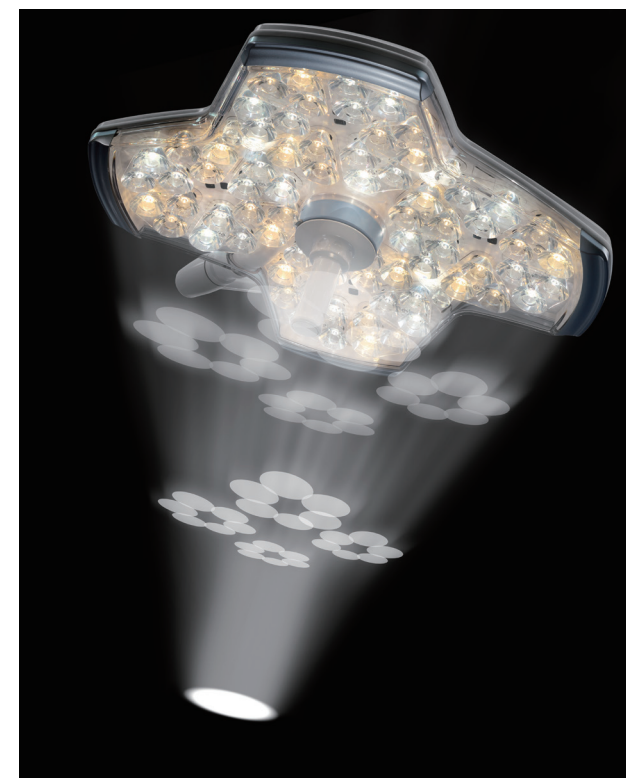
In clinical applications, the optical performance of surgical lamps will change due to the influence of the field of view, the position of the doctor, and the instruments. This can affect the doctor's concentration and efficiency, increasing the risk of surgery and the time of surgery. Therefore, the stability of the optical performance of surgical lamps has become a new standard for assessing their merits.

## Unique Lens Design –MPST (Multi-Patch Superposition Technology)

Homogeneous light field even when blocked by the surgeon's head

HyLED X adopts the new Multi-Patch Superposition Technology (MPST) of innovative lens group design. Each of lens group consists of several types of annular light spot, creating an individual and complete patch. All the patch will be superimposed at the operating filed, generating the surgical light beam. The light beam has a shadow dilution of 100% with tube and two masks, and the patch homogeneity D50/D10 reaches up to 70%.

The innovative MPST brings a much homogeneous beam than traditional lens design. Even if the light head is intercepted by surgeons' heads, the illumination in wound area is always complete and thus surgeon's judgement will not be affected.



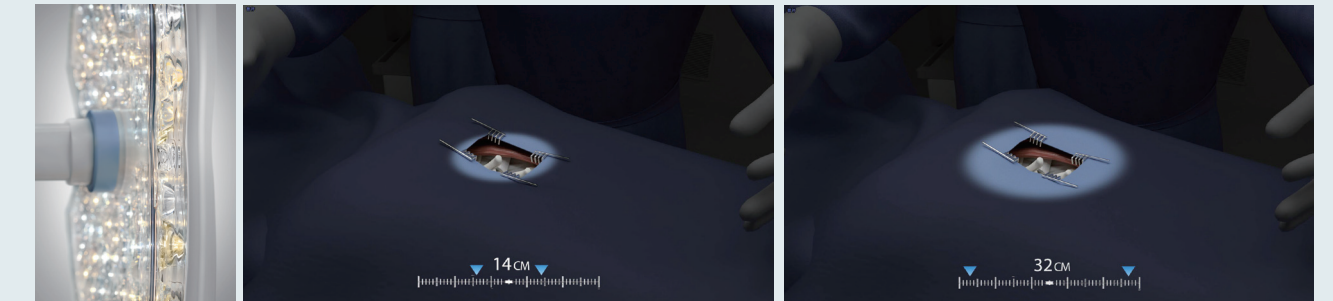
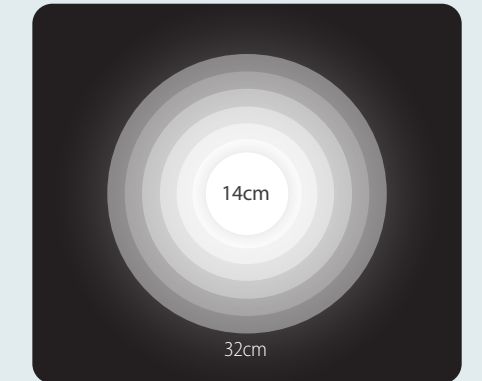
When the optical path is blocked, the shape of the spot does not change, and there is no local dark area.  
Spot uniformity (D50/D10) reaches 70%

## Wide Range Field Size Design with Multistage Adjustment

More Focus and Less Glare

HyLED X surgical light, with innovative light path design, can be adjusted from 14cm to 32cm by 10 levels. This can meet the needs of different types of surgery for different patch sizes.

For surgeries with tiny incisions, such as spine surgery and mitral valve replacement surgery, the light is more focused and the glare from peripheral region is less. The lens efficiency is optimized and the luminous area is increased.



## Automatic Shadow Management System - AICS Plus Enhanced Illuminance Compensation by Both Main and Satellite Lights

The illuminance of the operative field will be affected if it is blocked by surgeons' heads. For HyLED X, when sensing a block, the main light will transmit the signal to the satellite light. Both main and satellite lights will compensate the blocked illuminance smoothly. Specially designed software can avoid a flash caused by unwittingly trigger.







# Eye-relaxing Design iRelax

In clinical applications, visual fatigue is inevitable because medical staff continue to work under high intensity surgical lights for long time, and this intraoperative visual fatigue may also increase the chance of surgical errors.

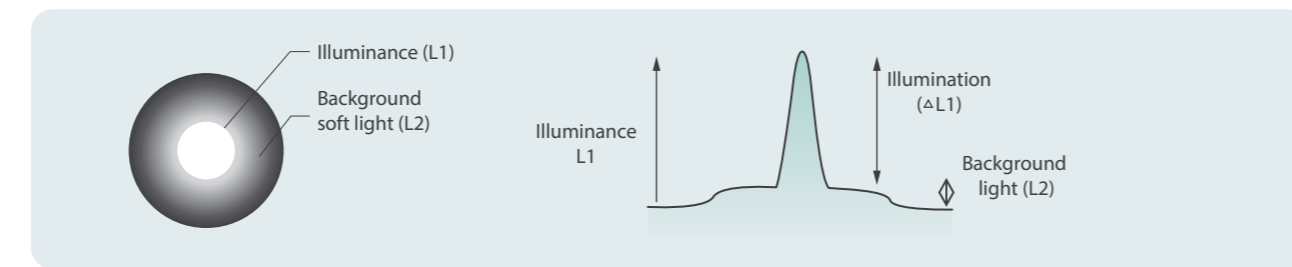
Therefore, eye protection will also be a new criterion for surgical lights.

Combined with "eye-relaxing light" and "smooth brightness", the iRelax function of HyLED X will reduce the sensitivity of doctors to the illumination of surgical light, reduce their visual fatigue, and provide better light adaptation.

## Eye-relaxing Light Reducing Eye Fatigue

Eye relaxing light by HyLED X to reduce contrast between the surgical site and peripheral region to improve relax and visual performance.

The most effective surgical lighting will provide a gradual transition between the illuminated area and the operating room lighting to reduce eye strain.

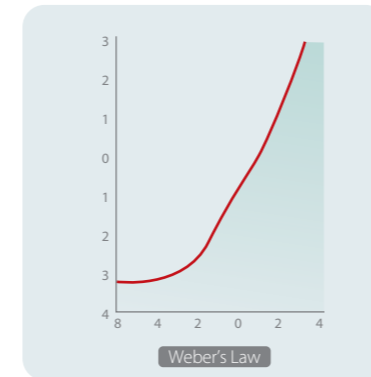


Reducing contrast between the surgical site and peripheral region improve relaxing and visual performance. Ratios in excess of 40:1 can be suitable, but this ratio should be minimized wherever possible. ①

The Illuminating Engineering Society of North America (IESNA)

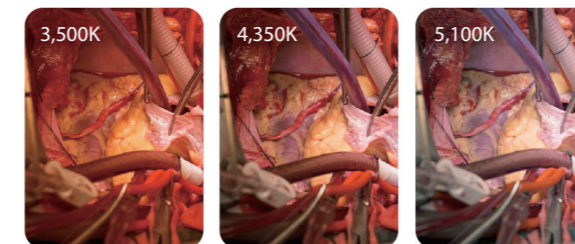
## Smooth Brightness For Better Light Adaptation

When switching on or off the surgical light, the medical team will feel uncomfortable. It will take a few seconds for their pupils for such light adaptation. Based on Weber's law, HyLED X provides a smooth illuminance pattern for better light adaptation.



## Temperature color

The HyLED X light provides a light column with either a fixed daylight-like color temperature - 4,350K, or a color temperature variable from 3,500 - 5,100K in five ranks. This function is helpful to distinguish the difference between various tissue types and the perception of true tissue colors, which is used especially within cardiac surgery. Mindray offers a special light source system with a uniform mixed light of cool white LEDs and warm white LEDs to realize the color temperature adjustment.



# Ease of Use

During the operation, medical staff always need to adjust illumination and light field of the surgical light, according to different clinical requirement.

## Easy to Adjust

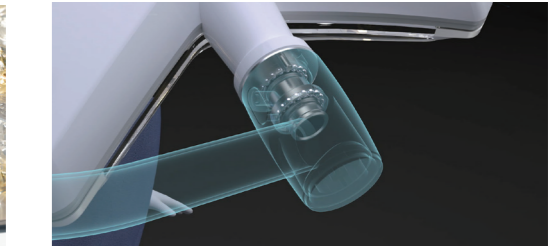
### Multifunctional Handle with Special Sensor Design

HyLED X can be equipped with a powerful impedance sensor integrated in the control handle. This allows two functions to be controlled directly from the sterile handle, simply rotate to control the illuminance and size of light field. There is no need to reset on the control panel.



### Low Resistance Joint Design

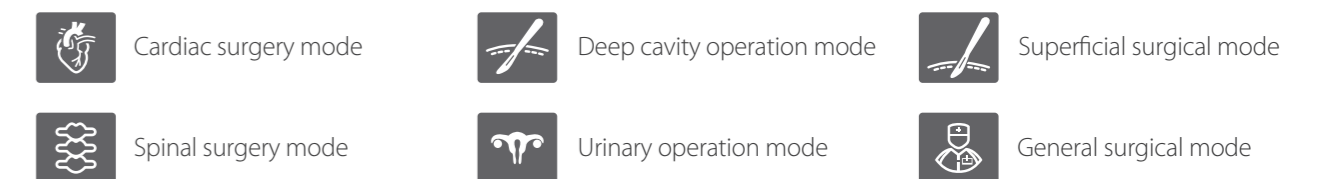
With a flexible bearing system integrated in the C-arm joint, it will be much easier to make the adjustment of light head.



## Easy to Choose

### Specialized Illuminance Modes

Illuminance requirements, in terms of size of incisions and depth of the operative field, vary with different surgeries. There are 6 options for different surgery mode in the HyLEDX control system. One-button switchover to different surgery modes helps save clinical time. All completely intuitive with the self-explanatory, icon-based selection of the touch screen.



## Easy to Change

### Quick Lock System

Easily transition Integrated Camera and Camera preparation as you Surgical Lights between rooms with no special tools needed.



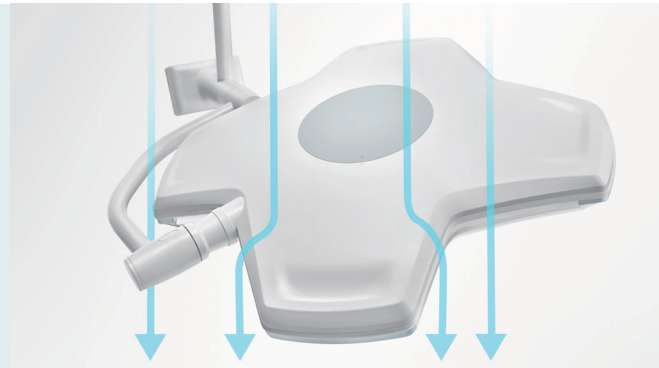




Mindray focus more on the clinical requirement, design it from perspective of medical staff, down low the cost of maintenance and service life of HyLED X.

### Safe and Durable

- Invisible screw and seamless design
- Easy to clean for better infection control—more than 49 cleaning disinfectant
- Better Compatibility with Laminar Flow-- DIN 1946
- Safe and durable-- IP54



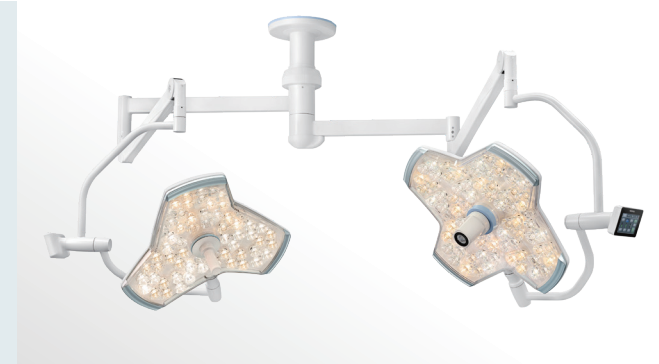
### Long Service Life

- LED service life 60000hr
- 5 years warranty for the LED bulbs



### Workflow Management

- Arc mask design, more focus on operation
- Anti-Flicker Design, no more eye fatigue
- C-arm handle, easy to control



### Various Video Solutions



Multi Screen System    Integrated Camera    4K Camera System    Digital Video Recorder

### Controller



Wall control    Touch screen control    Control panel

### Other Accessories



Various handles flexibility

HyLED X9 mobile LED surgical light

### Technical Specifications \*

	HyLED X9, HyLED X9M	HyLED X5
Central illuminance (at 1m distance)	160,000 lux	140,000 Lux
Light field diameter (at 1m distance)	140-320mm in ten levels	140-320mm in ten levels
Light field(D50/D10) **	70%	70%
Depth of illumination (20%)	1,200mm	1,200mm
Color Temperature	Standard: 4,350K	Standard: 4,350K
	Variable CCT: 3,500-5,100K **	Variable CCT: 3,500-5,100K **
Color rendering index(Ra)	97	97
Color rendering index(R9)	97	97
Shadow dilution with tube	100%	100%
Shadow dilution with one mask	65%	60%
	100%(with AICS Plus)	
Shadow dilution with tube and one mask	55%	52%
	100%(with AICS Plus)	
Shadow dilution with two masks	65%	60%
	100%(with AICS Plus)	
Shadow dilution with tube and two masks	55%	52%
	100%(with AICS Plus)	
Ambient light	Green light, <500lux	Green light, <500lux
Power supply of all light sources	55w	50w
Power supply	100VAC-240VAC, 50/60Hz	100VAC-240VAC, 50/60Hz
Dimming range	3-100%	3-100%
Light head dimension	≤700mm	≤670mm
Standard features	MPST, iRelax, green ambient light	MPST
Optional functions	AICS Plus	iRelax, green ambient light
Protection against harmful ingress of water or particulate matter	IP54	IP54

\* All values measured according to IEC 60601-2-41.

\* Due to manufacturing and measuring tolerances, all data relating to lighting systems has a tolerance of +/- 10%.

\*\* Max. patch light field diameter, D50/D10=70%.

\*\*\* Five ranks for variable color temperature 3,500/3,900/4,350/4,700/5,100K.

