

**mindray**

## HyLED X Series

LED Surgical Lights

# Lighten your work



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# Better Vision

In surgical procedure, the optical performance of surgical lamps may change the light field view due to the position of the surgeons or the various instruments used. This can affect the precision as well as efficiency of the Surgeon there by increase the risk and the duration of surgery. It is important to adopt new benchmark to have a stable and consistent optical performance of the surgical light.

## Multi-Patch Superposition Technology ( MPST )

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

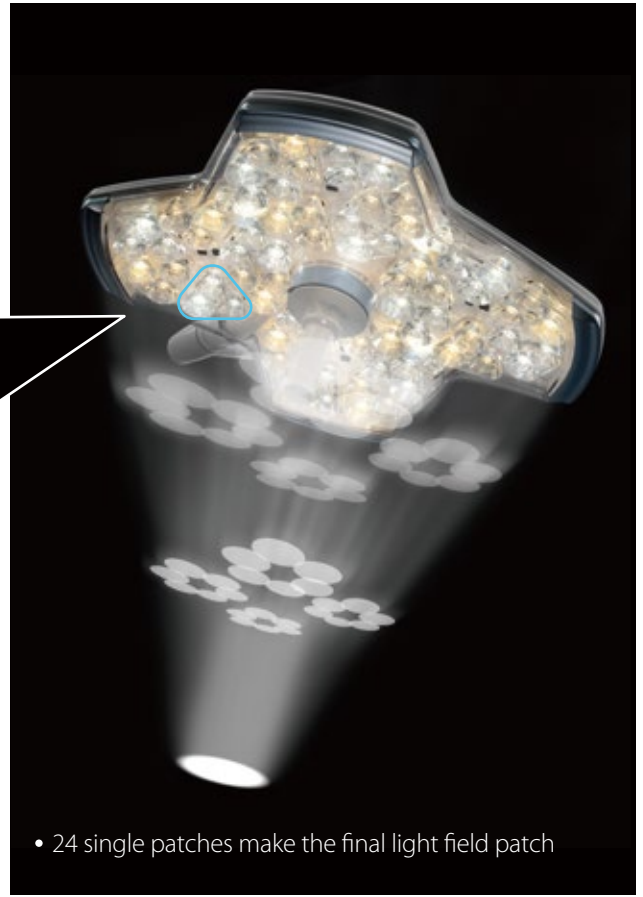
HyLED X adopts the new Multi-Patch Superposition Technology (MPST) through innovative lens group design.

Each of lens group consists of several types of annular light spot, creating an individual and complete patch.

All the light patches will get superimposed at the operating field, generating uniform surgical light beam.



• One single patch



• 24 single patches make the final light field patch

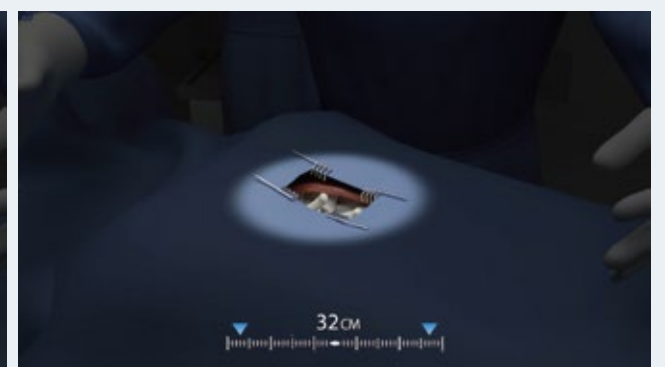
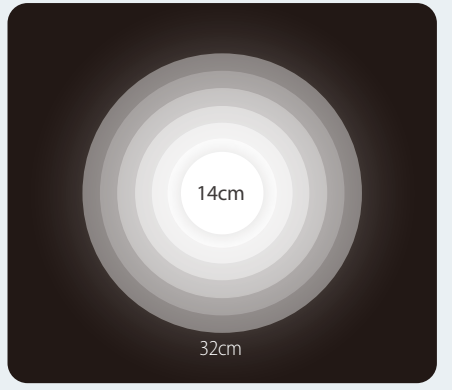
With tube and two masks light beam has a shadow dilution of 100% as well as the patch homogeneity D50/D10 reaches up to 70%. In practical, the innovative MPST allows surgeons to have a clear & homogeneous light field even if it's been obstructed by surgeons' heads.

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

More Focus and Less Glare

For surgeries with tiny incisions, such as spine surgery and mitral valve replacement surgery, the light needs to be more focused and the glare from peripheral region should be less. With this innovative design lens efficiency is optimized and the luminous area is increased.



## Active Shadow Management

Automatic Illumination Control System Plus ( AICS Plus )

The illuminance of the operative field will be affected if it is blocked by surgeons' heads. In HyLED X, when a block is sensed, the main light will transmit a signal to the satellite light dome allowing both light heads to compensate the blocked illuminance. Specially designed software will ensure a smooth change in intensity without any flash effects.







# Eye-relaxing light iRelax™

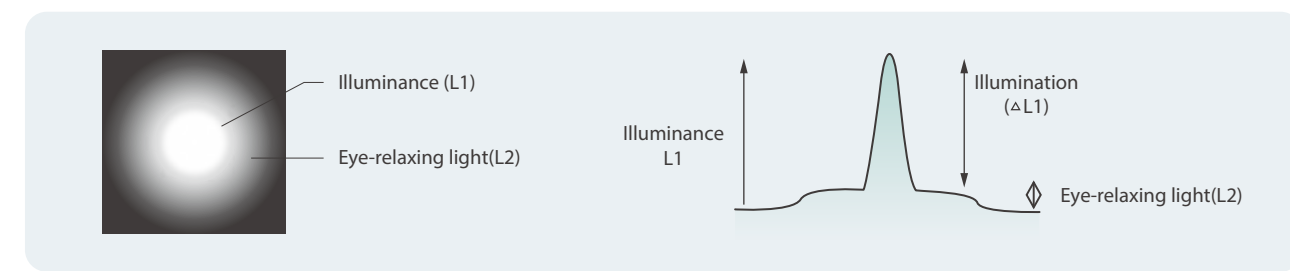
In clinical applications, visual fatigue is inevitable because medical staff continue to work under high intensity surgical lights for long time, and this intraoperative visual fatigue may also increase the chance of surgical errors.

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

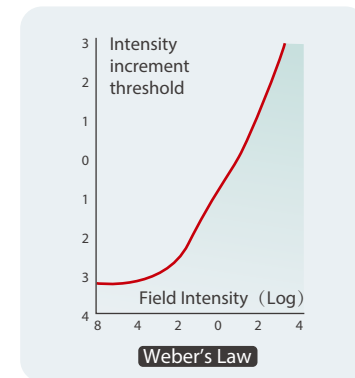
Eye relaxing light from HyLED X will reduce the contrast between the surgical site and peripheral region which reduces eye fatigue and improves visual performance. It provides a gradual transition between the focus illuminated surgical area and ambient lighting in the operating room.



The Illuminating Engineering Society of North America (IESNA) describes 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.

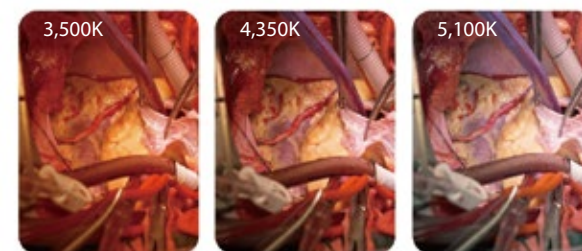
## Smooth Brightness For Better Light Adaptation

HyLED X provides a smooth illuminance pattern when the surgical lights are switched on, it helps to adopt visual acuity as per Weber's law.



## Color Temperature Distinguish Tissue Difference

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, the medical staff always needs 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 HyLED X control system. One-button switchover to different surgery modes helps save clinical time with an intuitive & icon-based user interface touch screen.



-  Cardiac surgery
-  Deep cavity surgery
-  Superficial surgery
-  Spine surgery
-  Gynecologic/Urologic surgery
-  General practice

## Easy to Change

### Quick Lock System

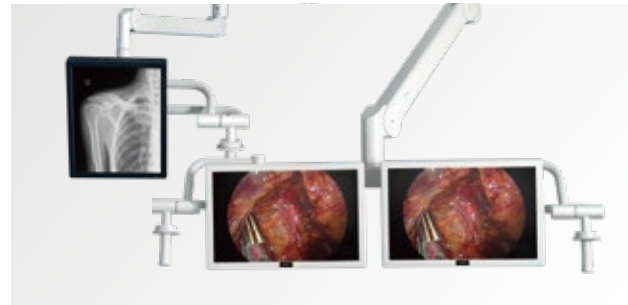
Easily transition Integrated Camera and Camera preparation as you Surgical Lights between rooms with no special tools needed.







## Various Video Solutions



Multi screen system



4K camera system



Integrated camera



Digital video recorder

## Controller



Wall control



Touch screen control



Touch keypad control

## Other Accessories



Various handles flexibility

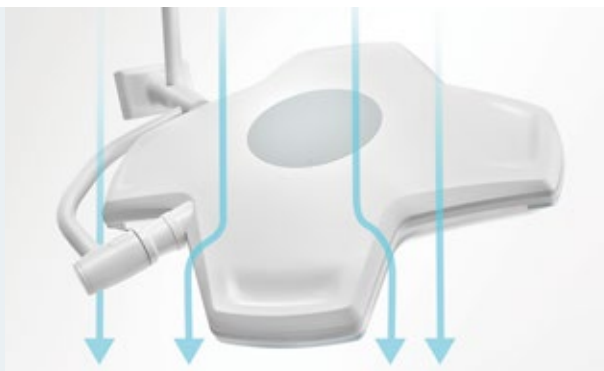


HyLED X9M mobile LED surgical light

Mindray focuses more on the clinical requirement, designs it from perspective of medical staff, and reduces 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
- Better Compatibility with Laminar Flow--DIN 1946
- Safe and durable--IP54
- Greater hygiene standards as Antimicrobial Powder Coating



## 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



## 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	65%	60%
	100%(with AICS Plus)	
Shadow dilution with two masks	55%	52%
	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	iRelax, green ambient light, AICS Plus	/
Optional functions	/	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.

\*\*\*\* MIS Lighting mode included