Illumination Solutions

Digital Image Correlation (DIC)

DANTEC DYNAMICS

Dantec Dynamics, a Nova Instruments company NOVA INSTRUMENTS

New to 2024! The XR/XB/SXR/SXB-Illumination Systems (I)

› On behalf of Dantec Dynamics, we are pleased to announce the release;

- of **new model types** („**V3-CX+“** and **„V3-MX**+“) of our **X-& SX-LED Illumination Systems** that will replace the **older „ V2-CT+“** and **„V2-MT+“** illumination models, and
- the **new** **DSM 47250: X-Illumination Controller**









New to 2024! The XR/XB/SXR/SXB-Illumination Systems (II)

› But what is the **difference**, and **more importantly**, the **CVP advantage** compared to the **older portfolio** and with **respect to the competition**?

1. ***Higher*** *optical outputs*
2. ***Clear*** *&* ***consistent*** *application-based illumination solution portfolio*
3. ***Modular*** *&* ***multi-system functionality*** *with the XR/XB/SXR/SXB illumination system +* ***X-Illumination Controller***
4. *Supply* ***standardized safety eyewear***
5. ***Best*** *illumination wavelength strategy*



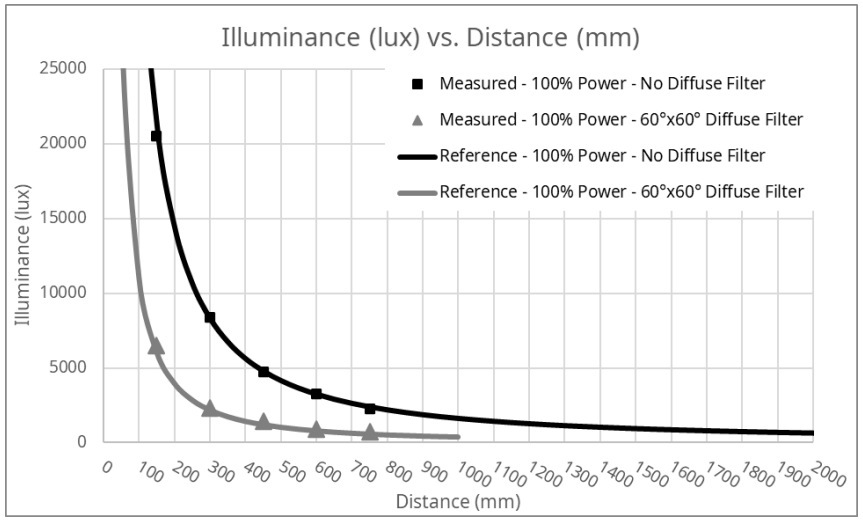
New to 2024! The XR/XB/SXR/SXB-Illumination Systems

1. *Higher optical outputs*

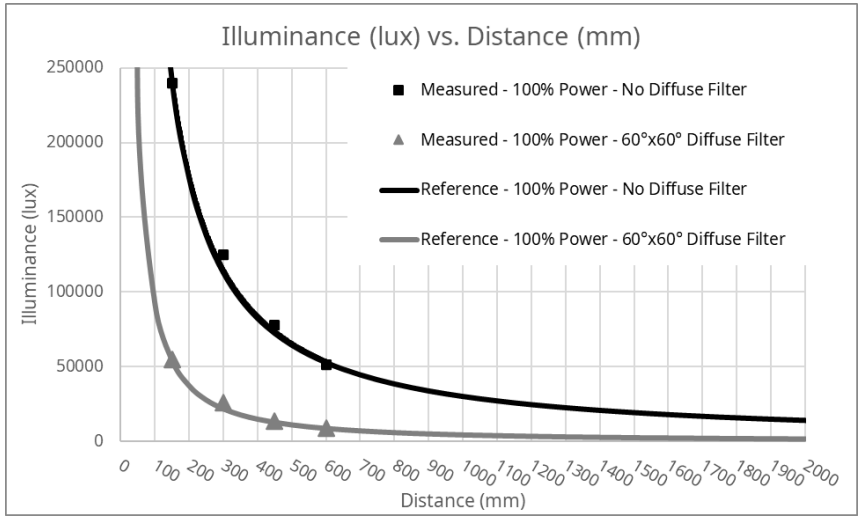
- At the same **stand-off distance;**
  - the **new** „**V3-CX+“** is **1.3x brighter** than the „**V2-CT+“**
  - the **new** „**V3-MX+“** is **1.5x brighter** than the „**V2-MT+“**
- *If a diffuse filter were used on a „**V3-CX+“** or **„V3-MX+“** model, the illuminance would be similar to the **predecessor „V2-CT+“** or **„V3-MX+“** models*
- **All DDs** illumination solutions have **higher (often factor times)** illumination output than **counterpart systems** from the **competition**
- The **measurement of illuminance** „lux“ has been performed for **„V2-CT+“** or **„V3-MX+“** models *„see charts to the right**

Article Number	Model	Rel. (Min) Shutter Time	Min Frame Rate
DSM 47100: XR-LED Illumination System	*V2-CT+*	*1000 µs*	*1000 Hz*
	V3-CX+	***740 µs (cont.)***	***1350 Hz***
DSM 47130: SXR-LED Illumination System	*V2-MT+*	*100 µs*	*10,000 Hz*
	V3-MX+	***66 µs (cont.)***	***15,000 Hz***

V3-CX+



V3-MX+



New to 2024! The XR/XB/SXR/SXB-Illumination Systems

2. *Clearer & consistent application-based illumination solution portfolio*

- DD states **which illumination solution** should be used with **which DIC system** and **what** is the **solutions, useable features**, **properties**, and. **working distance** are.
- Our competition **does not have** this information and **nor have** performed the **functional testing** to stipulate what a illumination solution can/cannot do.
- DD has;
  - **no „gaps“** in the portfolio,
  - **compact, clear** and **consistant** in portfolio
  - (We only have 6 illumination units, 2 of which are the same just different wavelength)

Article Number	Name	Wavelength	App. DIC System	Illumination Triggering	Min Use. Shutter Time / Max Cam. Frame Rate	Lumens	Max Use. Distance	Application & Solutions
DSM 47000	LED Illumination System	White	EduDIC	Continuous (Constant)	1540 µs (1.5 ms) / 650 Hz	6,240	1.5 m	Low-Speed (Quasi-Static Testing) Applications
DSM 47100	XR-LED Illumination System	Red (650 nm – 670 nm)	FlexDIC, MulticamDIC, MSpeedDIC, or ThermechDIC	Continuous (Constant) or Strobe (Stroboscopic)	740 µs / 1350 Hz (Continuous) 100 ns / 50 kHz (Strobe)	12,600	3 m	Low- or Medium-Speed Applications *High-Temperature **Fluroescent Speckling
DSM 47120	XB-LED Illumination System*/**	Blue*/** (440 nm – 460 nm)						
DSM 47130	SXR-LED Illumination System	Red (650 nm – 670 nm)	MSpeedDIC or HSpeedDIC		66 µs / 15,000 Hz (Continuous) 100 ns / 50 kHz (Strobe)	20,800	12 m	Medium- or High Speed (Fatigue or Dynamic) Applications *High-Temperature **Fluroescent Speckling
DSM 47140	SXB-LED Illumination System*/**	Blue*/** (440 nm – 460 nm)						
DSM 46060	HP-LED Illumination System	White	HSpeedDIC	Continuous (Constant)	133 µs / 7,500 Hz	25,530	5 m	Medium- or High Speed (Fatigue or Dynamic) Applications

New to 2024! The XR/XB/SXR/SXB-Illumination Systems

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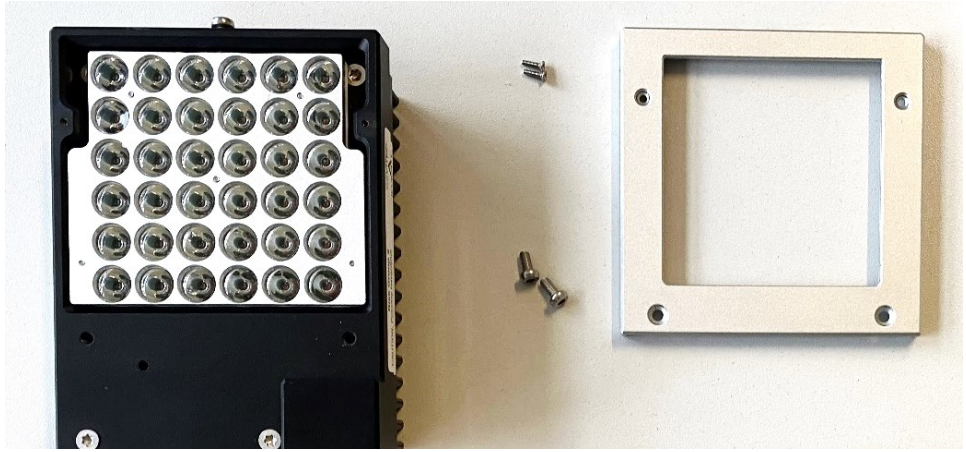
2. *Clearer & better application-based illumination solution portfolio (contd.)*

- The **new** „**V3-CX+“** or **„V3-MX+“** models have an **integrated diffuse filter bracket**. Users can **„slide in“** and **„slide out“ any** diffuse filter, **quick** & **easy.**
- The **predecessor** **„V2-CT+“** or **„V3-MX+“** model required manual dissassembly of the filter bracket.
- Also **5x symmetric/assymetric** diffuse filters (20° x 20°, 40° x 40°, 60° x 60°, 30° x 15°, and 60° x 15°) are supplied with the „**V3-CX+“** or **„V3-MX+“** models, instead of 4x symmetric diffuse filters as with the **„V2-CT+“** or **„V3-MX+“** models.

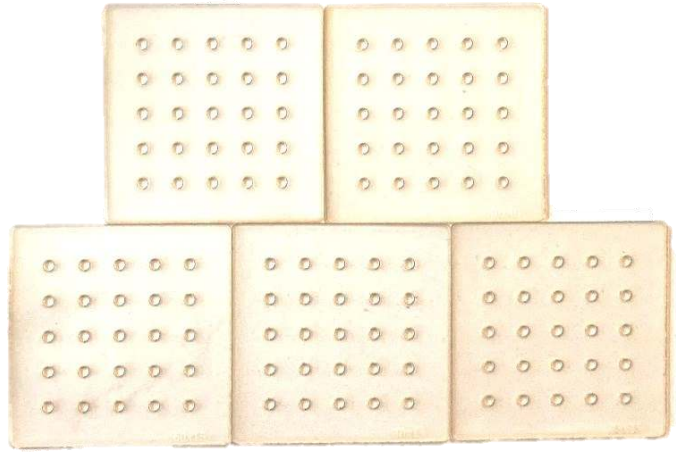
V3-CX+



V2-CT+



5x Diffuse Filters with **V3-CX+ Models**



New to 2024! The XR/XB/SXR/SXB-Illumination Systems

3. ***Modular*** *&* ***multi-system functionality*** *with the XR/XB/SXR/SXB illumination system +* ***X-Illumination Controller***

- **V3-CX+** or **V3-MX+** illumination units, aka. **XR-LED**, **XB-LED**, **SXR-LED**, or **SXB-LED**, can be **retroffited** with the (**optional**) **DSM 47250: X-Illumination Controller**) for:
  - **8x Multi-illumination unit system control** with **V3-CX+** and/or **V3-MX+** illumination systems for **MulticamDIC** or **MSpeedDIC** systems,
  - **Adjustable dimming intensity**, and
  - **Strobe (pulsed)** illumination trigger modeOur competition **does not** have **„system integratable“**or **„multi-controllable“** systems**.** Each system is **standalone.**
- Using the **X-Illumination Controller**, any **V3-CX+** or **V3-MX+** illumination unit can achieve a **100 ns strobe length** at **full optical power** with **220 ns pulse (level) delay**.





New to 2024! The XR/XB/SXR/SXB-Illumination Systems

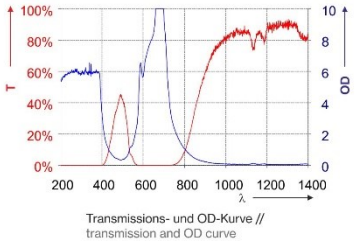
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*4. Supply **standardized safety eyewear***

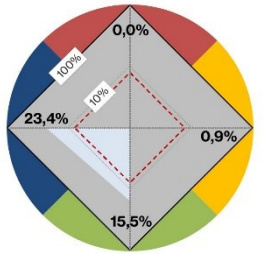
- For all of the **new** **„V3-CX+“** and **„V3-MX+“** models, we now provide **safety eyewear** included (as standard) with each item.
- Safety eyewear ensures that users can work safely with any illumination system, particular systems of **high optical output intensity** and those operated in **strobe illumination triggered mode**.
- Our competition **does not** do this, which inherently neglects the associated risk of using **high-output** & **strobe illumination**
- Since the safety rating of **„V3-CX+“** increased to **Risk Group 3 (IEC 62471)** and that potentially **any illumination system** could/can be operated in **strobe illumination mode**, with the **X-Illumination Controller** (in the future via retrofit) we have **standardized the delivery** of safety eyewear **together with each system**.

XR-LED & **SXR-LED**
Illumination safety-protection goggles

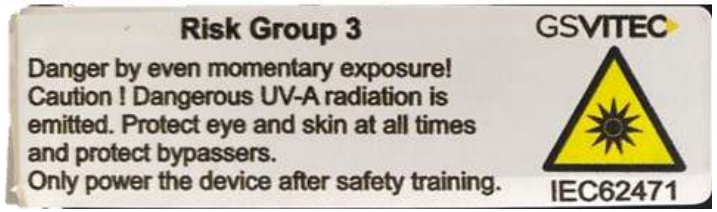




Transmissions- und OD-Kurve //
transmission and OD curve

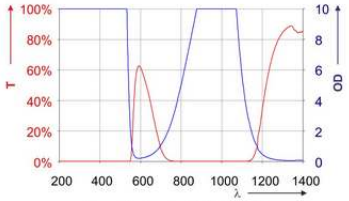


Transmission der Signalfarben nach DIN EN 172 //
transmission of signal colours acc. to EN 172

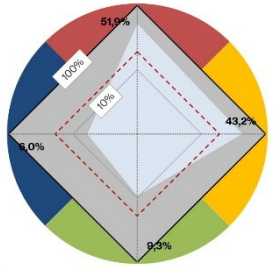


XB-LED & **SXB-LED**
Illumination safety-protection goggles





Transmissions- und OD-Kurve //
transmission and OD curve



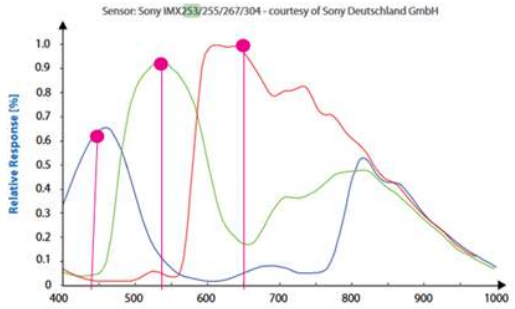
Transmission der Signalfarben nach DIN EN 172 //
transmission of signal colours acc. to EN 172

New to 2024! The XR/XB/SXR/SXB-Illumination Systems

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5. *Best illumination wavelength strategy*

- The **new** „**V3-CX+“** and **„V3-MX+“** models are available as **XB-LED** and **SXB-LED** models with **royal blue** wavelength **(440-460 nm)**, instead of **green** wavelengths (**520-535 nm**)
- Question: *Why? Why also does DD offer two wavelengths with **photo red** **(650-670 nm)** aswell, as the standard option?* Contrary to **popular belief** (& our competitions opinion), **photo red** **(650-670 nm)** is the best wavelength of illumination since it is the colour that **cameras** are **most responsive** to (achieve the lowest shutter times, fasters measurement application and it is also the **safest** to use)
- If you need or want **royal blue** you can have it, but 95% of DIC applications not **need** **royal blue**.



V2-CT+ (Green Illumination)



		Photo Red (650-670 nm)	Royal Blue (440-460 nm)	Green (520-535 nm)
Camera Spectral Response		*Highest* *96% Sens.*	*Lowe* *78% Sens.*	*High* *91% Sens.*
UV Output Intensity (Safety)		*Safest* *(Lowest Int)*	*Hazardous* *(Highest Int)*	*Moderate*
Application-Dependant	***High-Temp***	*No*	*Yes*	*Yes*
	Fluroescent Speckling	*No*	*Yes*	*No*
Competiton		*No*	*Yes*	*No*

Introduction to Illumination (I)

› **High-quality lighting** is **very important** for Digital Image Correlation (DIC). The ability of the technique to **measure**;

- **transient (ie. fast) events** can be achieved through using a **high-intensity (bright)** & **homogenous** illumination source.
- **accurately** can be achieved through using a **monochromatic (similar-wavelength)** & **continuous** (flicker-free) illumination source.



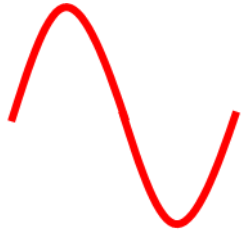
High Intensity (Brightness)

→ Refers to the **perceived lux** of the **emitted radiation** from the illumination source



Homogenous

→ Refers to the **distribution** of the **emitted radiation** from the illumination source



Monochromatic

→ Refers to the **wavelength** of the **emitted radiation** from the light source



Continuous

→ Refers to the **(temporal) pulsation** of the **emitted radiation** from the light source

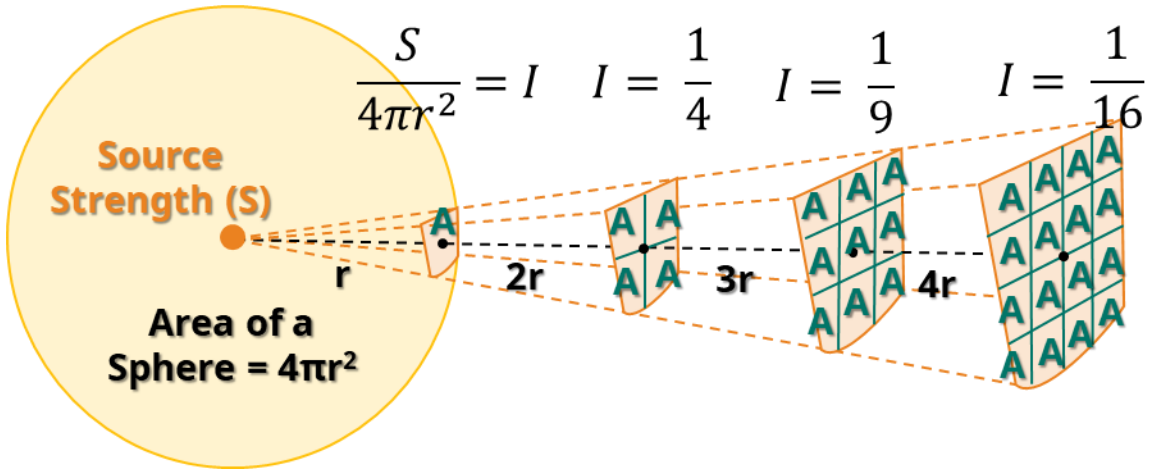
Introduction to Illumination - Brightness & Homogenity (II)

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› Physical terminologies for the description of **light intensities** are catagorized as;

- **Luminous flux →** measured in **lumens (lm)** being the total amount of light emitted in all directions (lm = cd x sr)
- **Lumonous intensity →** measured in **candela (cd)** being the amount of light emitted at a specific beam angle (steradian) (cd = lm / sr)
- **Illuminance →** measured in **lux** being the number of lumens per square-meter.

› The **intensity of the light** to an observer from a source is **inversely proportional** to the **square of the distance (r)** from the observer to the source. Meaning, the energy twice as far from the source is spread over four times the area, hence one-fourth the intensity. (**Inverse Square Law**)



Illuination Systems Portfolio (I)

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Article Number	Name	Wavelength	App. DIC System	Illumination Triggering	Min Use. Shutter Time / Max Cam. Frame Rate	Lumens	Max Use. Distance	Application & Solutions
DSM 47000	LED Illumination System	White	**EduDIC**	Continuous (Constant)	1540 µs (1.5 ms) / 650 Hz	6,240	1.5 m	Low-Speed (Quasi-Static Testing) Applications
DSM 47100	**XR-LED Illumination System**	**Red** (650 nm – 670 nm)	**FlexDIC**, **MulticamDIC**, **MSpeedDIC**, or **ThermechDIC**	Continuous (Constant) or Strobe (Stroboscopic)	740 µs / 1350 Hz (Continuous) 100 ns / 50 kHz (Strobe)	12,600	3 m	Low- or Medium-Speed Applications *High-Temperature **Fluroescent Speckling
DSM 47120	**XB-LED Illumination System***/**	**Blue***/** (440 nm – 460 nm)						
DSM 47130	**SXR-LED Illumination System**	**Red** (650 nm – 670 nm)	**MSpeedDIC** or **HSpeedDIC**		66 µs / 15,000 Hz (Continuous) 100 ns / 50 kHz (Strobe)	20,800	12 m	Medium- or High Speed (Fatigue or Dynamic) Applications *High-Temperature **Fluroescent Speckling
DSM 47140	**SXB-LED Illumination System***/**	**Blue***/** (440 nm – 460 nm)						
DSM 46060	HP-LED Illumination System	White	**HSpeedDIC**	Continuous (Constant)	133 µs / 7,500 Hz	25,530	5 m	Medium- or High Speed (Fatigue or Dynamic) Applications

DSM 47000: LED Illumination System (I)

- The **DSM 47000: LED Illumination System** is an easy-to-use, adaptable, constant (continuous) illumination system for the **EduDIC** system for any **low-speed (quasi-static) applications**.
- The minimum acquisition frame rate that can realistically be used with the LED Illumination System system when operating in (standard) continuous illumination mode is **650 Hz** corresponding with a realistic minimum shutter time of **1540 µs (1.5 ms).**
- Consisting of a **156 white-light LED array**, the LED Illumination System provides a flicker-free, medium-intensity light (**6240 lumens**) that can be switched to various cool (3200°K) to warm (5600°K) colour-temperature settings.
- The system also features a **dimmer** whereby the intensity can be adjusted from 10% to 100%. The LED illumination system has a fixed angle of illumination at **60°** and a **soft-light diffusion filter**.
- The **LED Illumination System** has a **max useable distance** of **ca. 1.5 m** from the test object.

LED Array (front)





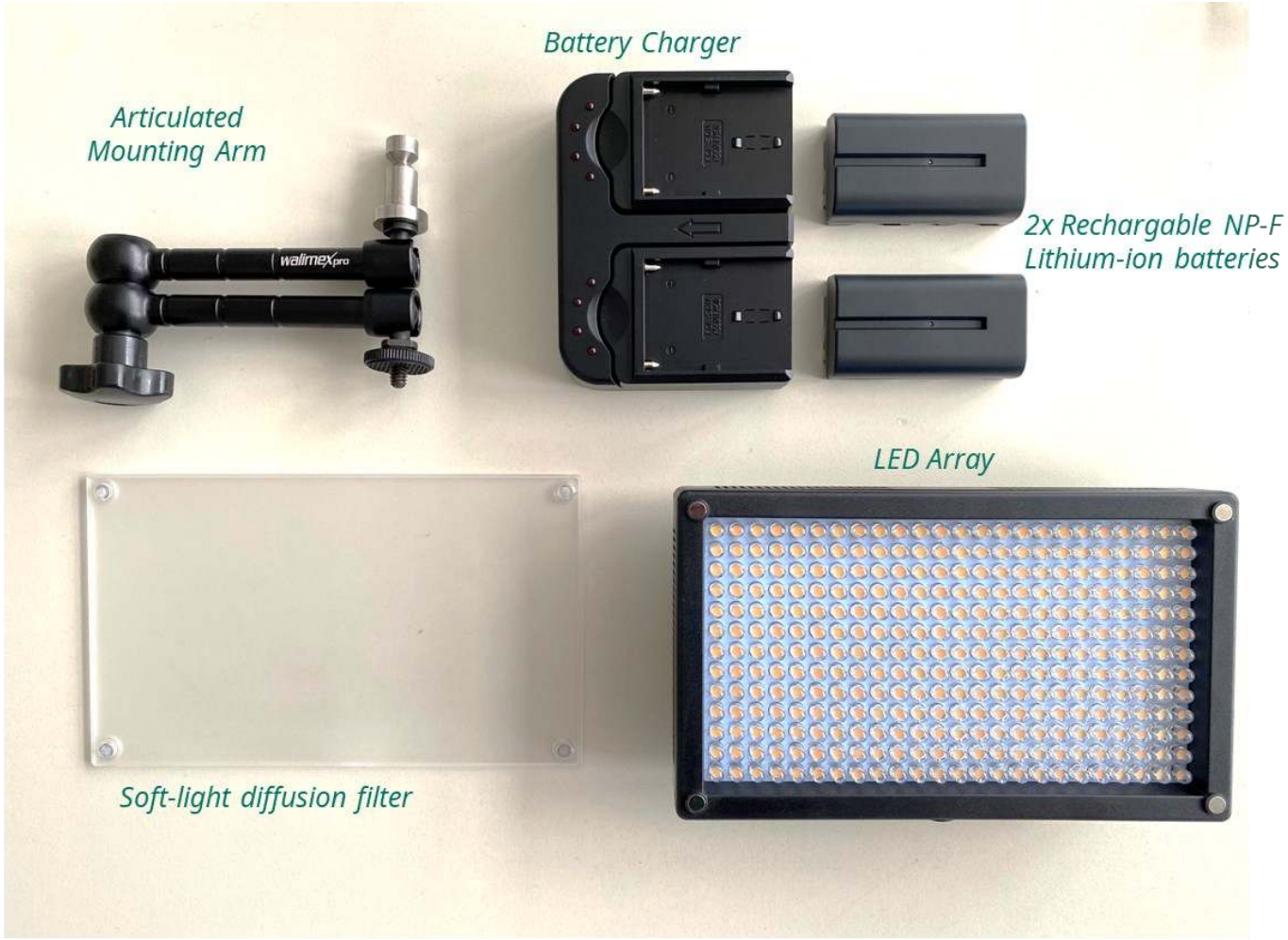
LED Array (rear)

DSM 47000: LED Illumination System (II)

- The **DSM 47000: LED Illumination System** is supplied together with a **articulated mounting arm** and is packaged in one, soft carry-case together with the **EduDIC** system**.** (It may also be **purchased seperately**)
- The system may be operated via direct connection to a power supply **OR** via **2x re-chargeable, NP-F Lithium-ion batteries** (charger is also included).
- The LED Illumination System weighs 0.7 kgs / 1.5 lbs (including mounting arm) and has dimensions 19 cm x 12 cm x 5 cm / 7.4 “ x 4.7 “x 2 “ (excluding mounting arm).



1x soft carry-case



Components of the DSM 47100: LED Illumination System (excluding cables)

List of Changes to X-& SX-Illumination Systems Portfoliio

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› Before **<May 2023**, the DSM 47100, DSM 47120, DSM 47130, and DSM 47140 was cited as „**V1-CT+“** or **„V1-MT+“** .

› As of **May 2023**, the DSM 47100, DSM 47120, DSM 47130, and DSM 47140 was re-cited to „**V2-CT+“** or **„V2-MT+“** , which incorporated the following changes to „**V1-CT+“** or **„V1-MT+“**;

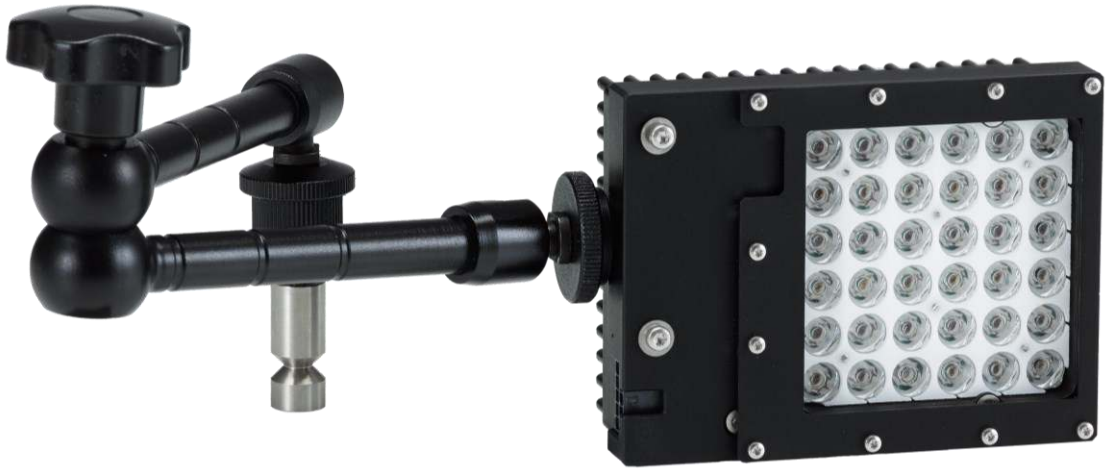
- diffuse filters can be **inserted into the slit** on the upper side of the illumination system,
- a **different power connection** is used (**Molex-design**), and
- a **different polarization filter mounting design** is incorporated

› As of **April 2024**, the DSM 47100, DSM 47120, DSM 47130, and DSM 47140 was re-cited as „**V3-CX+“** or **„V3-MX+“**, which incorporates the following changes to „**V2-CT+“** or **„V2-MT+“**;

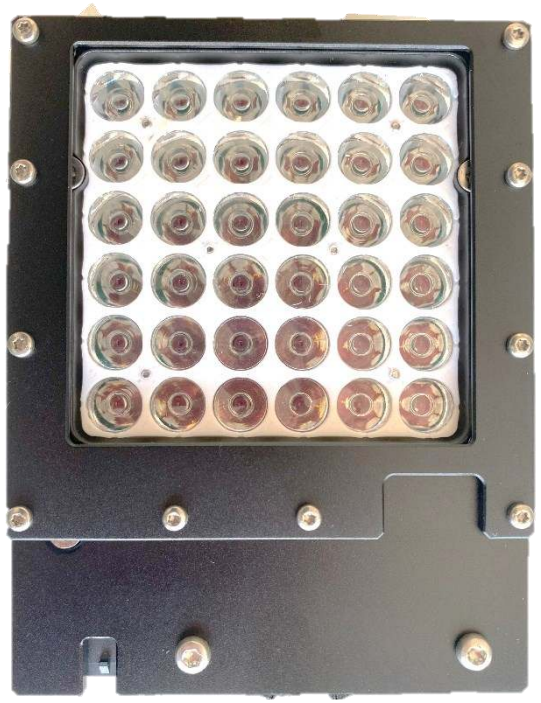
- **new compatabiltiy** with the **DSM 47250: X-Illumination Controller**,
- the **DSM 47120** and **DSM 47140** are offered with **royal blue** wavelength,
- the **DSM 47100** and **DSM 47120** are rated to an **IEC 62471** rating to **Risk Group 3**,
- the **mounting bracket** is offered as a separate, optional item, and
- the power supply for the **DSM 47100** and **DSM 47120** is of **different design** and **connection capability.**

DSM 47100/DSM 47120: XR & XB-LED Illumination Systems (I)

› The **DSM 47100: XR-LED Illumination System (Red)** and **DSM 47120: XB-LED Illumination System (Blue)** are adaptable, **continuous (constant) & strobe illumination** systems for the **FlexDIC**, **MulticamDIC**, **MSpeedDIC**, or **ThermechDIC** systems with **any low** or **medium-speed** applications.



DSM 47100/DSM 47120: XR/XB-LED Illumination System (Front) with articulated mounting arm



DSM 47100/DSM 47120: XR/XB-LED Illumination System (Front)

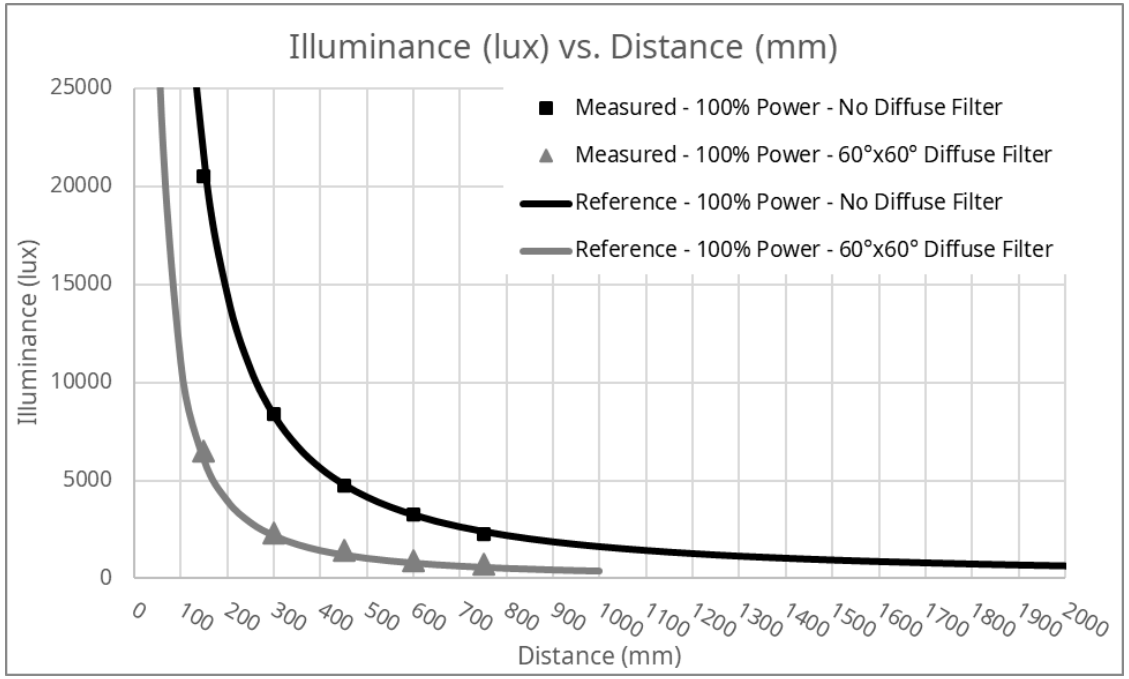
› The **XR-LED** is provided with **photo-red** wavelength (640-670 nm) – for all low/normal temperature testing applications.

› Alternatively, the **XB-LED** is provided with **royal blue** wavelength (440-460 nm) – for all high temperature and fluroescent-speckled testing applications.

› ***NOTE → Polarization filters (DSM 47180)*** *and* ***polarization filter mounting brackets (DSM 47185)*** *are available* ***as options****.*

DSM 47100/DSM 47120: XR & XB-LED Illumination Systems (II)

- The **DSM 47100: XR-LED Illumination System (Red)** and **DSM 47120: XB-LED Illumination System (Blue)** has a powerful **36 LED-array** that provides a **flicker-free**, **medium-intensity light (12,600 lumens)**.
- The minimum acquisition frame rate that can realistically be used with the **XR-LED** or **XB-LED** system when operating in (standard) continuous illumination mode is **1350 Hz** corresponding with a realistic minimum shutter time of **740 µs**.
- The maximum recommended distance for the use of **one XR-LED** or **one XB-LED** system is;
  - **3,000 mm (3 m)** without the use of a diffuse filter, or
  - **1,000 mm (1 m)** with the use of a 60°x60° diffuse filter



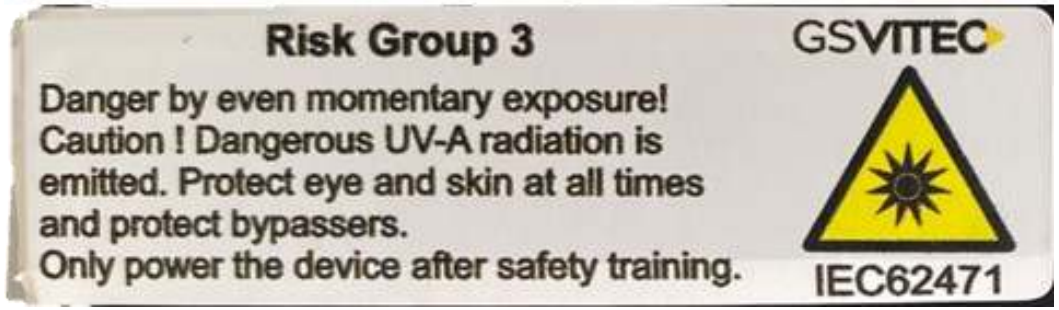
Illumination Standoff Distance (mm)	Illuminance (lux) without diffuse filter
100	37,420
500	4,140
1000	1,610
2000	625

DSM 47100/DSM 47120: XR & XB-LED Illumination Systems (III)

› The **IEC 62471 rating** of the **DSM 47100: XR-LED Illumination System (Red)** and **DSM 47120: XB-LED Illumination System (Blue)** is classified **Risk Group 3**.



DSM 47100/DSM 47120: Risk Group 3 - Warning Label (Side)



DSM 47100/DSM 47120: Risk Group 3 - Warning Label (Side)

CAUTION:

- ***XR-LED*** *&* ***XB-LED*** *are classified as* ***Risk Group 3***
- ***Dangerous UV-A*** *radiation is* ***emitted***
- ***Protect eye*** *and* ***skin*** *at* ***all times***
- *Only power the device* ***after safety training***
- *Wear the* ***provided illumination safety protection goggles*** *when using the illumination system.*

DSM 47100/DSM 47120: XR & XB-LED Illumination Systems (IV)

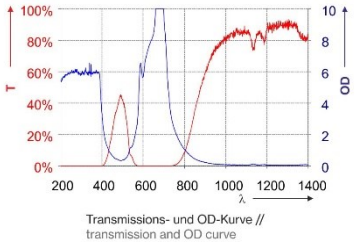
- The **DSM 47100: XR-LED Illumination System (Red)** and **DSM 47120: XB-LED Illumination System (Blue)** are supplied together with;
  - an **articulated mounting arm** for the attachment of the XR/XB-Illumination Systems to the brackets of the mountring rail,
  - one pair of **illumination safety protection goggles** for use with the **XR-LED** or **XB-LED** illumination system, and
  - one power transformer with 5 m cable. **Up to <u>two</u> XR-LED** or **XB-LED** illumination systems may be attached to the power transformer.
- ***NOTE*** → *Other cable lengths can be supplied upon request*
- The **XR-LED** or **XB-LED** weigh 0.4 kgs / 0.9 lbs (excluding mounting arm) and have dimensions of 11 cm x 8 cm x 4 cm / 4.3 “ x 3.2 “x 1.6 “ (excluding mounting arm).
- The **XR-LED** or **XB-LED** are IP 20.

Articulated Mounting Arm

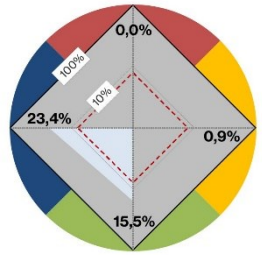


XR-LED
Illumination safety-protection goggles





Transmissions- und OD-Kurve // transmission and OD curve



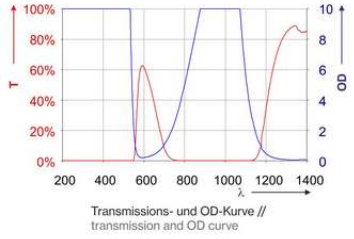
Transmission der Signalfarben nach DIN EN 172 // transmission of signal colours acc. to EN 172

Power Transformer

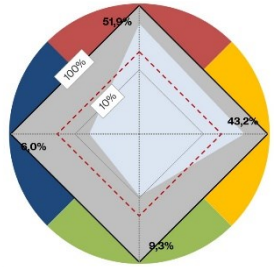


XB-LED
Illumination safety-protection goggles





Transmissions- und OD-Kurve // transmission and OD curve

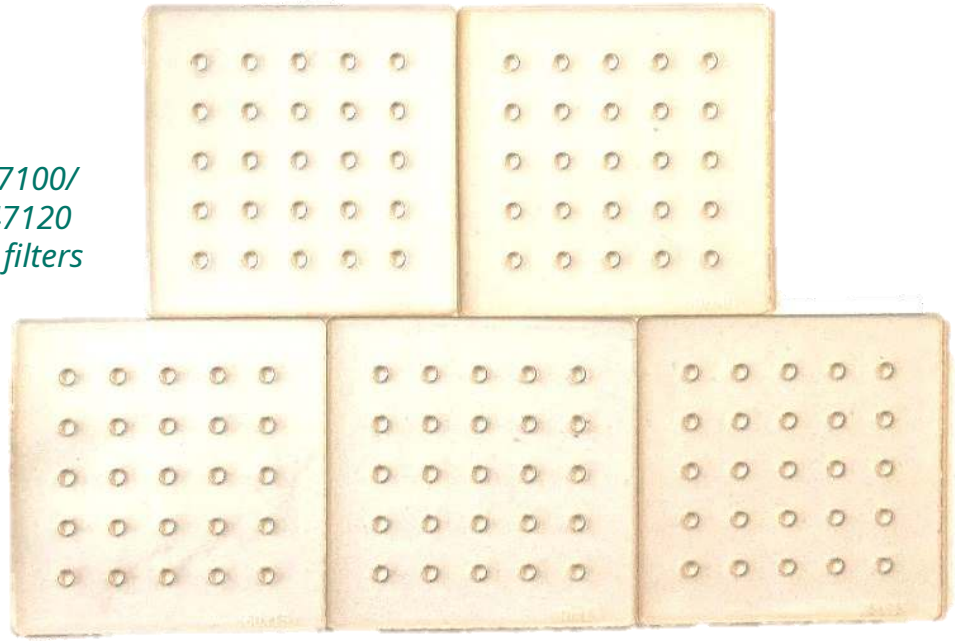


Transmission der Signalfarben nach DIN EN 172 // transmission of signal colours acc. to EN 172

DSM 47100/DSM 47120: XR & XB-LED Illumination Systems (V)

› Both the **DSM 47100: XR-LED Illumination System (Red)** and **DSM 47120: XB-LED Illumination System (Blue)** are supplied with **exchangable diffuse filters**, so users can better control the illumination distribution with respect to the test application stand-off distance. The higher the illumination angle, the lower the illuminance (lux) for a given stand-off distance.

DSM 47100/ DSM 47120 diffuse filters



5x Exchangable Diffuse Filters

1. *20° x 20°*
2. *40° x 40°*
3. *60° x 60°*
4. *30° x 15°*
5. *60° x 15°*

- *The illumination angle is described as a divergence angle in X° x Y° directions, respectively*
- *The optics can be mounted in 0° or 90° orientation with text legible in corner of filter*

DSM 47130/DSM 47140: SXR & SXB-LED Illumination Systems (I)

- The **DSM 47130: SXR-LED Illumination System (Red)** and **DSM 47140: SXB-LED Illumination System (Blue)** are adaptable, **continuous (constant) & strobe illumination** systems for the **MSpeedDIC** or **HSpeedDIC** systems with **any medium** or **high-speed** (fatigue or dynamic) applications.



DSM 47130/DSM 47140: SXR/SXB-LED Illumination System (Front)



DSM 47130/ DSM 47140: SXR/SXB-LED Illumination System (Rear)

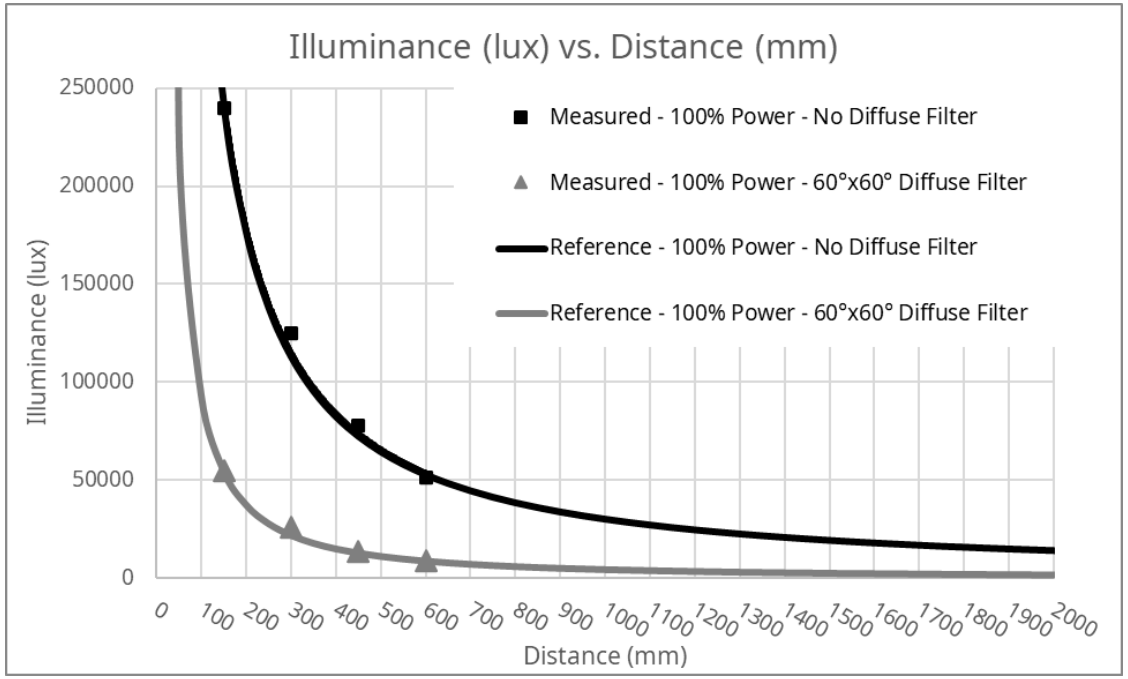
The **SXR-LED** is provided with **photo-red** wavelength (640-670 nm) – for all low/normal temperature testing applications.

Alternatively, the **SXB-LED** is provided with **royal blue** wavelength (440-460 nm) – for all high temperature and fluroescent-speckled testing applications.

NOTE → Polarization filters (DSM 47190) *and* ***polarization filter mounting brackets (DSM 47195)*** *are available* ***as options***.

DSM 47130/DSM 47140: SXR & SXB-LED Illumination Systems (II)

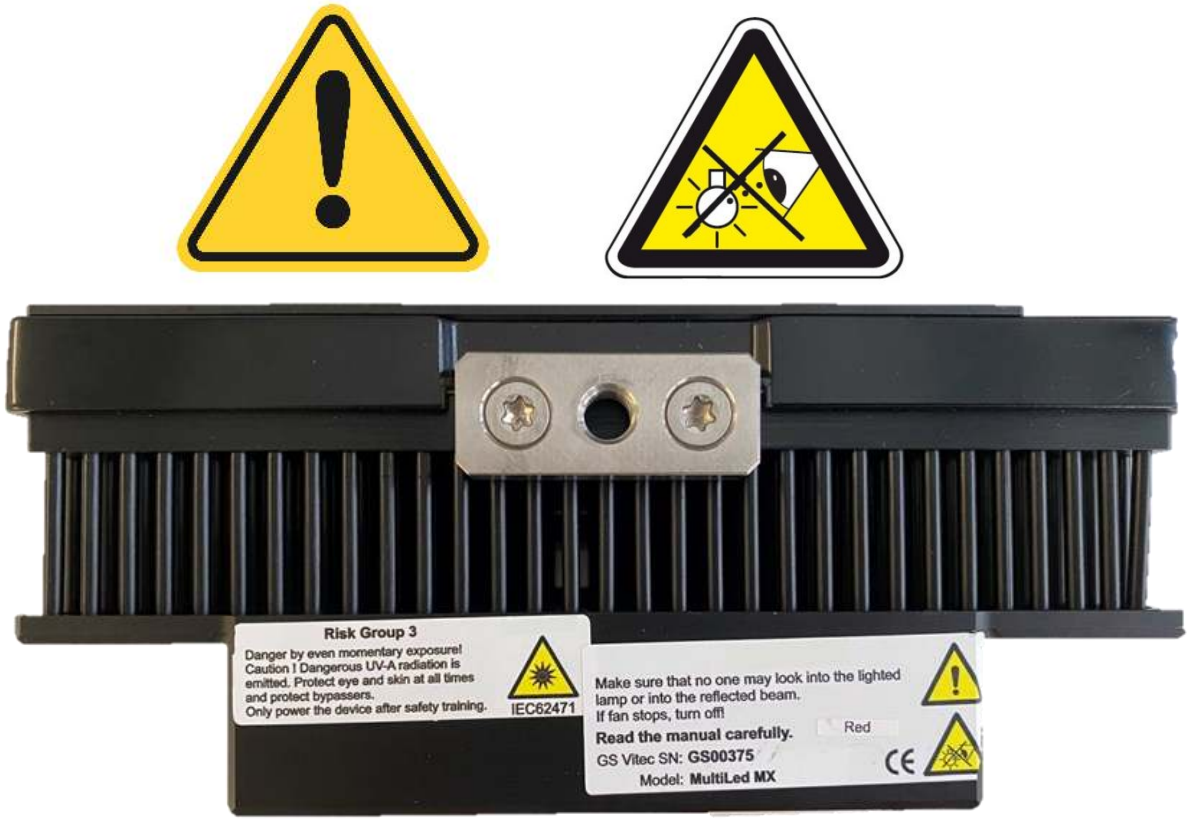
- The **DSM 47130: SXR-LED Illumination System (Red)** and **DSM 47140: SXB-LED Illumination System (Blue)** has a ultra-powerful **52 LED-array** that provides a **flicker-free**, **high-intensity illumination (20,800 lumens)**.
- The minimum acquisition frame rate that can realistically be used with the **SXR-LED** or **SXB-LED** system when operating in (standard) continuous illumination mode is **15,000 Hz** corresponding with a realistic minimum shutter time of **66 µs.**
- The maximum recommended distance for the use of **one SXR-LED** or **one SXB-LED** system is;
  - **12,000 mm (12 m)** without the use of a diffuse filter, or
  - **5,000 mm (5 m)** with the use of a 60°x60° diffuse filter



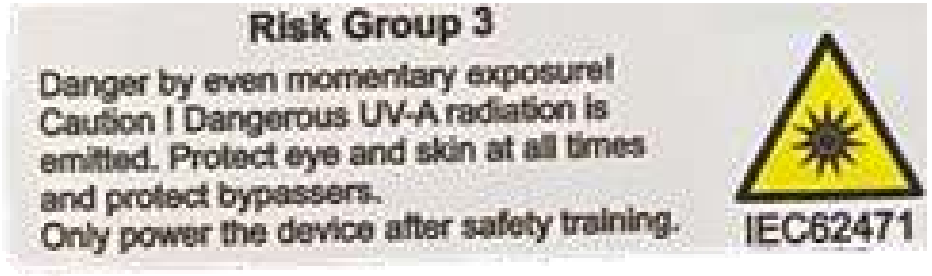
Illumination Standoff Distance (mm)	Illuminance (lux) without diffuse filter
100	378,570
500	64,450
1000	30,050
2000	14,025

DSM 47130/DSM 47140: SXR & SXB-LED Illumination Systems (III)

› The **IEC 62471 rating** of the **DSM 47130: SXR-LED Illumination System (Red)** and **DSM 47140: SXB-LED Illumination System (Blue)** is classified **Risk Group 3**.



DSM 47130/DSM 47140: Risk Group 3 - Warning Label (Top)



DSM 47130/DSM 47140: Risk Group 3 - Warning Label (Top)

CAUTION:

- ***SXR-LED** & **SXB-LED** are classified as **Risk Group 3***
- ***Dangerous UV-A** radiation is **emitted***
- ***Protect eye** and **skin** at **all times***
- *Only power the device **after safety training***
- *Wear the **provided illumination safety protection goggles** when using the illumination system.*

DSM 47130/DSM 47140: SXR & SXB-LED Illumination Systems (IV)

- The **DSM 47130: SXR-LED Illumination System (Red)** and **DSM 47140: SXB-LED Illumination System (Blue)** are supplied together with;
  - a **tripod** (since vibrations, due to the ventilation/fan, would cause a measurement disturbance to the DIC system, if the **SXR-LED** or **SXB-LED** illumination system were mechanically connected)
  - one pair of **illumination safety protection goggles** for use with the **SXR-LED** or **SXB-LED** illumination system, and
  - one power transformer with 7 m cable.
- ***NOTE*** → *Other cable lengths can be supplied upon request*
- The **SXR-LED** or **SXB-LED** weigh 2 kgs / 4.4 lbs and have dimensions of 21 cm x 14 cm x 9 cm / 8.3 “ x 5.5 “x 3.5 “ (excluding tripod).
- The **SXR-LED** or **SXB-LED** are IP 20.

Tripod

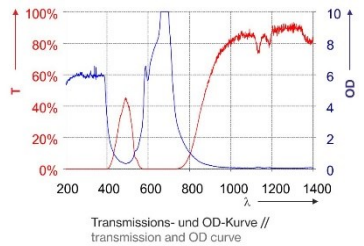


Power Transformer

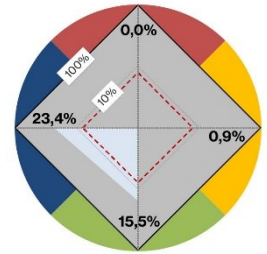


SXR-LED
Illumination safety-protection goggles





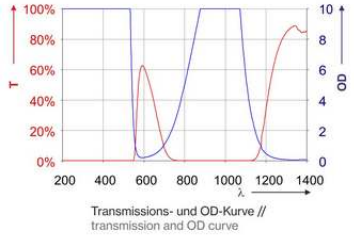
Transmissions- und OD-Kurve // transmission and OD curve



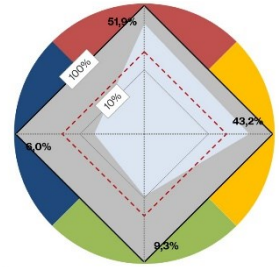
Transmission der Signalfarben nach DIN EN 172 // transmission of signal colours acc. to EN 172

SXB-LED
Illumination safety-protection goggles





Transmissions- und OD-Kurve // transmission and OD curve

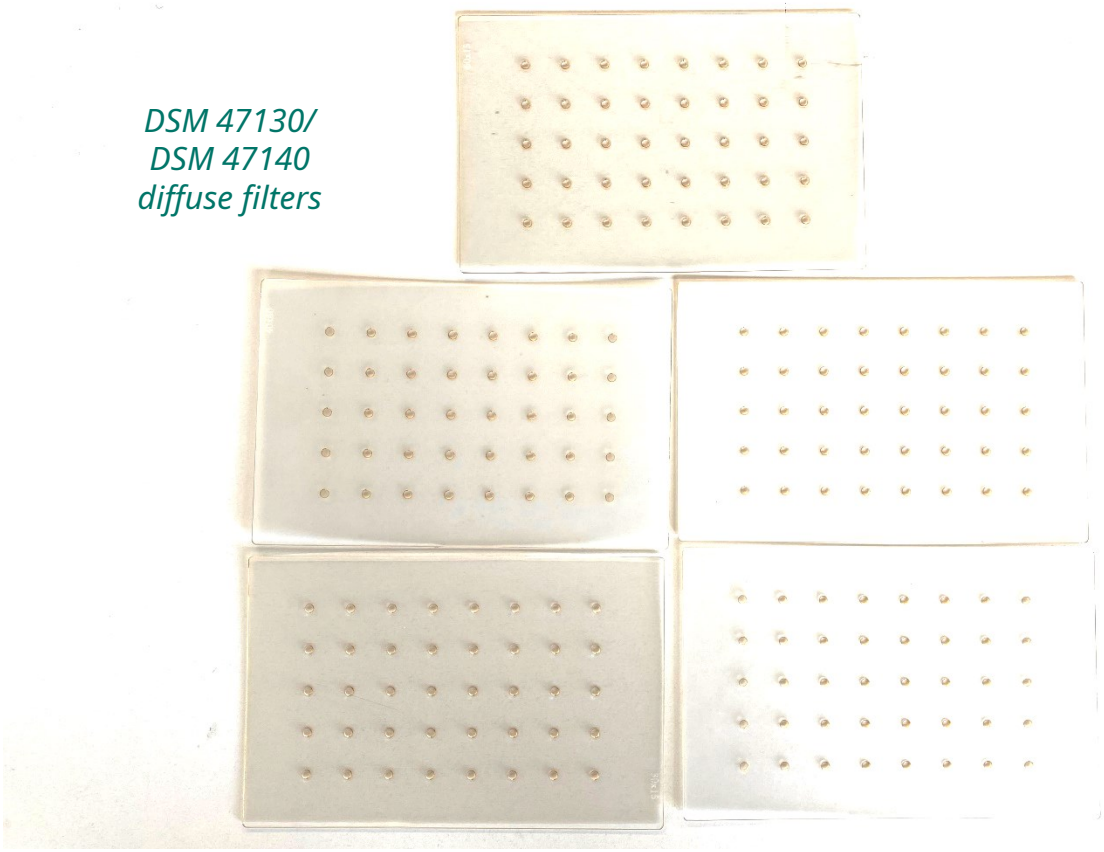


Transmission der Signalfarben nach DIN EN 172 // transmission of signal colours acc. to EN 172

DSM 47130/DSM 47140: SXR & SXB-LED Illumination Systems (V)

› Both the **DSM 47130: SXR-LED Illumination System (Red)** and **DSM 47140: SXB-LED Illumination System (Blue)** are supplied with **exchangable diffuse filters**, so users can better control the illumination distribution with respect to the test application stand-off distance. The higher the illumination angle, the lower the illuminance (lux) for a given stand-off distance.

DSM 47130/ DSM 47140 diffuse filters



5x Exchangable Diffuse Filters

1. *20° x 20°*
2. *40° x 40°*
3. *60° x 60°*
4. *30° x 15°*
5. *60° x 15°*

- *The illumination angle is described as a divergence angle in X° x Y° directions, respectively*
- *The optics can be mounted in 0° or 90° orientation with text legible in corner of filter*

DSM 47250: X-Illumination Controller (I)

- **V3-CX+** or **V3-MX+** illumination units, aka. **XR-LED**, **XB-LED**, **SXR-LED**, or **SXB-LED**, can be **retroffited** with the (**optional**) **DSM 47250: X-Illumination Controller**) for:
  - **8x Multi-illumination unit system control** with **V3-CX+** and/or **V3-MX+** illumination systems for **MulticamDIC** or **MSpeedDIC** systems,
  - **Adjustable dimming intensity**, and
  - **Strobe (pulsed)** illumination trigger modeOur competition **does not** have **„system integratable“**or **„multi-controllable“** systems**.** Each system is **standalone.**
- If the **X-Illumination Controller** is **not purchased** with the **V3-CX+** or **V3-MX+** illumination units, aka. **XR-LED**, **XB-LED**, **SXR-LED**, or **SXB-LED**, each illumination system can only be operated **independantly** with fixed ,100% optical output in (standard) continuous illumination trigger mode.
- Using the **X-Illumination Controller**, any **V3-CX+** or **V3-MX+** illumination unit can achieve a **100 ns** strobe length at full optical power with **220 ns pulse (level) delay**. It can be used with acquisition speeds of up to **50 kHz**.



DSM 47250: X- Illumination Controller



DSM 47250: X-Illumination Controller (II)

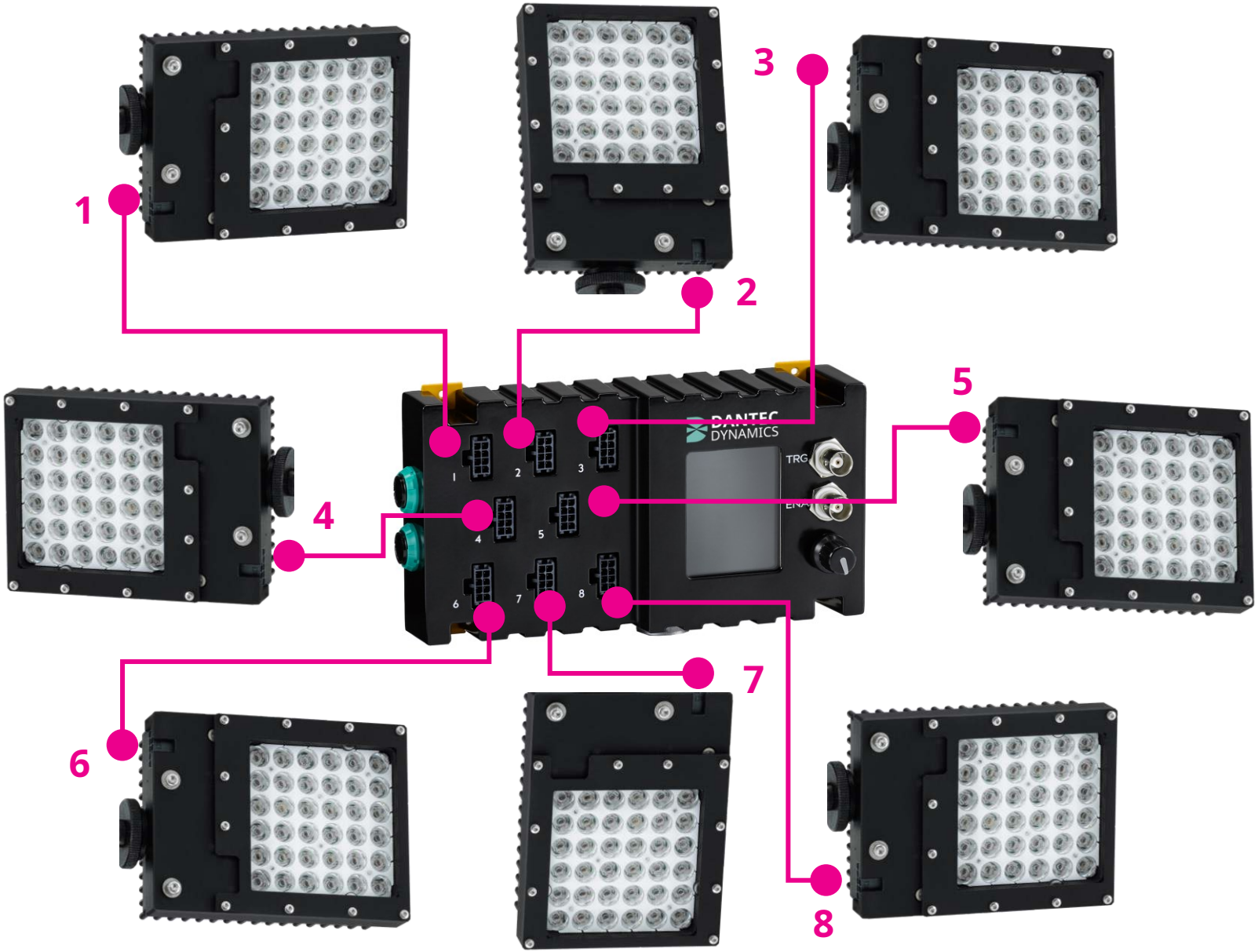
- **Up to 8**, **V3-CX+** or **V3-MX+** , aka. **XR-LED**, **XB-LED**, **SXR-LED**, or **SXB-LED**, illumination units can be used in **any combination** with the **DSM 47250: X-Illumination Controller**.
- **Irrespective** of the illumination unit type, wavelength, and illumination trigger mode, any combination of **V3-CX+** or **V3-MX+** illumination unit can be controlled **together** or **independantly**.



DSM 47130: SXR-LED Illumination System & DSM 47250: X- Illumination Controller

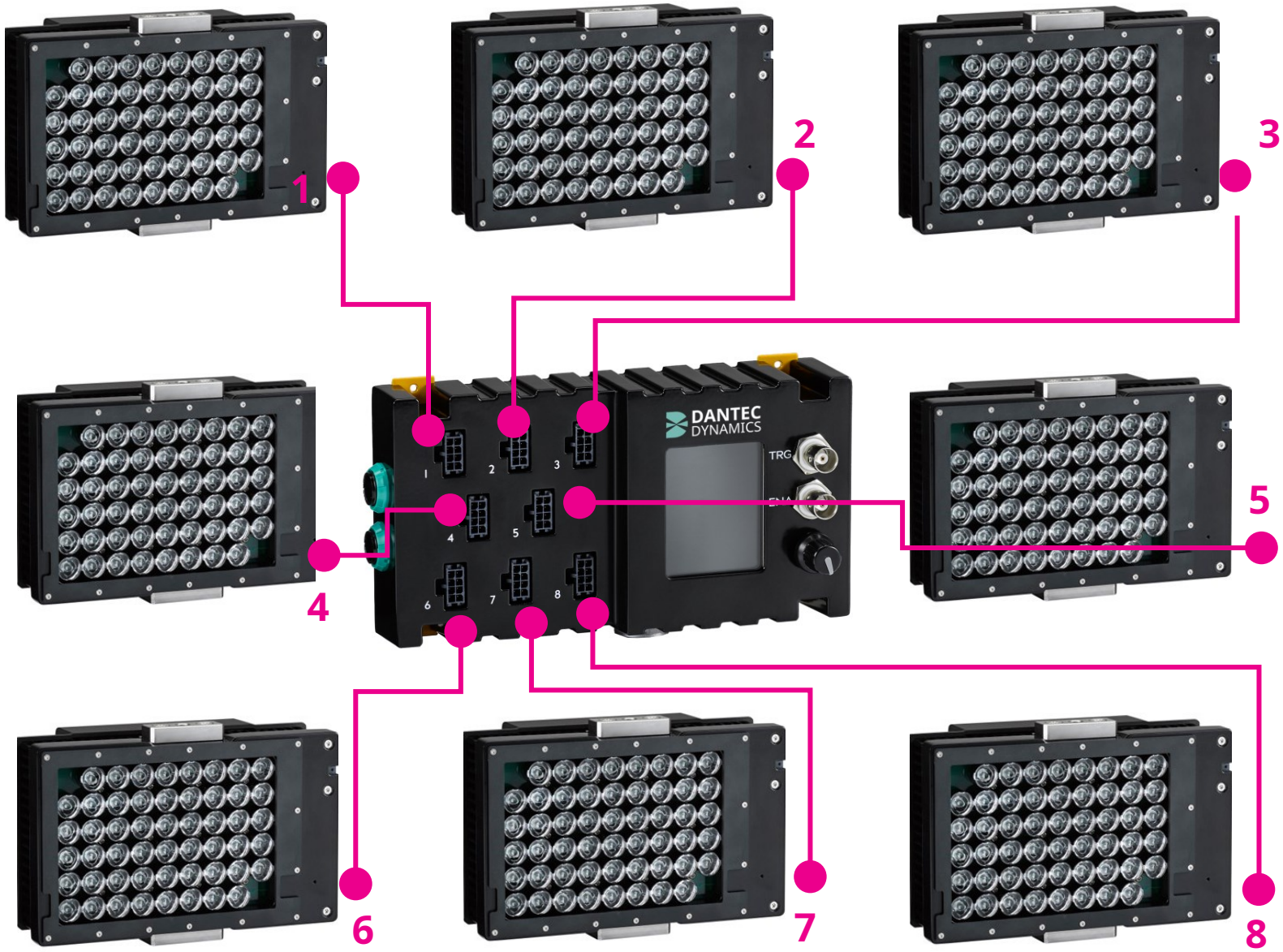
DSM 47250: X-Illumination Controller (III)

- **8x XR-LED** illumination units can be used in with the **DSM 47250: X-Illumination Controller**.
- Requires **only one power** transformer (included with the **DSM 47250: X-Illumination Controller**)
- **Continuous (constant) illumination** mode at a **max intensity** of **18%** = similar optical output if each were used independantly with own power adapter.
- **Strobe (stroboscopic) illumination** mode

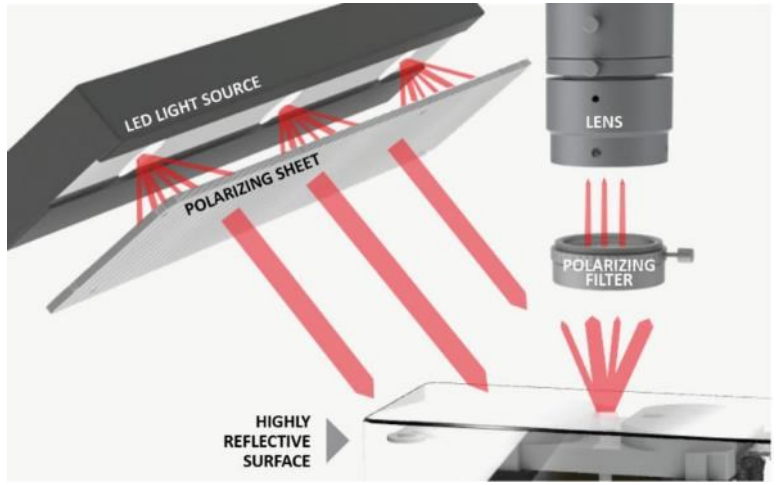


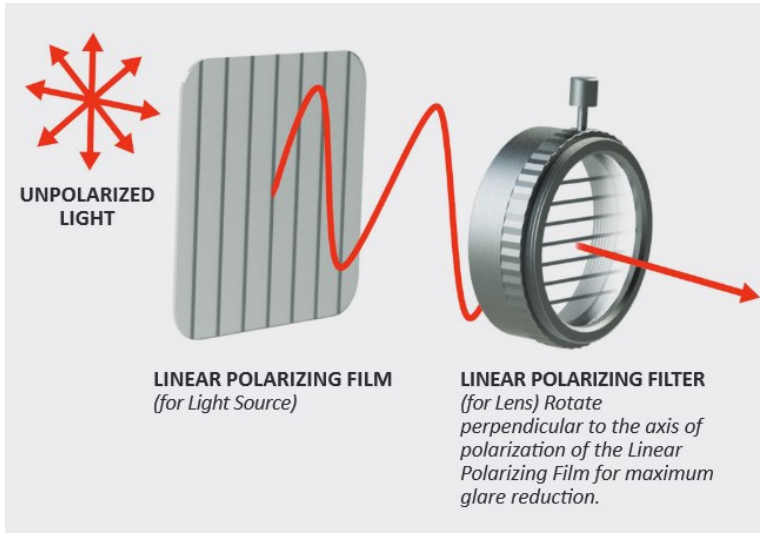
DSM 47250: X-Illumination Controller (IV)

- **8x SXR-LED** illumination units can be used in with the **DSM 47250: X-Illumination Controller**.
- Requires **two power** transformers (*special request to DD required*) 1 Power Transform per 4x SXR/SXB units
- **Continuous (constant) illumination** mode at a **100% max intensity**
- **Strobe (stroboscopic) illumination** mode



DSM 47180/DSM 47190: Polarization Filters (I)



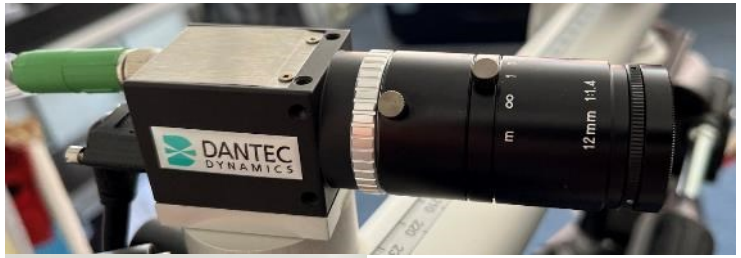


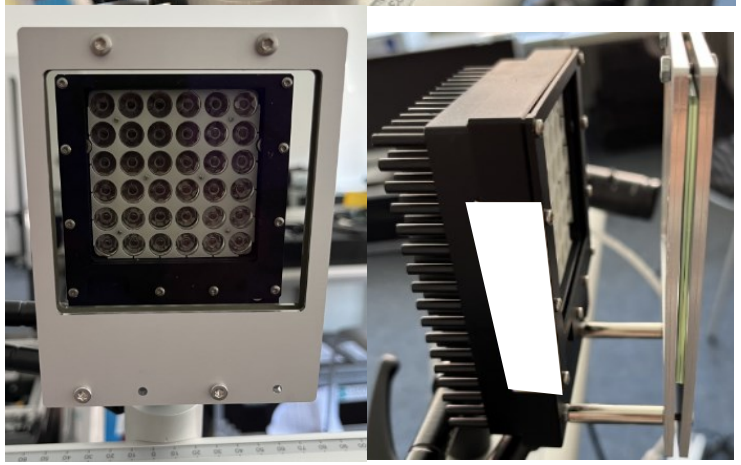
Source: https://midopt.com/pdfs/MidOpt_PG120_Polarizer.pdf

- A **polarization filter** is used to **manage reflections** and **suppress glare** that may occur when working through mediums (ie. glass windows) or with shiny-coated objects.
- Emitted light, as typically observed by the viewer, is unpolarized, meaning it's intensity is distributed in all directions and is the same in each direction. When light is refracted or reflected, it can amount to spectral glare that prevents contrast from being perceived or captured on an image. The refracted light, inadvertently, is polarized to the specific (application) viewing angle. This usually cannot be avoided, however, it can be minimized by using polarization filters.
- A **linear** polarization filter filters transient light in **only one** direction/angle. The advantage of this is that polarized light from a surface can be filtered out, thus allowing a measurement to be performed. Using a linear polarization filter, both for the **illumination** and **lens** (known as "**cross-polarization**") the effect of glare and refraction is minimzed.

DSM 47180/DSM 47190: Polarization Filters (I)



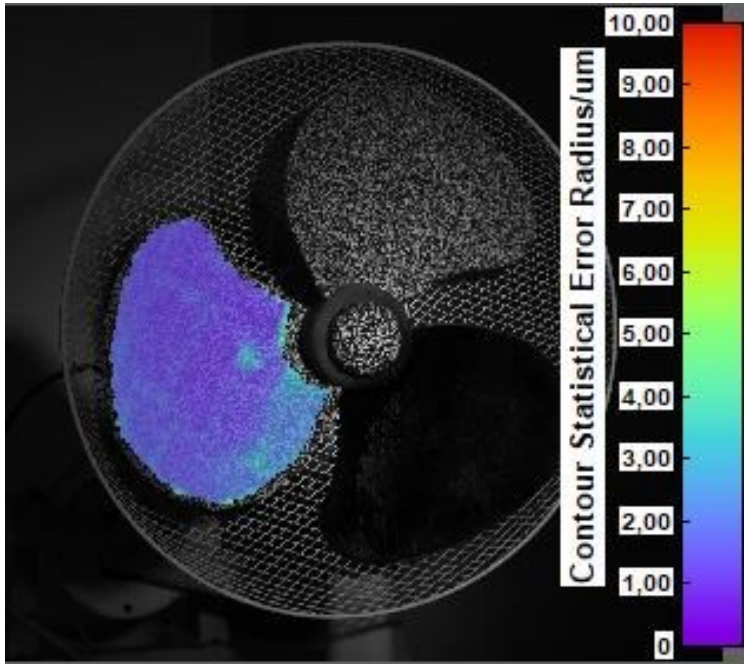




Test #1: Fan Rotation Test (w/o polarization filters)

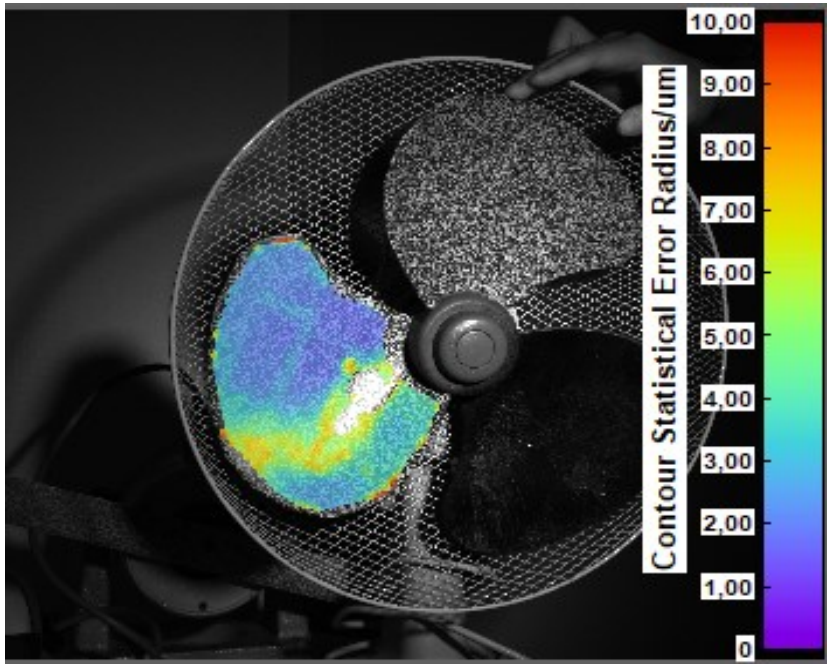
With polarization filters

Max Stat. Contour Error of 2 µm



Without polarization filters

Max Stat. Contour Error of 10+ µm



Top: Polfiler lens and DSM 47180: polarization filter
Middle: Assembly of a lens polarization filter on a camera
Bottom: Assembly of the DSM 47180: polarization filter on a DSM 47130: XR-Illumination System

DSM 47180/DSM 47190: XR/XB + SXR/SXB-Polarization Filters

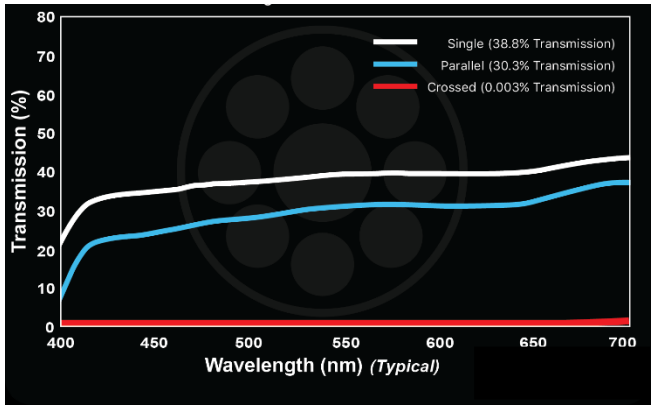


DSM 47180: XR/XB-LED Polarization Filter



DSM 47190: SXR/SXB-LED Polarization Filter

- The **DSM 47180: XR/XB-LED Polarization Filter** and the **DSM 47190: SXR/SXB Polarization Filter** are **high-temperature, linear polarizing glass filters** that can be attached to the mounting bracket of the **XR/XB-LED** or **SXR/SXB** Illumination Systems.
- They can be used to manage reflections and suppress glare that may occur when working through mediums (ie. glass windows) or with shiny-coated objects. The 2.5 ± 0.2 mm filter is polarizes light in the lengthwise direction and has a temperature rating of 115°C x 240 hours
- ***NOTE → Polarization filter mounting brackets (DSM 47185/DSM 47195)*** *are <u>required</u> in order to mount the polarization filters.*



DSM 47180/ DSM 47190: Polarization Filter Transmission Chart

DSM 46040: HP-LED Illumination System

- The **DSM 46040: HP-LED Illumination System** is a robust, continuous (constant) illumination system for **HSpeedDIC** systems and for **any small- or large-area, medium** or **high-speed** (fatigue or dynamic) applications.
- The minimum acquisition frame rate that can realistically be used with the HP-LED Illumination System system when operating in (standard) continuous illumination mode is **7,500 Hz** corresponding with a realistic minimum shutter time of **133 µs.**
- The system also features a dimmer whereby the intensity can be adjusted from 5% to 100%. The HP-LED illumination system has a variable angle of illumination at 20° (Spot) to 60° (Flood). The system is supplied with a heavy-duty tripod for mounting and weighs 3.6 kgs / 8 lbs (excluding tripod) and has dimensions 25 cm x 18 cm x 18 cm / 10 “ x 7 “x 7 “ (excluding tripod).
- The **HP-LED Illumination System** has a max useable distance of **ca. 5 m** from the test object.



HP-LED Illumination System (front)



HP-LED Illumination System (rear)

	0,3 m	0,5 m	1 m	2 m	3 m	4 m	5 m
Spot	244000 lx	128000 lx	40200 lx	16800 lx	8400 lx	4600 lx	2700 lx
Flood	148000 lx	56000 lx	18000 lx	7600 lx	4500 lx	2100 lx	1330 lx

Illuminance (lx) range at various stand-off distances for spot & flood setting

Thank you for your attention!

If you have any questions or comments, please contact your local Dantec Dynamics sales representative or E-Mail: product.support@dantecdynamics.com