Industrial LED Components

Solutions for Microscopy and Machine Vision

SCHOTT
glass made of ideas

SCHOTT Industrial LED Components

In-depth expertise in Machine Vision and Inspection Applications

Few forces are as powerful and versatile as light. As the need for automated inspection increases, so does the need for reliable sources of uniform, high-quality illumination. No one understands this need more than SCHOTT. As pioneers in the field of fiber optics, we've brought advanced lighting technologies to such diverse disciplines as research, manufacturing and healthcare. But like all pioneers, we're always looking for new challenges. New solutions to age-old questions. And new ways to harness the power of light.

Since their introduction, **L**ight **E**mitting **D**iodes have significantly improved in light output and efficiency. High output LEDs today enable state-of-the-art lighting solutions due to their long lifetime, design and operational flexibility, reliability and ruggedness. To extend and complete the established fiber optic product range of cold light sources and fiber optic light guides, and based on in-depth expertise in Machine Vision and Microscopy lighting, SCHOTT has developed different LED lighting product lines optimized for the individual application.

- **SCHOTT iQLED:** optimized lifetime, temperature controlled, and intelligent light feedback for Machine Vision applications
- **SCHOTT EasyLED:** economical stand-alone solution for Stereo-Microscopy and Macroscopy
- **SCHOTT VisiLED:** new contrasting options in Stereo-Microscopy and Macroscopy

Ultrabright LEDs, high quality materials and components, specifically developed software, and integrated microprocessor-controllers, enable versatile applications in varying environments.

Custom Solutions

At SCHOTT, standard LED components are just a starting point. Our engineers are innovators and problem solvers who will partner with you to create custom solutions to fit your requirements – solutions as simple as different LED colors or as complex as entirely new lighthead configurations. We can assist you with the optical design of the lighting system as well as characterize light output to optimize it for your individual application. We can modify the software of our microprocessor driven controller to adjust to your requirements.
To learn more about SCHOTT LED lighting components and our custom design capabilities, contact a SCHOTT representative near you, and let us expand your vision.

Private Labeling

SCHOTT offers the option of private labeling LED lightheads and controllers to provide our customers with the freedom to market their products as a complete package. Please contact SCHOTT for further information and details.

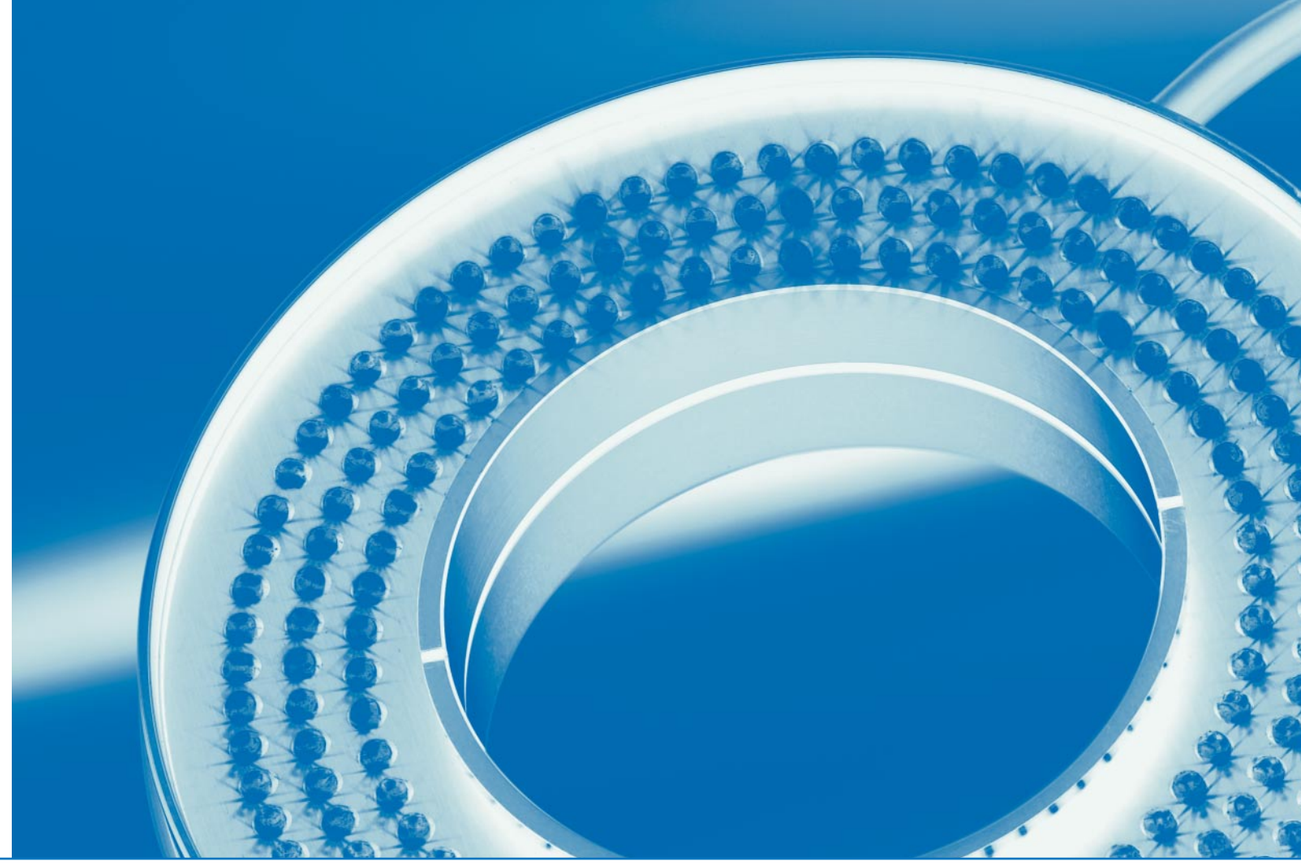
Contents

Introducing SCHOTT iQLED

Illumination for Machine Vision

With stable light and long life, LEDs are ideal for machine vision applications where even a minute of downtime can cost tens of thousands of dollars in lost productivity. Until now, LEDs had limitations, such as generating heat that can lead to light degradation and premature failure.

SCHOTT engineers changed all that with patented LED technology that's a step ahead of the industry. The result is a collection of products offering bright, consistent illumination, uniformity ensuring repeatable performance, and a list of exclusive technologies and features.



SCHOTT iQLED Exclusives

- Light-Feedback sensor for continuous monitoring of light intensity to stabilize output via feedback control.
- Temperature sensor, which monitors the head temperature and protects from irreversible damage due to high temperatures. Thus ensuring, long lifetime of the lighthead.
- A matrix plate heat sink that dissipates heat buildup, improving light output and extending component life.
- Matrix circuit design for homogenous light output and maximized reliability by isolating failures to individual LEDs.
- Improved light output stability compared to non-regulated voltage output.

iQLED Lightheads

SCHOTT LED lightheads can be used in steady-state mode as a general purpose area light, or in strobe mode to freeze motion, reduce exposure times and increase processing speed. In overdrive mode, light intensity can be increased up to 250% using the iQ421 Controller.

- iQLED lightheads are available in red, yellow, white, green, blue, UV and IR
- Custom LED options available
- Connector type: DIN Connector
- Housing material: black anodized aluminum

iQLED Lightheads & Lightlines

Ringlights, A25040 – A25040.6
Brightfield ringlight for uniform, shadow-free illumination enabling enhanced pattern recognition.

- Glass window (A25043) for use in dirty or dusty environments.
- Polarizer (A25041), enhances contrast on highly reflective objects, and can be used in combination with glass window to maximize lighting versatility.

Mini-Ringlights, A25070 – A25070.6
Brightfield ringlight designed for small diameter objectives.

Diffuse Dome Ringlight, A25050 – A25050.6
All the features of our standard ringlight combined with a dome diffuser that eliminates specular reflections on shiny surfaces. A custom ringlight with the mounting angle of the LEDs different to the standard ringlight will achieve optimum illumination of the dome.

Darkfield Ringlights, A25060 – A25060.6
Low-angle lighting creates “darkfield” effects that enhance the contrast of surface features. Perfect for enhancement of flat structures on surfaces for applications such as BGA (ball grid array) and bottle-top inspection.

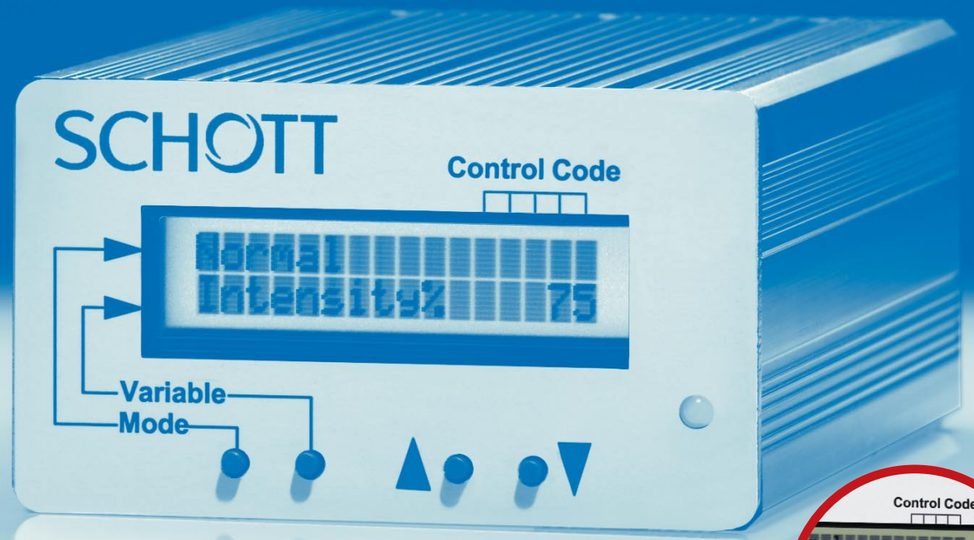
Spotlight, A25020 – A25020.6
Use for area illumination or in combination with our optional accessories such as a diffuser or coaxial attachment.

- Diffuser (A25024) easily converts unit to a backlight for diffused front lighting or silhouetting.
- Coaxial adapter (A25025) and detachable diffuser mount to spotlight body for quick, cost-effective conversion to coaxial lighting application (see below).
- Glass window (A25023) seals spotlight to NEMA 5 and IP54 for use in dirty or dusty environments.
- Polarizer (A25021), enhances contrast on highly reflective objects, and can be used in combination with glass window to maximize lighting versatility.

Backlights, A25000 – A25000.6
Uniform, diffuse illumination for transmitted light inspection applications or for use as a diffuse area front light. The unit is made of a thermally conductive material that when mounted to a metal surface will reduce LED temperature and increase lifetime.

LED Lightlines: Uniform lines of light for Machine Vision and inspection applications.

4” to 40” LED Lightlines, A25080 – A25086
SCHOTTs flexible design allows a variation of working distances with corresponding line lengths and widths. The user can position LED board and included lens set in discrete distances to realize working distances between 10 and 100 mm. Alternatively to the lens set, a diffuser plate can be used to create a small backlight for applications with limited space. Custom lengths, lightline holders and support products are available.



iQLED Controllers ...

iQ421, A25272

The Flagship in flexible LED Controllers

The iQ421 Controller fully utilizes the special features of the SCHOTT iQLED product line. The easy-to-use system features a 2 line/16 character display which allows simple set-up in four languages. Alternatively, users can set the operational parameters through the built-in RS-232-Interface, which also allows continuous monitoring of temperature, light output and status. Once set-up, the controller runs as a stand-alone unit.

The iQ421 provides features unmatched in the industry at an affordable price. A state-of-the-art controller, the iQ421 automatically recognizes the maximum current requirements of the LED head and adjusts to the appropriate current. The LED temperature is continuously monitored. In case of over temperature the operational current will be automatically reduced, while displaying a warning signal to the user before permanent damage occurs to the LEDs. The **normal** mode allows continuous dimming of light intensity between 0 and 100%.

One unique feature is the **Maintain mode** – a light feedback loop to maintain intensity ± 2% over operation of the LED head. It regulates the head current to compensate for degradation of LED output over time, self-heating, and changes in ambient temperature – all of which can affect light output.

In addition, the iQ421 features a **trigger** mode, with programmable delay to synchronize the unit with an external signal to extend LED lifetime and provide light only when needed. Moreover, it also has an internal **strobe** generator with frequencies between 15 Hz and 50 KHz to freeze motion of periodically moving objects. Programmable period and on-time can be combined with overdrive of trigger/strobe intensities up to 250%, while pre-defined overdrive rules of the LEDs are met.

For optimal implementation into automated systems, the iQ421 can be remotely switched on/off in **normal, maintain** and **strobe** modes. Error control codes are displayed on the front LCD and transmitted to the host computer via RS-232.

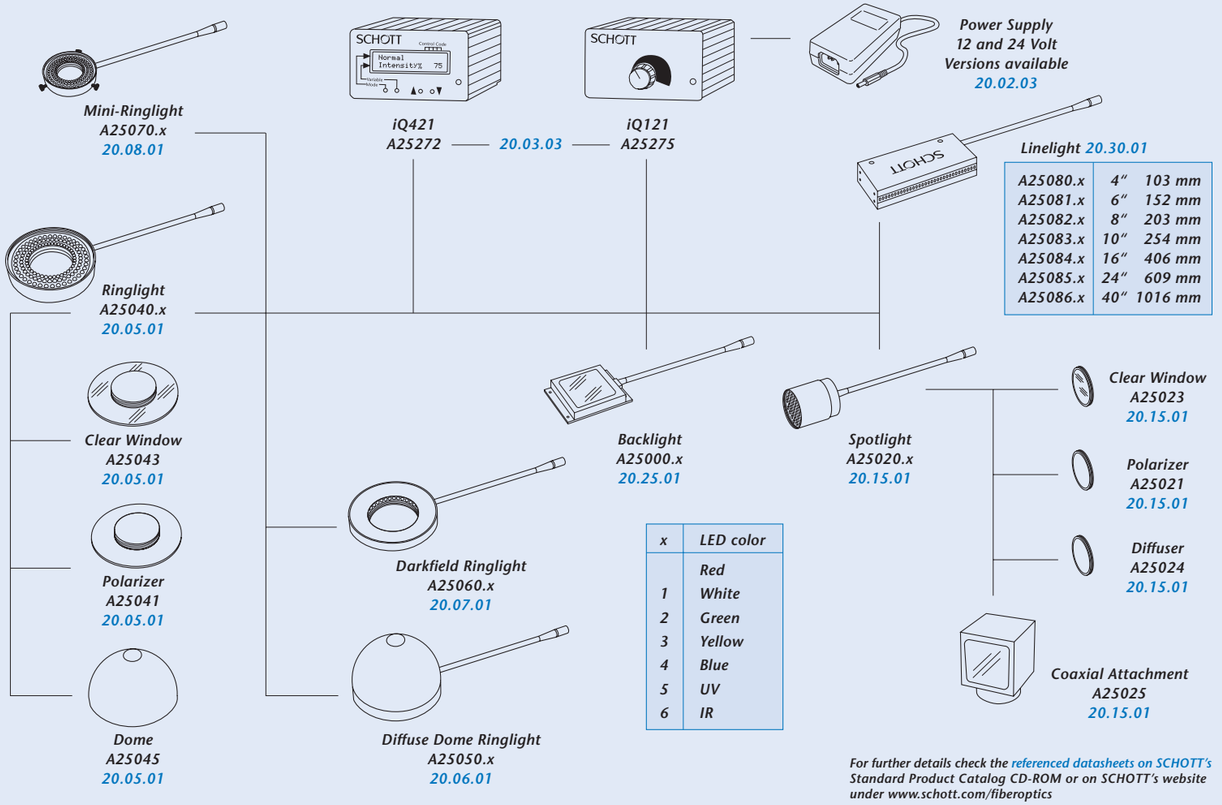
iQ121, A25275

A variable intensity Controller with temperature control

The iQ121 LED Controller automatically recognizes the maximum current requirements of the LED head and adjusts the appropriate current. The LED temperature is continuously monitored. A temperature indicator LED warns of high-temperature conditions and alerts the user to check intensity setting or ambient temperature. The temperature indicator light also signals the user that the power supply is connected and functioning. The single-knob light intensity control adjusts from 0 to 100%. A remote on/off function can extend LED lifetime and provide light only when needed during part inspection.

Design of iQLED 421 and 121

Designed for use in industrial environments the heavy-duty metal housing has T-slot grooves for mounting and integrated cooling channels, which make a fan redundant. Connectors for light heads and power supplies are lockable to ensure safe operation. The 2 amp light source output of the controller can be powered with DC-power supplies between 12 and 24 volt, depending on color and number of LEDs in the lighthead.



For further details check the referenced datasheets on SCHOTT's Standard Product Catalog CD-ROM or on SCHOTT's website under www.schott.com/fiberoptics

… and Stereo-Microscopy applications:

SCHOTT EasyLED …

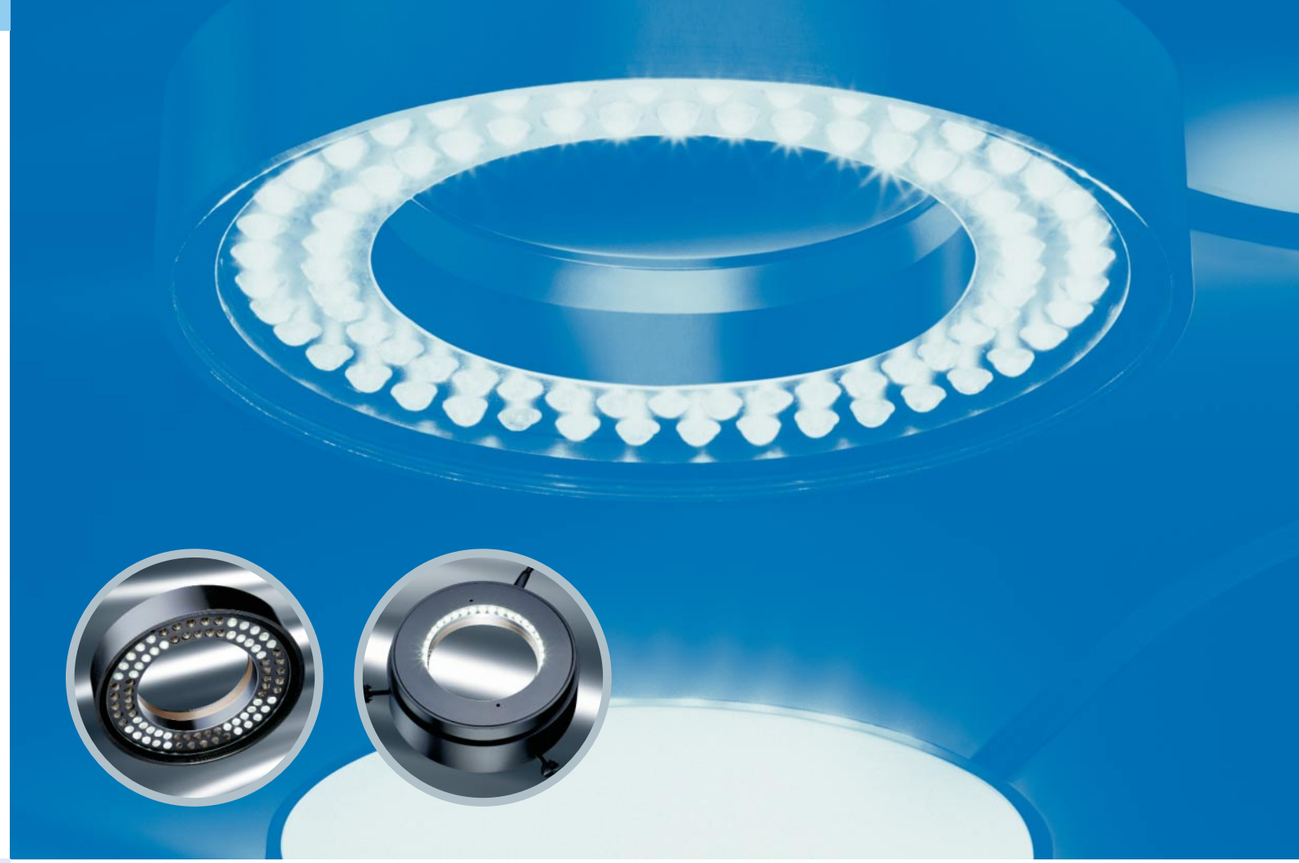
Economical stand-alone LED Illumination Microscopy

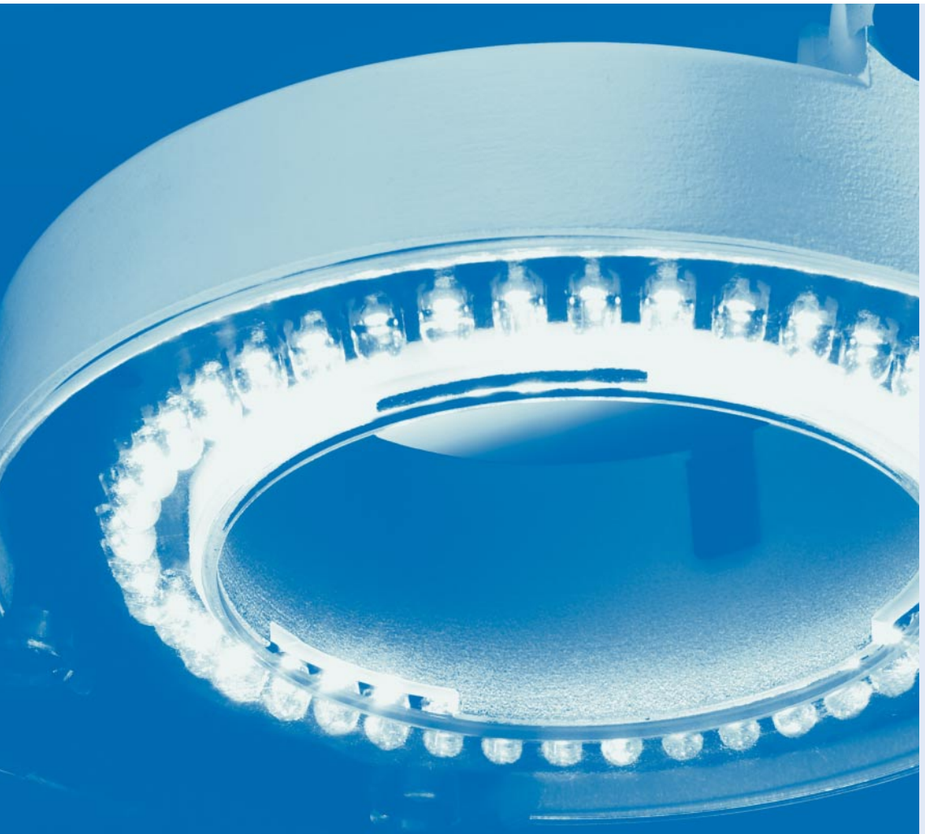
The EasyLED units feature the following SCHOTT exclusives:

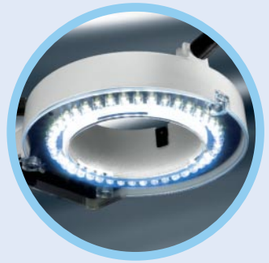
- Compact, white LED ringlights offer longer lifetime and shadow-free illumination for microscopy applications.
- Lightheads are controlled with just one touch for easy and quick illumination.
- Wall transformer for different voltages and power outlet shapes available.

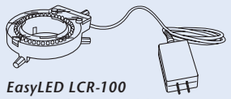
LCR-100 LED Ringlight, A25400 & A25400.1
The LCR-100 LED Ringlight is a compact, white ringlight for microscopy applications.

The LCR-100 has low and high intensity settings for flexibility in general purpose applications. A thumbscrew mounting system provides secure attachment to microscope and camera objectives from 2.00 to 2.63 inches (51 mm to 66 mm).

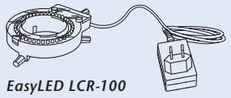








EasyLED LCR-100
U.S. version, A25400
21.01.01



EasyLED LCR-100
European version, A25410.1
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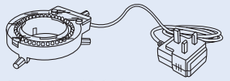


EasyLED LCR-100
UK version, A25420.1
21.01.01

… and SCHOTT VisiLED

Enhanced contrast for Microscopy

The VisiLED product line is an innovative illumination system specially developed for the fields of Stereo-Microscopy and Macroscopy. Utilizing the benefits of white LEDs this system opens up completely new possibilities for putting microscope specimen into the right light.

The VisiLED system features the following SCHOTT exclusives:

- Lightheads are controllable in segments, which enables new contrasting methods.
- Easy combination of brightfield with darkfield illumination or of incident light with transmitted light allows targeted mixing of light for demanding work in research, development and routine.
- Illumination parameter can be stored in memory positions, leading to reproducible mixed light conditions. Quick and easy changeovers between stored light settings.
- Integrated temperature sensor protects the white LEDs, ensuring long lifetime of the VisiLED lightheads.

The illumination system operates completely without sound and vibration. The produced light does not ripple or flicker. The luminance remains stable irrespective of supply voltage fluctuations.

VisiLED Lightheads

All VisiLED illuminations are optimized for microscopy use. Strongly focused illumination areas as well as the working distances and adaptation diameters match with common stereo microscope objectives.

Intensive cold light is brought precisely to the specimen – heat-free and with the best-quality white of approx. 6000K CCT.

The product line comprises:

Brightfield Ringlights for incident illumination for different requirements of intensity

- Ringlight S80-55 high intensity for objectives up to magnification 1.0
- Ringlight S80-25 high intensity for higher magnifying objectives
- Ringlight S40-55 for lower intensity requirements

The **Darkfield Ringlight** S40-10D provides an intensive illumination in incident darkfield, enhancing contrasts of flat structured surfaces. It can be mounted to 66/70 mm objectives via an adapter ring or easily be combined with all bright-field ringlights using the brightfield-darkfield adapter kit.

Two transmitted light stages for applications in transmitted light brightfield or in transmitted light darkfield fit in common stereo microscope stands.

- Transmitted Brightfield S80 TLBF
- Transmitted darkfield S40 TLDF

VisiLED Controllers

Controllers specifically developed for the VisiLED Series microscopy illumination system.

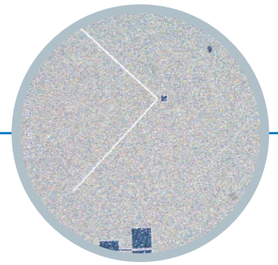
MC1500 – the intelligent multifunction center (A25365/400 000)
The MC1500, US patent pending, is the core of the VisiLED system. It controls up to two illuminations simultaneously and offers thus easy combination of any two VisiLED lightheads. The MC1500 allows to set various illumination parameters including light intensity, different segment modes and change of illumination direction. Additionally the controller offers rotating, strobing, external triggering or flashing the LED light, ensuring constant mixed light characteristics through its synchronized control of the connected VisiLED illuminations.

Different mixed light settings can be permanently stored in the memory section of the MC1500, quickly reproducible using the controller keys or a foot switch. The MC1500 can be completely controlled by PC or laptop via RS232 interface or USB. It allows exact parameter settings and expanded segment control. A windows demo software and a DLL to integrate in customer software are enclosed.

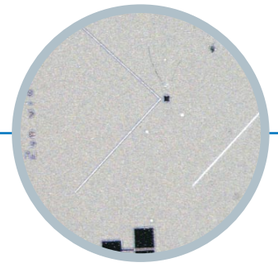
The LED temperatures in each VisiLED illumination are continuously monitored by the MC1500. This thermo guard ensures a long lifetime of the white LEDs – even when set at the maximum brightness level.

Additional accessories: a flash cable, a foot switch and a RS232-to-USB1.1 converter

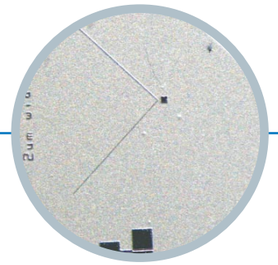
MC750, A25360/400 010
A controller for lower contrasting requirements. The MC750 has continuous dimming via potentiometer and over temperature protection of the LED lighthead.



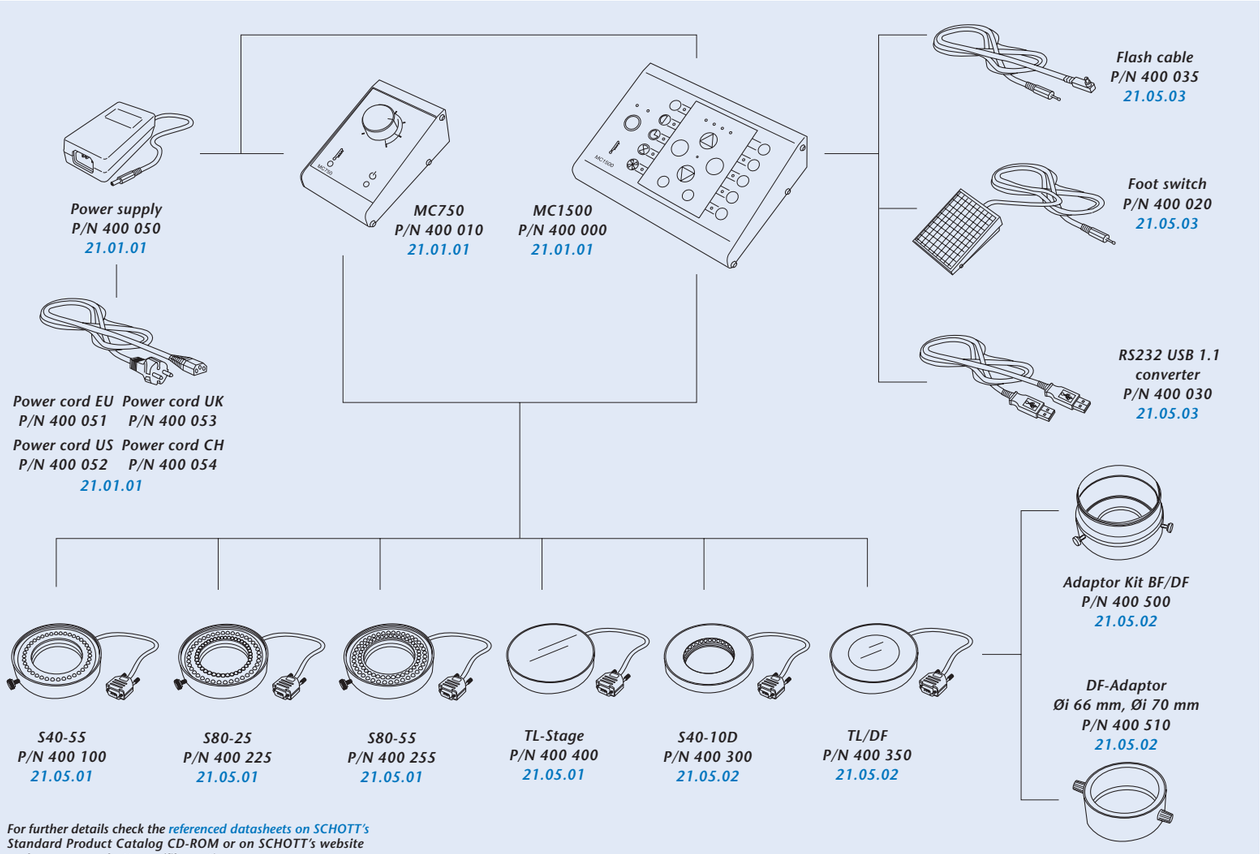
Wafer, Brightfield, full circle



Wafer, Darkfield, full circle



Wafer, Darkfield, 1/4 circle from north



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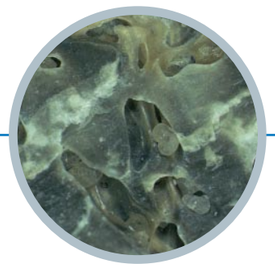
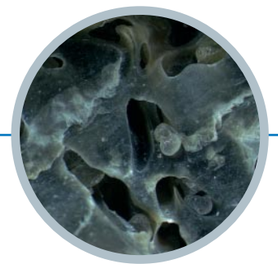
System diagram VisiLED



Oyster Shell, Brightfield Ringlight

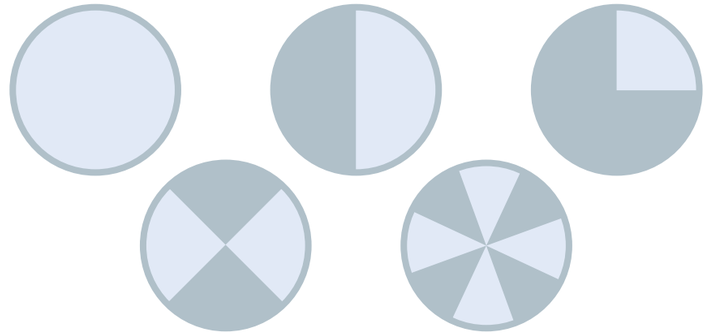


Oyster Shell, Darkfield Ringlight

Contrast your application

The excellent controllability of the LEDs affords the VisiLED contrasting methods, which go far beyond the possibilities provided by conventional microscope illuminations:

The MC1500 contains five preset VisiLED segment illumination modes.



This enables quick changeover between shadow-free full circle illumination to soft-shadow half circle or 4-point illuminations as well as to strongly directional illuminations. Rotating these directed illuminations around an object intensifies surface structures and optimizes contrast.

Additional contrasting options are achieved by combination of two VisiLED illuminations:

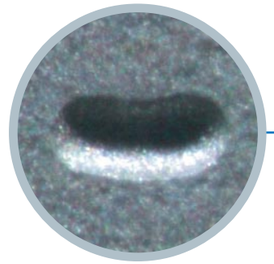
For example:

- The incident darkfield ringlight enhances structures on flat surfaces but also creates black shadows in recessed openings. Adding a small amount of brightfield illumination, softens these shadows and makes inspection of the recessed openings possible.
- Certain translucent objects are normally inspected with incident light, e. g. crystals in geology. Adding transmitted light and optimizing the illumination direction helps considerably to intensify contrasts.

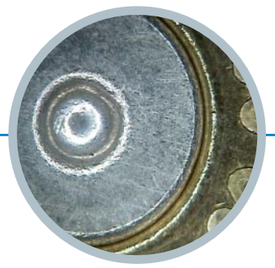
Continuous rotation of a directional illumination increases the impression of three dimensionality with structured specimen, specially when viewed on a monitor.

In flash mode the defined mixed light can be momentarily enhanced by an intensive single pulse: exposure times of connected photo equipment can be reduced – the mixed light "flashes". This is important when documenting weakly reflective specimen.

The possibility of storing, archiving and easily reproducing the high contrasting light conditions together with the option of controlling the VisiLEDs exactly from PC makes the system the ultimate choice for investigations in the field of forensics.

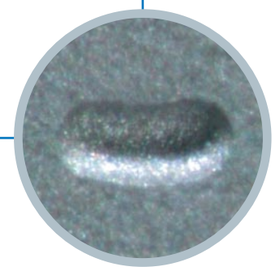


Notch in a Wafer, Incident Darkfield & Brightfield, 1/4 circle from north



Breech Face Marking, Brightfield Ringlight, full circle

Breech Face Marking, Brightfield Ringlight, 1/4 circle from north west



Notch in a Wafer, Incident Darkfield, 1/4 circle from north

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SCHOTT
glass made of ideas