

Opto Engineering® **THE TELECENTRIC COMPANY**, has evolved through the years, releasing hundreds of new, diverse products and developing multiple areas of expertise. Today we can say that we specialize in **OPTICAL IMAGING TECHNOLOGIES**. Our focus is to build and provide every component needed to solve imaging applications: starting from our know-how in optics and competence in lighting, we can supply the best combination of tools available on the machine vision market. For all of these reasons, Opto Engineering® has become the partner of choice in high-end optical applications for many of the major machine vision companies worldwide.

Opto Engineering®, OPTICAL IMAGING TECHNOLOGIES.



OPTICS

TCCORE PLUS

Ultra-compact large FOV telecentric lenses and illuminators, CORE PLUS family

The **CORE PLUS family** features telecentric lenses and illuminators for large FOVs (**now up to 260 mm**), with an extremely innovative opto-mechanical design ideal to image large objects in a reduced space. Both the working distance and the mechanical length of CORE PLUS lenses

and illuminators have been optimized to make a measurement system as compact as possible: compared to any other telecentric lens and illuminator of similar FoV, the CORE PLUS series are **up to 45% shorter**.



PCHIAF

Hole inspection optics for 2/3" detectors with adaptive lens focusing and innovative locking focusing

PCHI optics have been developed by Opto Engineering® to easily inspect holes, cavities and containers. Unlike common optics or so-called "pinhole lenses" which can only image flat fields of view, hole inspection optics are specifically designed to image both the bottom of a hole and its vertical walls.

We have added **PCHI023-AF**, hole inspection lens for inside inspection of cavities down 10 mm with a built-in liquid lens module for fast and reliable diameter changes, and the new **PCHI023-MF** that improves the manual focusing mechanism with a more user-friendly "FFL-like" locking.





PCBPN

Boroscopic probe for 1/3" detectors, 4 and 7 mm probe diameter with optional waveguide module

PCBP probes are used to inspect holed objects such as engine parts, containers and tubes whose hidden features can only be controlled by introducing a probe into the cavity.

The catadioptric (refracting + reflecting) optical design ensures a much higher resolution than fiber-based probes and

enables the complete 360° inner view of the entire cavity.

We have added the new **PCBPN013** boroscopic probe for inspecting small cavities from the inside, down to 5.5 mm, also available with built-in illumination (**PCBPN013-WG**) and the new **PCBP023** lens for 5 Mpx cameras.



TCEL

Telecentric optics with liquid lenses technology

TCEL series by Opto Engineering® features a perfect combination of telecentric optics and **liquid lenses technology** allowing to significantly increase the depth of field (DOF). This is particularly important for small fields of view due to the proportionality of the DOF with the magnification.

Thanks to their optical design, TCEL lenses **ensure excellent optical performances** both in terms of telecentricity and especially distortion throughout the entire operating range. This makes them a perfect choice for many inspection and measurement applications spanning from electronic and semicon segments to the automotive one, from pharmaceutical to fasteners.



TCLWD3M

Long working distance telecentric lens for up to 1.1" sensor

TCLWD3M series is a range of telecentric lenses specifically designed for electronic, semiconductor and fasteners applications. The **long working distance** allows for extra space, which is essential if you need

to install illumination, pick-up tools, or provide the necessary separation from hazardous production processes.

The optics have been optimized to match up to the new 1.1" Sony sensor in order to deliver **high resolution and superb image quality**.



LTBP

High power strobed-only LED backlights

The **LTBP series** of high-power LED backlights from Opto Engineering provide high image contrast and illuminance for demanding high-speed applications - **now with optional integrated collimation film available!**

When positioned behind the objects to be inspected, the LTBP series highlights silhouettes, providing high image contrast and illuminance with exposure times of tens of seconds. The backlights work

in strobe mode, but they also feature a special continuous mode to be used for alignment or setting purposes when used with the LTDV1CH-17V controller.

The backlights' robust and modular design, featuring M8/M12 connectors and scratch-resistant protective covers, is conceived for silhouettes and can be easily installed into any machine vision system due to lateral M6 threads and a slick design, suitable for environments with space constraints.





LIGHTING

LT2BC

High uniformity continuous LED backlights

LT2BC series are high-intensity LED backlights designed to provide exceptional illumination performances and excellent uniformity in a compact design (only 26 mm thickness) - **now with optional integrated collimation film available!** All LT2BC models feature a test report with measured uniformity. Their robust design

featuring M8 connector and scratch-resistant protective cover is conceived for demanding industrial automation environments and to provide you a great choice of sizes, colors and aspect ratios for many diverse applications (from 4:3 to 16:9 and bar lights).



ACCESSORIES

LTDV 2CH

2 channels LED strobe controller, 20A/40A pulsed mode - 2A/4A continuous mode

Opto Engineering® range of LED strobe controllers now includes LTDVE2CH-20F, LED Strobe controller 2 channels, 20A/40A pulsed - 2A/4A continuous.

LTDV controllers accurately set current intensity, pulse duration and delay of LED illuminators, offer filtering options for trigger signals and easily synchronize the strobe pulses with the camera exposure to meet today's machine vision high-speed demands.

LTDVE series of controllers can be configured via Ethernet or RS485. With the Ethernet interface, you can configure the controller with either the Modbus/TCP slave protocol or the internal web browser. The second option allows for a very easy configuration of the controller using a common web browser to visually change the parameters and/or inspect the device status.

KEY BENEFITS AND FEATURES:

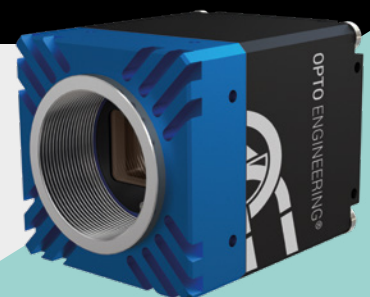
- Compatible with most of the LED lighting solutions available
- Ethernet, RS485 interface
- Up to 2 independently controlled output channels
- Max output current up to 40A pulsed/4A continuous
- Easy configuration
- Small, compact units with DIN rail mounting



Customized machine vision cameras

Industrial cameras specifically tailored for your needs

With two decades of experience in the field of machine vision, Opto Engineering® offers **customized industrial cameras** specifically tailored to answer every need. **Designed and manufactured in Italy** by Opto Engineering®, these cameras start from a set of basic common features to provide a **wide range of customizations**, both hardware and software/firmware.





CAMERAS

COE

Low Resolution Area Scan Cameras for Highest performance

Today Opto Engineering® offers **robust, compact, high-quality cameras** for the most common industrial applications including measurement, high-speed inspection, security and much more. The robust design allows installation into industrial scenarios without the risk of mechanical failure and GenCam®

compliant SDK allows easy coding with most software packages. Equipped with the latest sensors and available with GigE and USB 3.0 interface options, there are several possibilities for most applications. The resulting **excellent image** quality is ensured by well-matched Opto Engineering's excellent lenses.



SOFTWARE

FABIMAGE

Creating your own Vision Application has never been easier: FabImage Studio and Libraries

Together with optics, lighting, and cameras, software is a critical step in developing a vision system. Software is essential to correct, process, and analyze images, ensuring that the output of a vision system satisfies the inspection requirements. With a low-level programming approach, e.g. C++ combined with machine vision dedicated libraries, you can have total freedom. But, it requires a highly skilled

and dedicated resource. That's why Opto Engineering® **FABIMAGE STUDIO** is the perfect solution for software development! FABIMAGE STUDIO is a **software tool for machine vision engineers** that will assist you in creating your application. It follows a natural logic flow - from input to output - combined with one of the most powerful libraries in the market, with 1000+ functions.

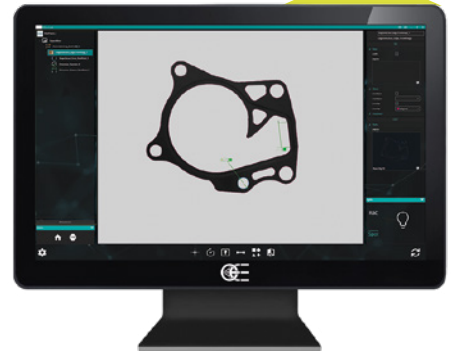


HORUS

Measurement at your fingertips: HORUS, Windows OS desktop application for optical metrology

Horus is a **metrology software application** ensuring unpaired system measurement accuracy thanks to its state-of-the-art calibration algorithms and protocols. It was developed together with our partner Tielogic, an Italian-based IT company which supports our clients with custom software development and other IT machine vision related services. In Horus you'll find the **perfect match between algorithm and hardware**: in fact, the software also guides the user into the

main phases of system set up (telecentric and collimated light alignment, lens and object plane alignment, optical distortion removal etc.). Its **ease of use and flexibility**, the built-in communication with external devices (camera, strobe controller, motor controller...) and the possibility of customization of graphics, algorithms, and IT structures interfacing (SCADA, DBs...) make this software the best option for metrology machines and applications.



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