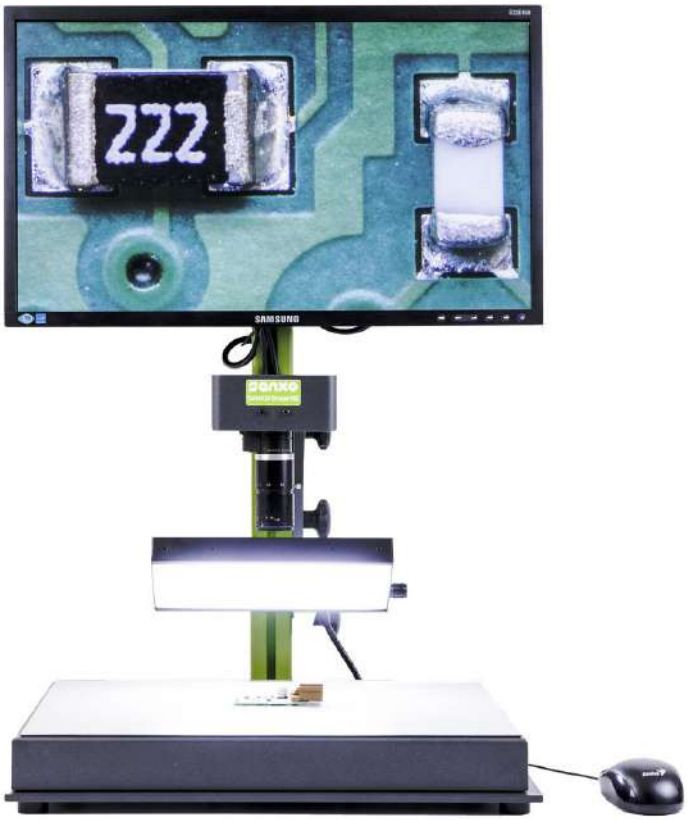
SANXO – Scope HD U10: Industrial digital microscope

"All about the image quality" The flagship of the SANXO product line is the best industrial microscope for an innovative company. Cristal clear image of the object with the best possible color fidelity appears on the ergonomically positioned screen. Many times the smallest details matter. They will never be overlooked by the 20,5 megapixel sensor working at 80% quantum efficiency. The superpower of the microscope allows 4 times digital zooming without reducing image quality.



SANXO – Scope HD U10: Industrial digital microscope - Basic Features

- Sharp live image, high resolution
- Easy to use with a single mouse
- Fast focusing, dimensional measurements and 3D imaging
- One click documentation and QR or DTM identification
- Image and Data saving on SSD or on network drive

The new industrial digital microscope model U10 is equipped with the new 1”, 20.5 Mpix IDS camera with SONY sensor, which gives outstandingly good true colors and it has nearly 80% quantum efficiency. Using the special digital zoom function with the mouse wheel, the zoomed image is equally very sharp and clear on the full HD resolution monitor thanks to the particularly good 20.5 Mpix USB3 camera from IDS-Imaging GmbH and the advanced software features.

In use, the application offers basic functionality such as digital zoom and pan, real-time image enhancement and image saving (local/remote device). Using the calibration feature, distance between two points displayed on the screen can be measured using either pixel units or calibrated real-world units. The basic and advanced functions as well as the settings can be accessed by right-clicking anywhere on the screen (see image below).

SANXO – Scope HD U10 is a reflected light microscope because it uses the reflected beam of the incident light. Ideal to inspect opaque samples, anything that is nontransparent. The SANXO digital microscope performs all the tasks of a traditional compound microscope with the benefits of digital image processing.

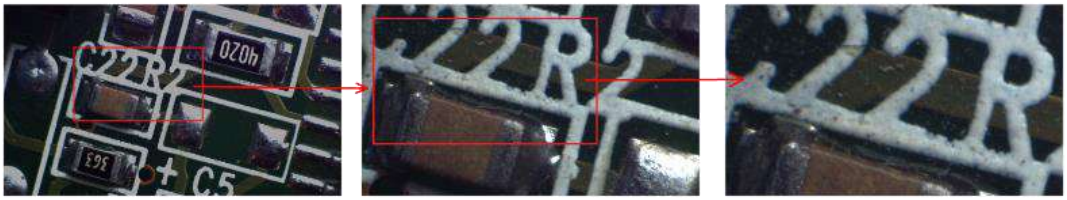
Auto-Focusing of the industrial digital microscope

The system provides two focusing options, which can be selected and configured in the Settings -> Autofocus tab. In Classic mode, the focusing is triggered by a double-click on the target image part. Fast and accurate presets are available. In Continuous mode the focusing takes place automatically in the center of the screen.

Zooming

The camera stand allows the user to use different working distances very easily by moving the camera closer or further. If the object distance is fixed then the user still can use the real-digital zoom by scrolling the mouse wheel. Using the digital zoom the image is equally very sharp and clear on the full HD resolution LCD thanks to the very good 20,5 Mpixel camera.

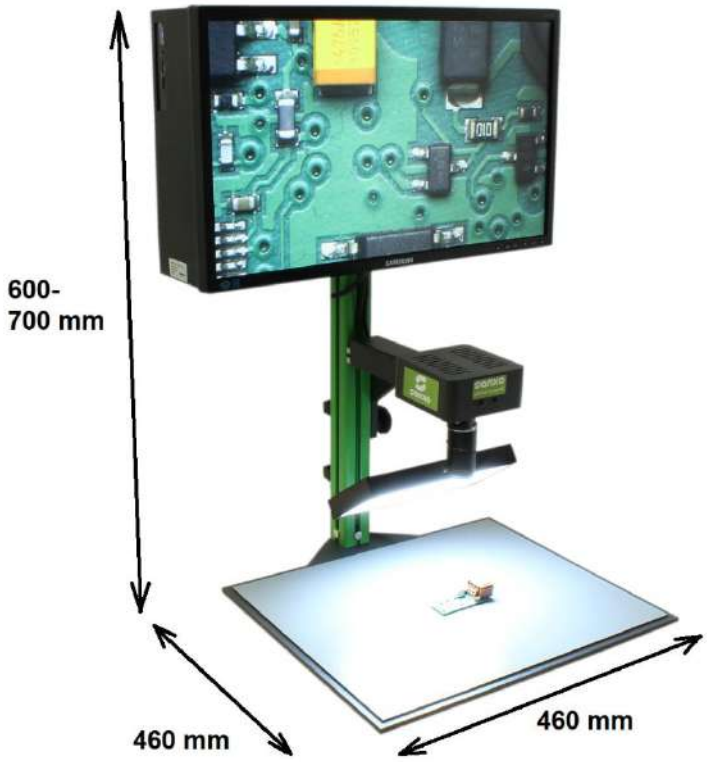
Use the mouse wheel to switch between the zooming profiles. The zoomed area will always be centered to the current position of the mouse pointer. An overlay graphic on the top right corner provides information on the current size, number, and location of the zoom state.



Panning

If the currently active profile only shows a section of the camera sensor's image, then the currently shown part becomes movable. Again, an overlay on the top right corner of the screen gives the user feedback on the current state of the pan.

Dimensions



Materials

The 6mm thick Base Plate is painted metal, the pole is standard 40x40 ITEM aluminum profile, the camera holder and the case are painted aluminum and the LCD and mini-PC holder is painted sheet metal. The base plate is covered with a 2mm ESD rubber mat. The rest of the parts of the system are EC complied standard products.

Features

The stand has adjustable holders for both camera and monitor that enable influencing imaging attributes, such as the camera distance, and operating ergonomy. The monitor can be tilted to get the best view angle for the user. Choice of lenses dictates many properties of the setup as the specifications such as focal length and aperture range define angle of view, magnification, and depth of field. The application offers basic functionality such as digital zoom and pan, real-time image enhancement and image saving (local image folder/remote USB memory stick device).

Measurements can be done easily. Using the calibration feature – one click calibration – the distance between two points displayed on the screen either pixel units or calibrated real-world units.

There is an optional autofocus function that uses the electronically tunable lenses of the Swiss Optotune company. The focal length of the electrical lenses is tuned within milliseconds by applying a control. The Optotune lens can be paired with certain fixed focal length lenses (it does not work with all kinds of lenses). In some setup the Optotune lens is used in between the camera and the fixed focal lens and in other setup it can be used as a close-up lens.

Video recording

The SANXO industrial digital microscope provides video recording. The resolution and the frame rate can be adjusted in the settings. To start or stop the video recording, simply click the appropriate icon in the right-click menu.

HDR

The SANXO industrial digital microscope offers the **High Dynamic Range Imaging** function.
This function highlights the details in the darker part of the image (typically if the details are in the shade) or reduces the shiny saturated bright part of the image. There are two HDR functions available. One of the functions is optimized for speed and the other is optimized for image enhancement.

Fast focusing in milliseconds: New approach of focusing makes much faster focusing by applying the Map based focusing method. When the object is fixed, the algorithm calculates beforehand a map of focus points. Then by moving the mouse pointer on the screen the image get focused in milliseconds under the mouse pointer.

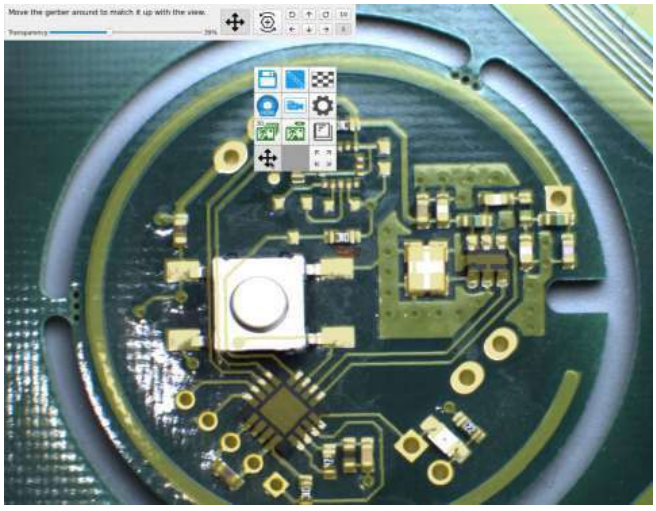
Super Imaging (Hyperfocus image): The tunable lens brings add-on features for the user. Using the so-called image stacking technique and the HDR (High Dynamic Range), a big depth of field HDR image can be generated using the SANXO-Scope HD. Also, a

3D mesh surface is generated which gives better understanding and a clear visualization of the object to be checked.

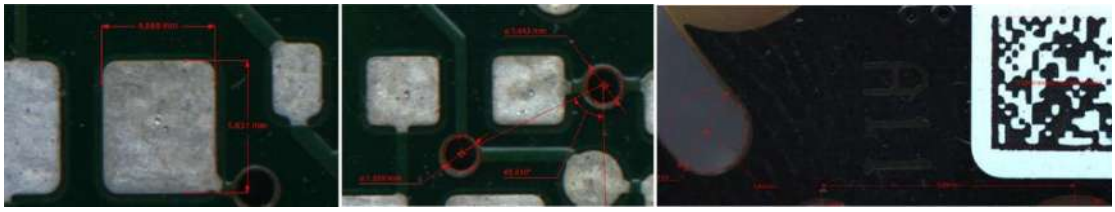
Super Image Single Image (background is in focus) 3D mesh surface

Gerber CAD drawing

This is an optional function. Gerber CAD drawing visualization tools give essential help for the manual inspection. The use of Gerber images associated with the PCB projected onto the live magnified image can provide significant assistance in quality control. The live magnified image enables detailed examination of printed circuit boards while the Gerber images allow comparison of the original design intentions with the physical prototype.



Measurements



Distance

With the Ruler function, users can measure 2D distances between two - manually marked - points. The measurement's dimension is pixels or mm unit- after calibration.

Angle

With the SANXO-Scope HD you can measure angles. The user must mark the 3 points manually. The measurement unit is degree.

Circle

For measuring circles, the user has two options: a manual and automatic method. With the manual method (Circle by 3 points) the user marks the 3 points, which defines the circle. With the automatic method (Canny circle detector) the user marks only a rectangle area around the circle. The dimensions are in pixels or after calibration in mm units.

DTM Code reading

If the product has identification code / QR code, DTM matrix, Barcode / then the user can use the DTM tool to read it and save the image with a name that includes time stamp and identification code.

Coordinate system

Coordinate system helps the user to make a quick check of the dimensions of the inspected object. Horizontal, vertical or a complete coordinate system can be placed in the image. The microscope system can start with the coordinate system in the optical center (like a crosshair).

2D Calibration

Using the calibration feature, distance between two points displayed on the screen can be measured using either pixel units or calibrated real-world units. The calibration process can be performed using the calibration card provided with the SANXO-Scope HD. The calibration can be initiated by opening the toolbar menu and clicking on the Calibration icon.

The measured distance is given either in pixels ('px') on the sensor or, if a calibration is present, in the chosen real-world units ('mm' by default). You may switch between the measurement modes through the toolbar menu by clicking the 'mm/px' toggle button. The corresponding menu elements can be seen on the right.

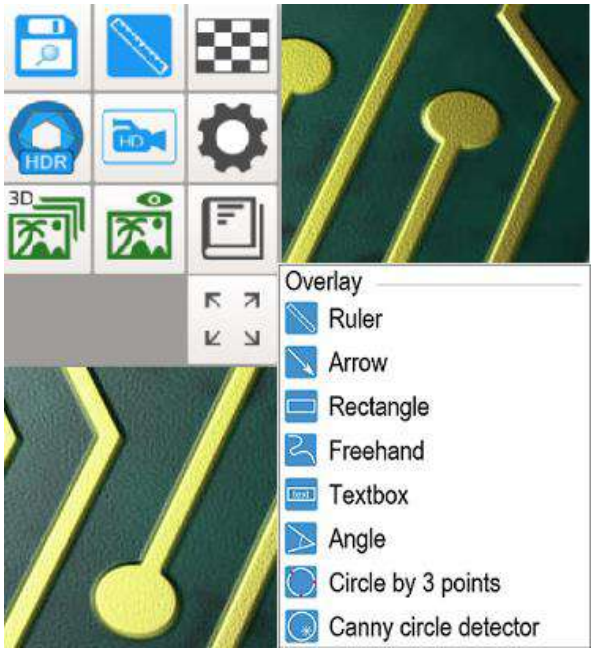
One-Click calibration

The SANXO-Scope HD can easily be calibrated using a calibration card or calibration glass. The calibration only takes a few seconds and after that the scope can be used to measure distances accurately in real-world units.

You can have your own calibration card. The setup supports adding a new calibration pattern, so if you go for higher magnification just print your new calibration card and you can use it directly. The calibration card is used for high accuracy. Its resolution is 0.015 micron. At ca. 140x magnification the 1-micron measurement accuracy can be achieved.

Overlay Graphics

The SANXO-Scope HD provides overlay graphics that can highlight and/or measure certain features for documentation. For highlighting the user can use an Arrow, Rectangle, Freehand and Text box. The user can measure circles, distances, and angles. The positions of the overlay graphics will not change if the user zooms in or zooms out.



Advanced Features

There is an **optional autofocus function** that uses the electronically tunable lens of the Swiss company Optotune. The focal length of the electrical lenses is tuned within milliseconds by applying a control current. These options become available when such a lens is connected.

Focusing

The system provides two focusing options, which can be selected and configured in the Settings -> Autofocus tab.

In **Classic** mode, the focusing is triggered by a doubleclick on the target image part. Fast and accurate presets are available. When **Map based** mode is active, the focusing requires two steps. The map creation takes place after a doubleclick, and it takes several seconds. After finishing, you can focus simply by hovering the mouse over the desired image part. In **Continuous** mode the focusing takes place automatically in the center of the screen.

HDR

With the SANXO-Scope HD, applying **HDR (High Dynamic Range) techniques**, high dynamic range light conditions that are problematic even for the human eye, can be easily managed. During the process, an image sequence is captured, applying varying exposure times. Based on the sequence the camera response can be estimated, and a pixelwise floating point representation can be created.

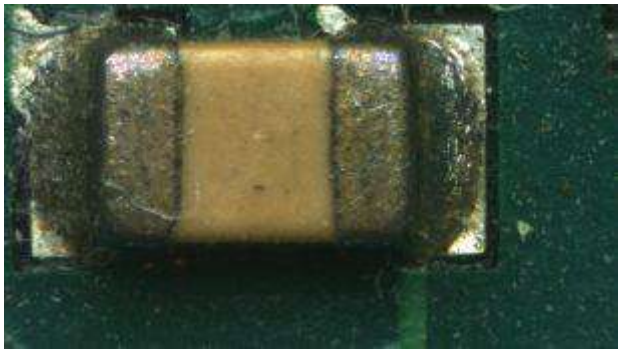
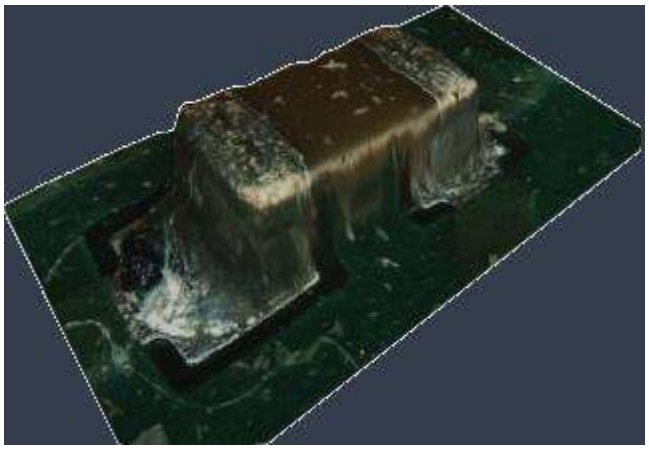


Image Stacking and 3D functions

The aim of **Image Stacking** is to increase the depth of field and obtain depth information. An image sequence, taken with uniformly changing focal distance, gives back sharp details for each part of the object. Knowing the image layer, which is locally the sharpest of the sequence, a depth map can be created. Based on this information, the layers can be merged to a "superimage" , that has only focused parts. Using the previous data, a 3D-model (triangle mesh and texture) of the object can be generated. The function can be activated with the "Start capturing a focal/HDR stack" button. The upper and lower bounds of the object can be selected with the two sliders. The number of layers should be around 20. The HDR is an extra option, which should be turned on, if the image has either very bright or light parts. The Image Stacking functions can be accessed in the Right Click Menu:

Large depth of field image can be generated using a special liquid lens and Image Stacking SW mode


Using this icon you can reload the last large depth of field image generated with the Image Stacking

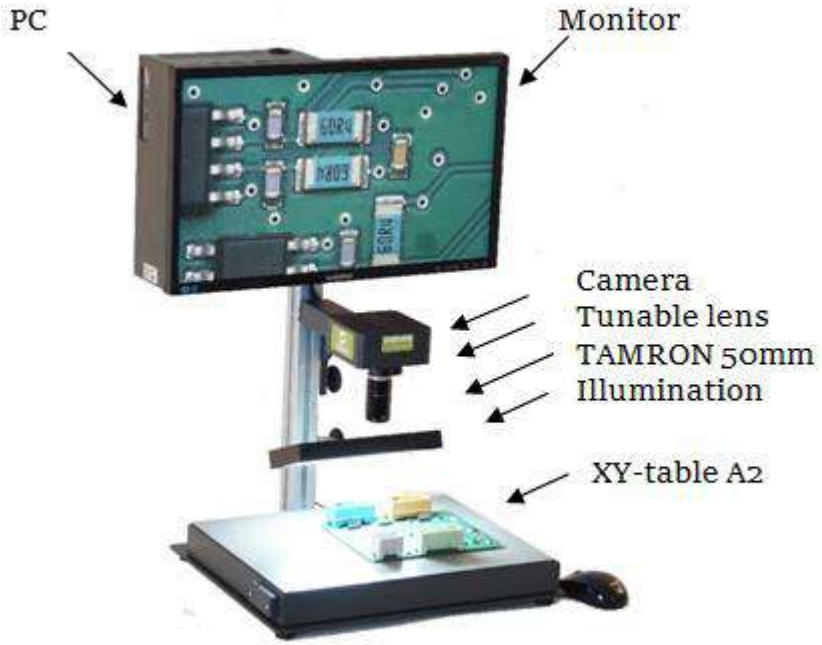


Setups and SANXO – Scope HD U10: Industrial digital microscope Prices

All setups come with a heavy-duty platform and an adjustable stand, a Full HD resolution monitor, a mini-PC with mouse, Megapixel TAMRON lenses and the SAN20W illumination. The Standard Setup which supports most of the desired use has 50mm megapixel fixed focal length TAMRON lens and a flat diffuse illumination. Additional accessories such as tunable lens, tilting table, XY table or extra lightning stands can also be configured into the package. A standard SANXO-Scope HD setup consists of the following products:

Models	**SANXO-Scope HD U10 20.5 Mpix**
Item no:	Equipped with 25mm lens: SC-10-01-25 Equipped with 50mm lens: SC-10-01-50 Equipped with 75mm lens: SC-10-01-75*
Camera	SONY 1” 20.5 MPixel IDS color camera digital zoom
Lens	Megapixel TAMRON 75, 50 or 25mm
Monitor	Full HD resolution 22”
Camera stand	Adjustable and robust camera stand
PC	INTEL NUC i7® 8GB RAM, 240GB SSD
Autofocus	Optional and supported, suitable AF lens is 16-40
3D imaging	Optional and supported
Light source	SAN-20W DIM white illumination (700mA) 210x98x25mm
Frame rate	c.a.30-70 FPS

Examples



Standard SANXO-Scope HD plus the optional tunable lens and XY-table A2

Optional monitor stand

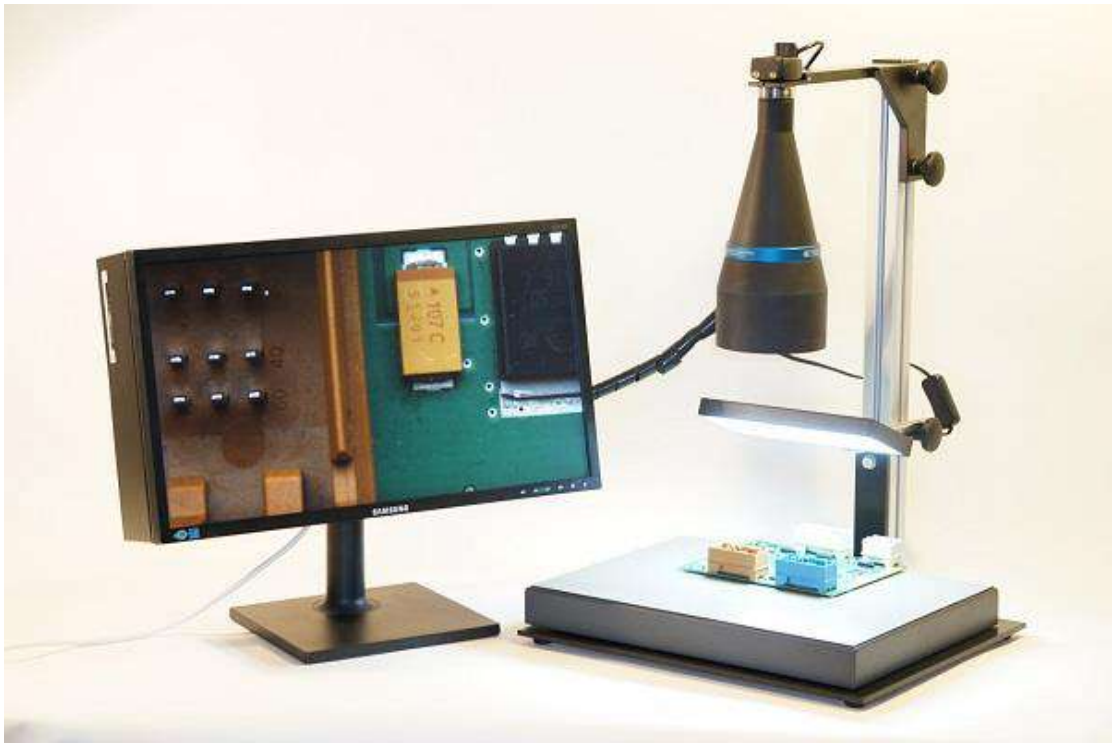
Optional monitor stand: The monitor + PC unit can be used with the optional monitor stand. In this case the monitor is not attached to the aluminum rod. The monitor can be placed sideways next to the camera stand. If you place an order and you want to use this setup use “MS” (monitor stand) after the setup name like: SANXO-Scope HD U4 MS.

The MS option is free of charge when you place an order for the SANXO-Scope HD. The monitor stand allows rotating the monitor around the Z axis, can be tilted and can be moved up and down as the following pictures shows.

Optional C mount lenses

This picture shows the SANXO-Scope HD U4 MS including Telecentric lens 1280. The advantage of this setup is the big depth of field plus there is no perspective distortion, so this setup is ideal for measurements.

The SANXO-Scope HD supports standard C mount lenses (telecentric, macro, 360 degree lens etc.), so the user can easily change between lenses and get a new optical setup in order to support other upcoming needs. If you have specific requirements, do not hesitate to contact our specialist to get more information.



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