PHOTON ENERGY
A Hitachi Group Company

VISION SYSTEMS

EN

MAP
Marking by Augmented Positioning

Functions

Traditionally markings are positioned on a workpiece using a red-light-frame or a pointing laser indicating position and layout. This simple method uses state-of-the-art technology and works very well for most applications.

However, for a more detailed and precise positioning of the laser marking a camera system needs to be implemented.

PHOTON ENERGY offers various camera options to enable the customer to precisely place markings on the workpiece in a fast and easy manner. The portfolio ranges from basic positioning aids (MAP) to fully automated workpiece positioning systems (SMART) featuring µm-resolution.

All PHOTON ENERGY camera options are equipped with MAP (Marking by Augmented Positioning). MAP is a manual positioning function and easy to use. It can be combined with CamVision or CamVisionPro.

The PHOTONmark marking software imports and displays pictures generated by MAP after mathematical correction and transformation into top-view.

Markings can be arranged very accurately, quasi directly on the workpiece, displayed as realistic picture, to ensure precisely located markings.

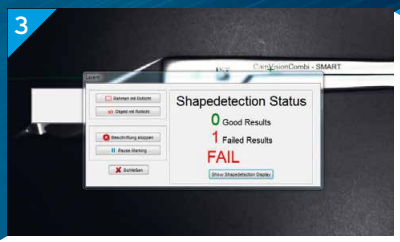
- What you see is what you get! -

CamVision samples (off-axis view)

SMART
Simple Marking by Augmented Reality Targeting

SMART can be combined with CamVisionPro and CamVisionCombi. SMART allows integration of pre- and post-procedures into the marking process.

There is a user-friendly wizard to guide you through the intuitive Shape Detection setup procedure.



Pre-Process-Control:

Checks prior to actual laser marking:
- Is the workpiece the correct one? (Fig. 1)
- Is the workpiece already marked? (Fig. 2)
- Is it allowed to mark this workpiece again? (Fig. 3)

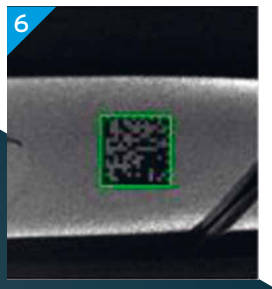
Automatic Marking Alignment:

If the correct workpiece has been placed into the marking area, SMART will detect its position via Shape Detection (Fig. 4) and align the marking with respect to its lateral and angular position. The precision depends on the particular camera system installed.

Post-Process-Control:

SMART can read data-matrix-codes (DMC), (Fig. 5, 6) in order to verify its content by comparison with input values and specifications or to check and measure the DMC against standard quality criteria.

SMART gives quality control of the laser marking to 100%!



link to video

Camera Systems

CamVision

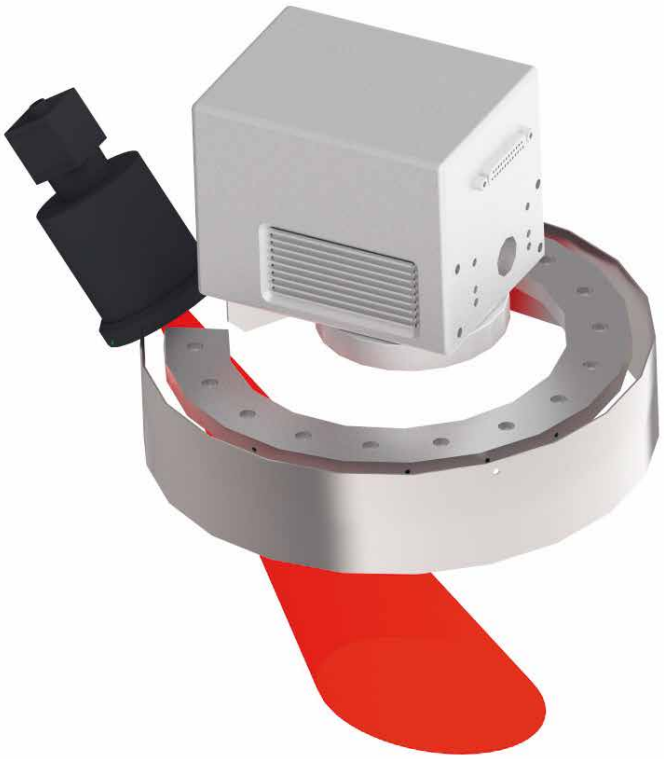
CamVision is the basic option for displaying the marking field in the marking software PHOTONmark.

Optical distortion due to off-axis mounting of the camera is corrected by the software and an accurate picture is displayed on the marking software GUI.

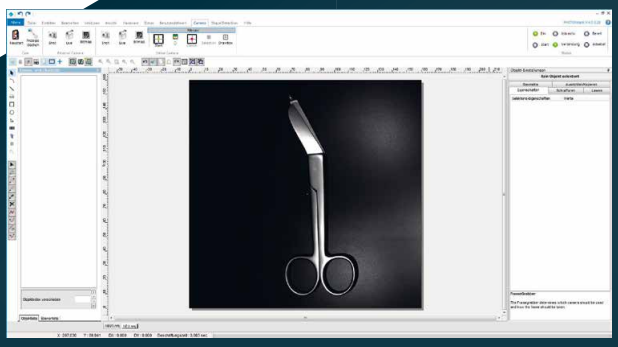
Using MAP and simple „drag and drop“ marking objects can be arranged easily on the marking area.

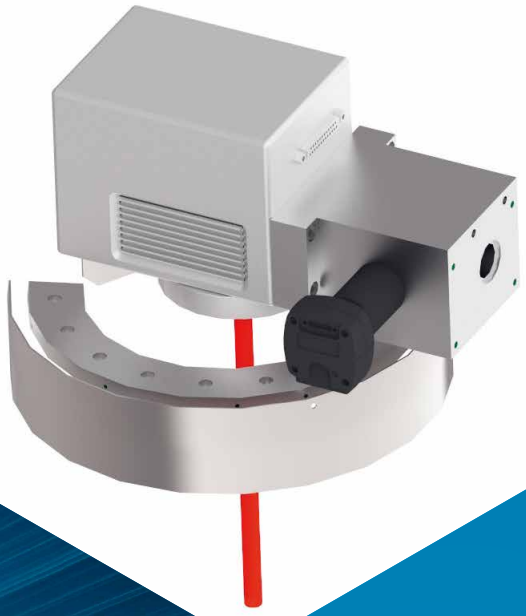
The result is visualized properly prior to real marking.

Marking set-up is simplified – production is yield-optimized.



Surgical instrument by CamVision





CamVisionPro

CamVisionPro offers high-precision positioning.

A special camera is looking through scanner and objective lens onto the workpiece following the laser beam path. Aberration is corrected by complex algorithms to ensure highest precision.

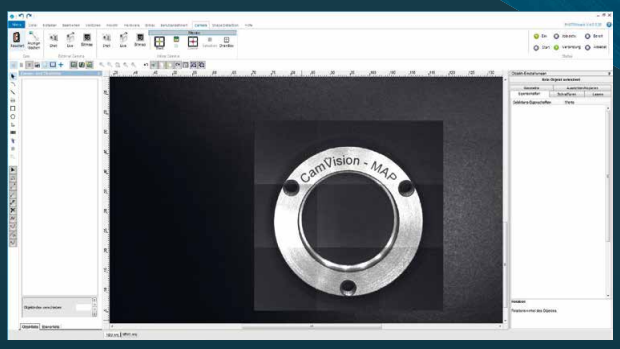
As the camera field of view is small, the work area is segmented into small area sections. A rasterization function corrects and assembles the segments to show a distortion-free true to size picture of the entire situation. The size of each segment depends on the objective lens.

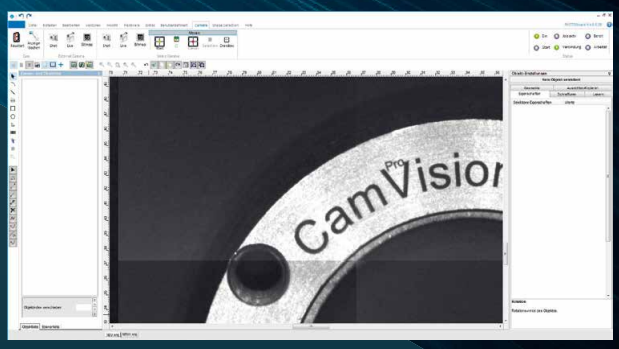
Marking objects can be positioned easily using MAP and „drag and drop“ either on the overall picture or on a segment picture.

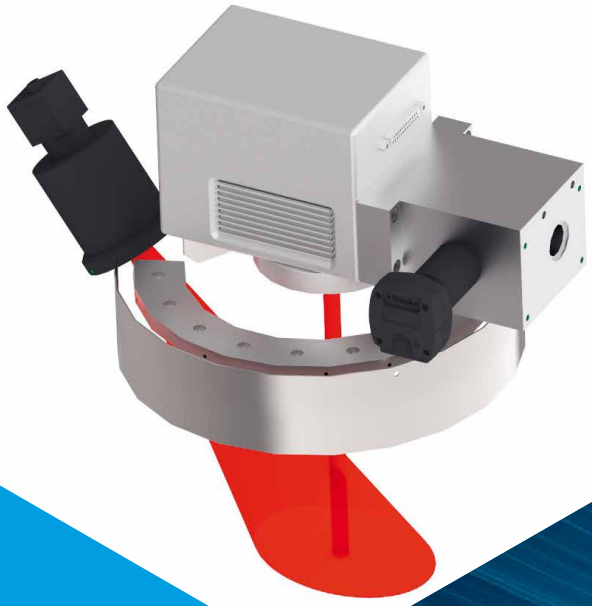
Advantages:

- Extremely high resolution
- Display of small parts and fine details
- Zoom function

Segmentation by CamVisionPro







Advantages of CamVisionCombi:

- Fast display of the entire marking field by CamVision
- Easy definition of ROIs (Region-of-Interest) for high-res pictures from CamVisionPro. No rasterization – shorter process time
- Superposition of CamVision and CamVisionPro pictures for high-precision marking
- Zoom in on tiny objects

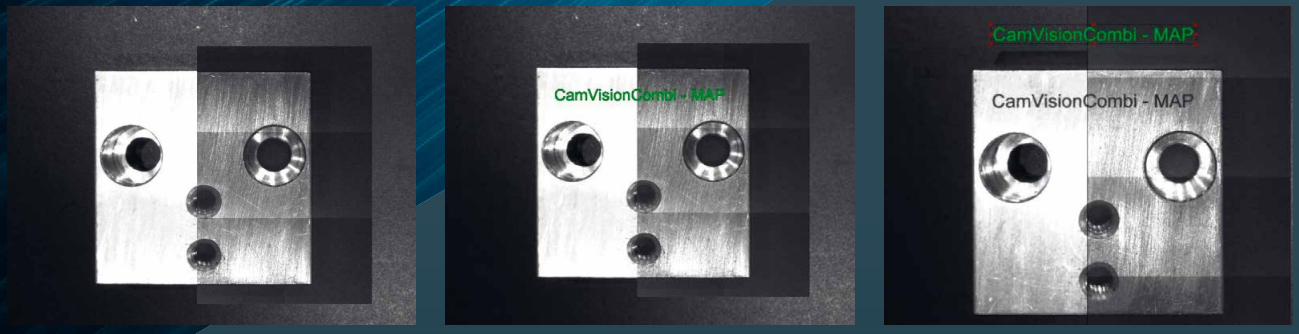
CamVisionCombi

CamVisionCombi offers maximum flexibility and advantages of both, CamVision and CamVisioPro.

An off-axis CamVision camera delivers the overview screen of the entire marking field while the Region-of-Interest (ROI) will be displayed by CamVisionPro as high-resolution picture. The smaller high-resolution ROI picture will be integrated in the larger low-resolution overview screen and allows precise positioning of the marking object without having to rasterize the entire marking field.

Especially in combination with SMART CamVisionCombi reduces process time significantly.

Superposition of off-axis CamVision picture and on-axis CamVisionPro picture



CamVision
CamVisionPro
CamVisionCombi
Functions & Features

FUNCTION		PRODUCT		
main-function	sub-function	CamVision	CamVisionPro	CamVisionCombi
STANDARD				
off-axis camera		●	-	●
inline camera (on axis, through the lens)		-	●	●
off-axis and inline camera		-	-	●
resolution		> 10 MP	0.86 MP per segment 86 MP for entire marking field	0.86 MP per segment 86 MP for entire marking field
rasterization		-	●	●
field of view		entire marking field	approx. 1% of entire marking field	entire marking field and approx. 1% of entire marking field
LED illumination		●	●	●
MAP		●	●	●
	picture superposition	-	-	●
positioning accuracy		± 100 µm	± 20 µm	± 100 µm / ± 20 µm
OPTIONAL				
SMART		-	●	●
	Shape Detection	-	●	●
	Teaching Tool	-	●	●
	DMC-Verification	-	●	●
	Pre-/Post-Control	-	●	●

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