



Process-Monitoring for AXIALSCAN FIBER

- Process monitoring free of chromatic aberrations
- Dynamic and fast focus tracking for coaxial inline / offline camera monitoring
- Optical output for plasma and heat radiation
- Dust-protected industrial design in IP64 for adaption to AXIALSCAN FIBER

PRODUCT DESCRIPTION

We have developed the RAYSPECTOR monitoring unit for our AXIALSCAN FIBER to facilitate the laser process optically with comprehensive imaging and to support you in achieving an even better quality of your workpieces. With its automatic dynamic and fast focus tracking by means of a camera, the RAYSPECTOR monitoring module creates even more efficiency in electromobility and additive manufacturing. It can be easily connected to existing machine designs.

ADVANTAGES AND BENEFITS

Highly dynamic and fast camera tracking for inline observation and high resolution for offline observation, e.g. for position detection of workpieces. Connection of a wide range of welding monitoring systems is possible.

High flexibility in process monitoring, the dust-protected industrial design as well as sensor-specific software components distinguish the product. In combination with the AXIALSCAN FIBER, the RAYSPECTOR increases the quality of the laser process, helps reduce downtimes and lowers costs.

TYPICAL APPLICATIONS

- Inline camera video recording of welding and sintering processes
- Offline position detection and process set up procedures by means of imaging software
- Heat map generation by means of a pyrometer or light intensity measuring system of a powder bed layer
- Code reading with OK / NOK – check



IP 64
Dust and sprinkle water
protected



Production
in clean room

EFFICIENT IMAGING PROCESS



MORE SECURITY

The RAYSPECTOR gives you both more flexibility and more reassurance in the laser process. The automatic dynamic and fast focus tracking with only one camera offers you the possibility to control welding and sintering processes by a coaxial inline camera recording or to position the process exactly on the workpiece offline and to determine the position of the component precisely before each step. The result is sharp, high-contrast images anywhere in the processing area and greater positioning accuracy. At the same time, the movement of the camera axis and the pre-focusing AXIALSCAN FIBER deflection unit can be coordinated. And in addition, the software makes it possible to control the entire laser process. In this way, you can combine individual tiles or individual elements for a high-resolution image of the entire field. In parallel, the display of data from the process can be made possible with the data analyser of the image data.



OPTICALLY ADVANTAGEOUS

Cameras with chip up to $\frac{2}{3}$ and C-mount make sense here. The advantage is the industry-standard mechanical interface, which makes RAYSPECTOR independent of the camera manufacturer and its technology. This allows you to monitor the workpiece over a large FOV field of view. The process monitoring has an optical output for plasma and thermal radiation.



BETTER QUALITY

The monitoring unit enables observation of the melt pool in 3D printing, as well as welding monitoring in many electromobility applications such as battery production. The workpiece can be visualised throughout the entire welding process. This means that defects can be detected at an early stage, their exact position documented and eliminated. The quality of your production increases.



LESS WASTE

The RAYSPECTOR's dust-protected IP64 industrial design has several advantages. You no longer have to worry about contamination or burns on the optics. Due to the reduced risk of contamination, there are fewer damaged components. The result: more reliability in the process and a longer service life for your machines. And that ultimately reduces your rejects. Cleaning and maintenance of the monitoring unit is also no longer necessary. In addition, RAYSPECTOR makes it possible to visualise the workpiece during the entire welding process. This means that defects and their exact position can be documented and repaired if necessary. This leads to less waste overall.



EASY INTEGRATION

You can easily install the camera tracking vertically or horizontally according to the position of the AXIALSCAN FIBER. This offers you flexibility and easy integration into your machine design. And you are not limited to just one camera path. Keyword "Plug and Play" – for the synchronisation of the monitoring unit with the AXIALSCAN FIBER, little user know-how is required – everything works fully automated.

THE PERFECT COMPANION:



RAYGUIDE

SIMPLE PROCESS SOFTWARE

Guarantees fast and easy interactions for customised programming. User-friendly set-up and calibration of the deflection unit and effortless automation.



SP-ICE 3

CONTROL CARD WITH FEEDBACK

Can be used universally as well as specifically for individual requirements. The laser system can thus be optimally controlled, optimised during development and monitored during operation.

ALLGEMEINE SPEZIFIKATIONEN

Power supply	Internally from deflection unit
Ambient temperature	+15°C to +35°C
Storage temperature	-10°C to +60°C
Humidity	≤ 80 % non condensing
IP Code	64
Interface signals	digital
Weight excluding deflection unit [kg]	approx. 5
Dimensions excluding external camera beam path [mm]	115 x 122 x 230
Tracking error focusing unit [ms]	1.5
Speed of moving lens [mm/s]	880

RAYSECTOR is delivered combined with the AXIALSCAN FIBER

OPTISCHE SPEZIFIKATIONEN

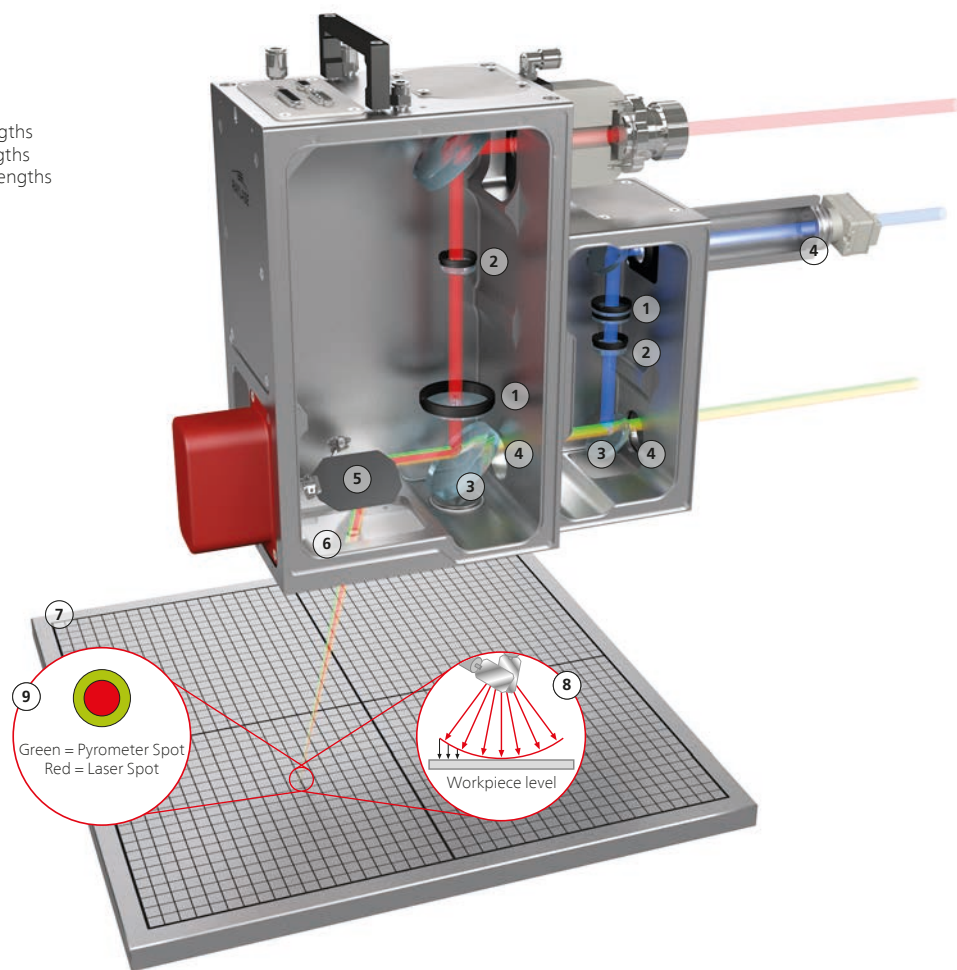
Equipment feature	Astigmatism compensation for process light		
Mechanical camera interface	C-Mount		
Maximum camera chip size	⅔"		
Optimized wavelength camera path	640 nm		
Sensor output for:			
Plasma radiation [nm]	400 – 550		
NIR wavelength [nm]	700 – 900		
Heat radiation [nm]	1300 – 2100		
Processing field size [mm x mm]	250 x 250	400 x 400	700 x 700
FOV Image field size [mm x mm] ¹	23 x 30	29 x 39	41 x 55
Optical resolution [μm] ¹	17	21	30

¹ Camera with ⅔" chip, 5 Megapixel, monochromatic

MORE VISIBILITY THROUGH OPTICAL CAMERA TRACKING

Process light:

- Laser beam
- Short wavelengths
- Long wavelengths
- Camera wavelengths



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|---|---|---|--|
| 1 | focusing lenses for laser and camera beam | 7 | Laser process field and tiled camera field of view |
| 2 | Moving Z-lenses | 8 | Moving Z-lens effect |
| 3 | Dichroic elements | 9 | No lateral or vertical aberrations. |
| 4 | Process monitoring interfaces | | Measurement spot and laser beam are congruent. |
| 5 | Deflection mirror | | Focus of all wavelengths on the workpiece plane. |
| 6 | Protective glass | | |

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