

Symmetry S3 EBSD Detector



Fast and versatile analyses with the ultimate all-in-one EBSD detector

The **Symmetry S3** electron backscatter diffraction (EBSD) detector is the 3rd generation detector in the ground-breaking Symmetry product line. The S3 combines unparalleled analysis speeds (> 5700 patterns per second – pps) with all of the unique features that ensure market-leading performance without any compromise.

The **Symmetry S3** is the only EBSD detector that is designed to deliver excellent results from every type of sample. The unique lens-free fibre-optic coupled camera system results in exceptional sensitivity for all analytical conditions, from the analysis of beam sensitive materials to routine, high-speed characterisation. The high pixel resolution combined with guaranteed sub-pixel distortion levels make the S3 ideal for detailed strain and high-precision EBSD work, while the software-controlled detector tilting ensures optimised acquisition geometries for every size and shape of sample.

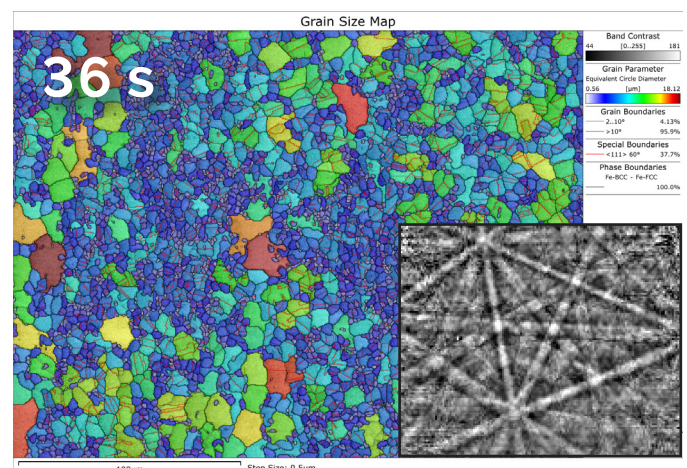


The Symmetry S3 combines exceptional sensitivity with extreme speed

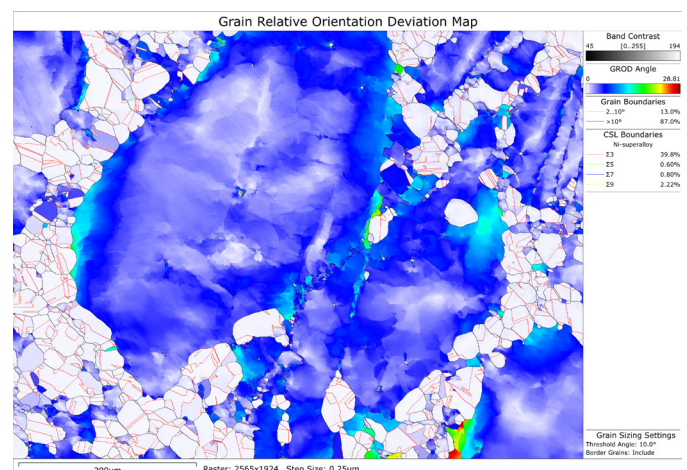
- 6 different camera modes providing ultimate flexibility
- Up to 1244 x 1024 pixel image resolution
- Acquisition speeds > 5700 indexed pps at 156 x 128 pixel resolution
- Unique lens-free fibre-optic coupled camera system delivering market-leading sensitivity
- Guaranteed sub-pixel distortion for high precision EBSD work (including HR-EBSD)
- Software-controlled detector tilting, ensuring optimal geometry for every sample
- Unique proximity sensor system (patent pending) to prevent collisions and minimise downtime
- Optional integrated 5-diode forescatter detector (FSD) imaging system

Maximising throughput without compromise

The extreme analysis speed of the **Symmetry S3** enables grain size characterisation to international standards in under 60 seconds. The excellent pattern resolution at the maximum speed (156x128 pixels) and the sensitivity delivered by fibre-optics ensure that rapid analyses do not compromise on data quality or SEM resolution.



Grain size map of a duplex stainless steel collected in 36s (2352 grains, ASTM Grain Size 12.6). Inset – typical EBSD pattern quality at maximum analysis speeds.

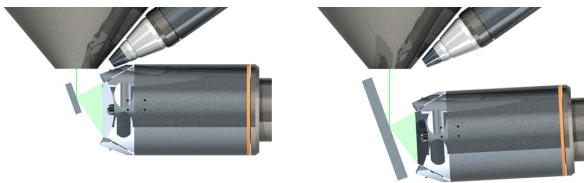


Grain relative orientation deviation (GROD) angle map of a deformed and partially recrystallised Ni superalloy sample. Measurements were collected in 14 minutes at 5,763 pps, using a beam current of 21 nA.

Ultimate versatility: perfect results from every sample

The Symmetry S3 detector is designed to analyse without compromise. Its unique software-managed screen elevation control ensures that the detector can be safely positioned at the optimum geometry for every sample and for any measurement, including for transmission Kikuchi diffraction (TKD).

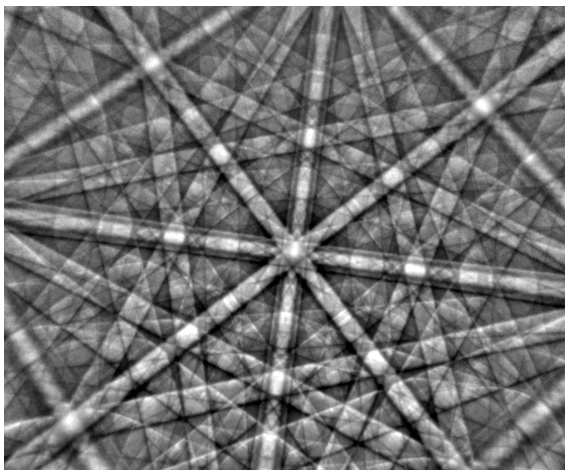
- Up to +/- 22 mm motorised elevation movement
- Autocalibration ensures perfect indexing at any geometry
- Proximity sensor system detects and prevents potential collisions before they occur – saving money and downtime



The benefit of the Symmetry S3's screen elevation control. Left – standard position with a small sample at a short working distance. Right – large sample at a longer working distance, with the Symmetry S3 tilted downwards to maintain the ideal sample-detector geometry and to avoid shadowing the energy dispersive X-ray spectrometry (EDS) detector.

Symmetry S3's megapixel resolution and guaranteed sub-pixel distortion make it the ideal detector for high precision EBSD analyses:

- Proven performance for HR-EBSD investigations
- Real-time orientation precision down to 0.01° using AZtec's patented Refined Accuracy indexing

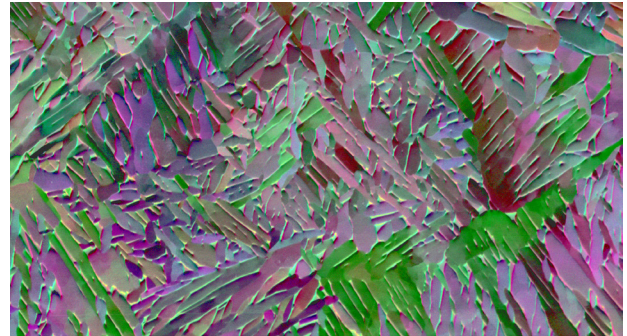


Full 1244 x 1024 resolution EBSD pattern from a cubic ZrO_2 phase

See your samples in a different light

5 optional forescatter detectors (FSDs) deliver fast and flexible sample imaging:

- Lower 3 diodes for crystallographic and topographic contrast (or darkfield when performing TKD) with false colour option
- Upper 2 diodes for Z-contrast



False-colour forescatter detector image of an additively manufactured Ti 64 alloy sample, highlighting crystallographic contrast in α -Ti grains.

Symmetry S3 EBSD Detector Specifications

Resolution	Max 1244 x 1024
Speed	> 5700 pps (at 156 x 128 pixel resolution)
Optics	Lens-free fibre-optic coupling
CMOS Sensor	Bespoke CMOS sensor developed and optimised for EBSD
Distortion	Guaranteed < 1 pixel
Sensitivity	Max 1000 pps / nA
Phosphor Screen	High sensitivity all-round phosphor, matching shape of CMOS sensor
Collision Protection	Proximity sensor collision avoidance system (patent pending)
Elevation	Motorised screen elevation control, up to +/- 22 mm movement
Insertion	Fully motorised, high speed and high precision insertion / retraction
Interface	Bellows-type for high vacuum integrity
FSD System	Optional 5 diode FSD
High T Screen	Optional, high-sensitivity screen with optical interference infra-red filter
Handset	Optional – insertion / elevation control

Visit nano.oxinst.com/Symmetry-S3

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