

EYELINK 3 TECHNICAL SPECIFICATIONS

Functional Specifications

Physical & Functional Specifications		
Sampling Rate	250/500/1000 Hz Monocular or Binocular	
Eye Tracking Principle	Dark Pupil – Corneal Reflection	
Pupil Detection Models	Centroid or Ellipse Fitting	
Gaze Accuracy ¹	0.5°	
End-to-End Sample Delay ²	M = 2.37 ms (SD < 0.5 ms) @ 1000 Hz; M = 3.38 ms (SD < 1.1 ms) @ 500 Hz	
Blink/Occlusion Recovery	1.0 ms @ 1000 Hz	
Gaze Precision ³	1000 Hz: 0.06°/0.03°/0.02° (Filter Off/Normal/High) 500 Hz: 0.05°/ 0.02°/0.01° (Filter Off/Normal/High)	
Trackable Eye Rotation Range (Decoupled X/Y Rotations)	± 26° Horizontal, ± 17° Vertical in Pupil-CR Mode ± 30° Horizontal, ± 25° Vertical in Pupil-Only Mode	
Gaze Tracking Range (Rectangular Area)	40° × 25° (Without Head Movements) 70° × 50° (With Head Movements)	
Eye-to-Camera Distance	<ul style="list-style-type: none"> • 65 mm – 85 mm Effective Eye Distance • > 20 mm Mirror Clearance to Eyes • Fixed Focus 	
Eye Video Frame Rate	Configurable (1 to 500 fps)	
Glasses Compatibility	Good (Glasses Dependent)	
Pupil Size Resolution ³	0.1% of Diameter	
Head Tracking	NIR Marker and IMU Data Fused	IMU only (Marker Free)
Head Tracking Data	Full 6DOF (Head Position: X, Y, Z; Head Rotation: Pitch, Yaw, Roll)	Head Rotation: Pitch, Yaw, Roll
Trackable Head Rotation	Pitch: ± 15° Yaw: ± 38° Roll: ± 50°	Unlimited
Trackable Head Position	X: ± 55 cm; Y: 76 cm from -28 to 48 cm @ 80 cm distance Z: 30 to 120 cm for MRK3-120; 40 to 300 cm for MRK3-240	N/A
Online Eye Event Parsing	Fixation / Saccade / Blink / Fixation Update	
EDF File and Link Data Types	Pixel Data: Gaze, Eye-in-Head, Head-in-Space; Head Tracking Data: X, Y, Z (mm), Pitch, Yaw, Roll (angles); Additional Data Types: Raw, HREF Eye Data, Pupil Size and Pupil Ellipse data, Buttons, Messages, Digital Inputs	
Real-Time Operator Feedback	Eye position gaze cursor superimposed on static image or position traces with camera images and tracking status.	

Specifications are preliminary and subject to change without notice.

¹ Measured with real eye fixations at multiple screen positions on a per subject basis.

² Time from physical event until first registered sample is available via Ethernet output.

Optional data filter algorithm adds one sample delay for each filtering level.

³ Measured with an artificial eye.



Updated: Nov 13, 2024