SEA.AI

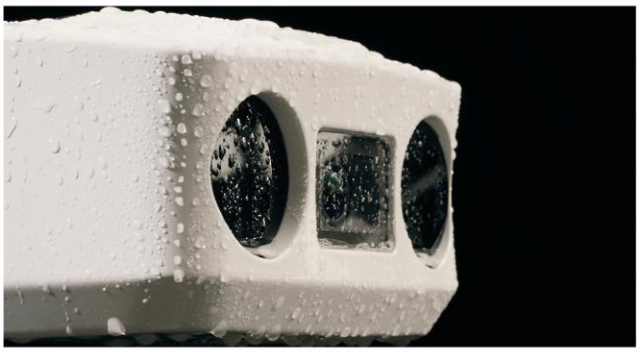
MACHINE VISION FOR SAFETY & SECURITY AT SEA





WATCHKEEPER
MOTOR SERIES

WATCHKEEPER integrates EO/IR thermal and daylight imaging with real-time onboard AI to autonomously detect and classify surface targets day and night, in any weather. Solid state, passive, and drawing under 27W, it delivers professional-grade maritime surveillance on any vessel, any platform, any mission. Where size and power are constraints, WATCHKEEPER is the answer.





Watchkeeper Detects

- Vessels, RIBs and small craft on collision cours
- Persons in water and marine mammals
- Floating hazards, debris, logs and semi-submerged objects
- Port, harbour & commercial vessel security
- AIS-dark and AIS-spoofing vessels

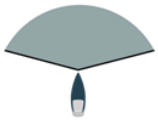
Key Capabilities

- AI powered camera for situational awareness and safe navigation
- Scalable EO/IR model range, daylight-only to full dual thermal/daylight
- Passive operation, no electronic signature, passive range estimation
- Solid state, no moving parts, designed for unmanned operation
- Under 1kg, 27W, optimized for power and weight-constrained platforms

Product Specification SEA.AI Watchkeeper for Motorboats

Fixed-mount AI camera system for situational awareness and safe navigation — Watchkeeper 1280 / 640 / 320 / Lite.

IMAGING SENSORS

Parameter	WK 1280M	WK 640M	WK 320M	WK Lite
				
Thermal (IR) Sensors	2× LWIR 2×640×512 (=1280x512)	1× LWIR 640×512	1× LWIR 320×256	—
NEDT	≤ 30 mK			—
IR FoV (H×V)	48° × 19° (2×18 mm)	24° × 19° (18 mm)	24° × 19° (9.1 mm)	—
EO Sensor	4K low-light HDR at 3840×2160			
EO FoV (H×V)	130° × 65°			

DETECTION RANGE PERFORMANCE*

Target	WK 1280M	WK 640M	WK 320M	WK Lite
RHIB (6 m × 2 m)	1,750 m	1,750 m	900 m	550 m
NATO Target (2.3 m × 2.3 m)	1,170 m	1,170 m	590 m	360 m
Human-sized Target (1.8 m × 0.5 m)	480 m	480 m	240 m	150 m
MOB, Buoy (0.4 m × 0.4 m)	200 m	200 m	100 m	78 m

*Detection ranges are based on optical sensor performance under ideal conditions. Actual detection range depends on environmental conditions — weather, sea state, visibility and target contrast. [1] WK Lite has no thermal sensor — RGB daylight detection

SYSTEM SPECIFICATIONS

Parameter	All Watchkeeper Motor models
IMU	9 DoF — heading, pitch, roll, acceleration
Digital Stabilization	IR + EO — high-frequency vibration & shock compensation
AI Processing	NVIDIA® Jetson Orin NX — 1024-core Ampere™ GPU, 6-core ARM® Cortex®-A78AE (v8.2)
AI Detection Rate	Thermal and RGB — 8 FPS
Object Classes	Unknown Hazard, Vessel, Motorboat, Sailing boat, Buoy, MOB
Passive Ranging	Camera-only distance estimation — no active emitter (SEA.AI Patent)
Pan / Tilt	Fixed mount - digital pan function

AI detection requires an active AI Subscription. Check sea.ai for subscription options.

MECHANICAL & ELECTRICAL

Parameter	WK 1280M	WK 640M	WK 320M	WK Lite
Dimensions	110 × 163 × 86 mm			
Weight	1023 g	975 g	951 g	935 g
Power Supply	12–36 V DC, 29.3 W max			
Temperature Rating	–25 °C to +55 °C (operating) +70 °C (storage) IEC 60945			
IP Rating	IP67 (IEC 60529)			
Shock Resistance	Tested per MIL-STD-810H, Method 516.8 — half-sine 20 G, 23 ms, 3 shocks/direction, 6 directions (X/-X/Y/-Y/Z/-Z)			
Connectivity	Ethernet, GPS, LTE			

EMC COMPLIANCE & INTERFACES

Parameter	All Watchkeeper Motor models
EMC Directive	EU 2014/30/EU — Electromagnetic Compatibility
EMC Emissions & Immunity	EN 60945:2002 (Maritime navigation & radiocommunication equipment)
RoHS	2011/65/EU — Restriction of Hazardous Substances
CE Declaration	SEA.AI GmbH — DoC Watchkeeper_V1, 10 July 2025
Interfaces	Ethernet | NMEA 2000 via ShipModule-3e-N2K
API: Video & Data Output	Standard API & Extended API | RTSP video (H.264/H.265) | WebSocket image stream | WebRTC | TTM/TLL target output (Ethernet)