OCULAR ROBOTICS

HIGH PERFORMANCE SENSOR POINTING TECHNOLOGIES

RobotEye RE01 OEM

Two-Axis Optical Pointing System

Product Datasheet

RobotEye RE01 OEM Two-Axis Optical Pointing System

The RobotEye RE01 OEM is an implementation of our RobotEye technology designed to provide a general purpose high performance two axis optical pointing capability for use in OEM and prototype systems. As with all RobotEye systems, the sensor or source is able to remain completely stationary while the signal is directed about two axes. The RE01 OEM optical path components can be specified, including from our standard range of mirror surfaces at build time to work with your chosen sensor or source.

The unprecedented motion bandwidth of the RobotEye RE01 OEM allows the following types of behaviours to be achieved with ease.

- *Pre-programmed Paths* - The RE01 OEM can accurately follow predefined paths with extremely high accelerations up to 50,000°/s^2 and velocities up to 10,000/s delivering unparalleled path following capabilities to a wide range of sensors and sources. Where repeated precision repeated path following about two axes with your sensor or source is important to your application the RE01 OEM provides an ideal solution.
- *Dynamically Generated Paths* - Just as with predefined paths the RE01 OEM is able to follow dynamically generated paths with the same unparalleled accuracy, acceleration and velocity as in the pre-programmed case and with the same flexibility to use the sensor our source of your choice. The generated paths can be completely arbitrary within the field of regard of the RE01 OEM. These paths are realised simply by streaming desired aperture angles to the relevant function in our RobotEye RE Lib C++ library. A good example of this behaviour is our inertially slaved RE01 option which provides a ready made off the shelf implementation where the RE01 OEM aperture is slaved to the inertial sensor connected to the system.
- *Dynamic or Structured Pointing* - The ability of the RobotEye RE01 OEM to move rapidly and accurately between points with extremely high acceleration and slew speed provides unprecedented capability in acquiring sensor data from, or pointing a source at, points of interest within the field of regard of the RE01 OEM. Whether a structured grid of measurements is required or completely arbitrary points are being defined by some input to the system the RE01 OEM can acquire each designated point dwell for the required amount of time and move to the next point with unparalleled speed.
- *Velocity Controlled Scanning* - By setting the RE01 OEM to velocity mode the full field of the system can be scanned at a wide range of rates in both azimuth and elevation. Applications of this mode include: scanning the environment surrounding a system for a given signal; mapping the environment surrounding the system in terms of a given sensor's band of sensitivity; or even illuminating the surrounding environment in a controlled way. The RE01 OEM velocity mode offers full control to be able to achieve these behaviours as required by the application.

Implementation of all of these behaviours is straightforward using the RobotEye RE Lib C++ library supplied standard with the RobotEye RE01 OEM Optical Pointing System allowing quick and easy integration into the target system.

RE01 OEM Specifications

Mechanical		*Optical*	
Maximum Azimuth Rate	10,000°/s	Clear Aperture	22mm
Maximum Elevation Rate	4,000°/s	Mirror Options	Yes
Maximum Aperture Acceleration	>50,000°/s	Customizable Optical Path Elements	Yes
Azimuth Axis Resolution	0.010°		
Elevation Axis Resolution	0.004°	*Software*	
Azimuth Range	360° Continuous	RobotEye Class Library Support	Windows/Linux
Elevation Range	70° (±35°)		
Accuracy	0.05°	*Environmental*	
Weight	2.5kg	Operating Temperature Range (Head)	-20°C - +70°C
		Operating Temperature Range (Control Unit)	0°C - +70°C
Electrical		IP Class Rating	65
Communication	Ethernet	*Note: IP Rating valid only when both supplied power & optionally supplied weatherproof Ethernet cable connectors are fitted.*	
Supply Voltage	24VDC		
Power Consumption — Typical (average)	<1.5 A		
— Maximum (peak)	10.0 A		

Specifications are subject to change without notice

Software

RobotEye C++ Class Library — The RE01 ships with a fully documented C++ class library for both Windows and Linux that can be used to simply and quickly interface to the RE01 device. This enables rapid application development for users of the RE01. The library provides access to the entire range of RE01 features. The RobotEye Class Library Reference Manual is available for download from the Downloads tab, and contains a full description of the library and its use.

RobotEye Inertial slaving application — The RE01 (inertially slaved variant) ships with an application that allows plug-and-play integration with a variety of Intersense inertial Attitude Heading Reference Systems (AHRS). This application, in conjunction with the RobotEye Class Library allows a wide variety of applications to be developed. See the Head Mounted Display on the RE01 Videos page for a demonstration of the use of this application.

Custom Application Development — Ocular Robotics Pty. Ltd. provides a full range of custom development services for users who have specific application requirements for the RobotEye RE01 OEM System. These services range from custom firmware development for the RE01 through to large scale software development for applications of the RE01. Please contact Ocular Robotics for more information if required.

Optical Path Element Options

The only required optical element in the RE01 OEM System is the mirror at the centre of the system. When ordering a system a mirror can be chosen from our standard range (see the ordering information tab on the RE01 OEM product page of our website) that suits the sensor or source used in your application or alternatively a customer specified mirror may be installed when the system is built. Other optical components may also be built into the optical path of the RE01 OEM, whether it is a system window with particular transmission properties, signal collimation optics or some other requirement. Please contact Ocular Robotics for more information if required.

Environmental

The RobotEye RE01 OEM System has been designed to operate in the harshest environments with an environmental protection rating of IP65 and an operating temperature range of –20°C up to 70°C. All system components have been designed or selected to meet the performance and operational requirements of the demanding environments in the defence, resources and homeland security sectors.

As with all of our systems, the RE01 system gains its robust nature from the fact that the sensor, all drive components and control electronics remain stationary and inside the system enclosure or within the housing of the platform to which the system is mounted leaving only the RobotEye head exposed. The low mechanical stress operation of the RobotEye technology ensures extended operation at high levels of performance. All of this results in a system that can be relied on to operate in harsh environments for long periods without attention.

Control & Communication

The RE01 OEM system requires a 24VDC power connection and a 100 Megabit Ethernet connection. Communication and control of the RobotEye RE01 OEM System is achieved via the system's Ethernet port, full control of the system aperture and system feedback including current aperture orientation is enabled through the RobotEye C++ Class Library. The connection to a sensor used with the system is normally made to the computer which is controlling the RE01 aperture so that application software can efficiently fuse sensor data and aperture positions to produce registered sensor data.

System Customisation

All RobotEye systems can be customised to meet the needs of an application or operating environment. Whether it is tailoring for operation in a particular service environment, component material changes, enhancing performance specifications, altering the optical path characteristics or a range of other possible modifications, all of these things can be achieved while retaining the dynamic performance and other benefits of the RobotEye technology. Please contact Ocular Robotics for more information if required.

System components

The RobotEye RE01 OEM System is supplied as standard with the following components:

- RobotEye RE01 OEM Head w/specified system mirror
- RobotEye RE01 OEM Control Unit
- 2 Metre Interconnecting System Cables
- 3 Metre System Power Cable
- RobotEye C++ Class Library

Optional system components are:

- Inertially Slaved RobotEye System Upgrade
- Optical Path Element Customisation (contact Ocular Robotics for more information)
- Extended Interconnecting System Cables
- RobotEye OEM Head Enclosure
- Weatherproof Ethernet Cable
- System Case

The RE01 OEM Standard Mirror Options		
Mirror Surface	Detail	Reflectance
Enhanced Aluminium	1/10λ, 1/4λ, 4-6λ	plot
Protected Gold	1/10λ, 1/4λ, 4-6λ	plot
Protected Silver	1/10λ, 1/4λ	plot
UV Enhanced Aluminium	1/10λ, 1/4λ	plot
Visible Laser Diode	520nm - 675nm	plot
Broadband Dielectric	400nm - 700nm	plot
Broadband Dielectric	700nm - 900nm	plot
For other laser line, dielectric and specialist mirrors contact Ocular Robotics		

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