Optocator™ Laser Sensors

The classic laser sensor for improved quality and process control

The Optocator is an industrial laser triangulation sensor designed for non-contact measurements of thickness, height, width, length, position, level, surface profile, flatness, contour, displacement or vibration.

Careful selection of the laser light source combined with an unique, high speed light intensity control loop makes it possible to measure on most materials regardless of surface texture, temperature, color or in difficult ambient light conditions.

Since data is collected at 16 000 or up to 78 000 samples/second real-time measurements can be made on rapidly moving objects. Several models of the Optocator sensors have been developed to satisfy difficult application requirements.

Typical Optocator applications include level measurements of molten iron, profiles of extruded rubber and road pavement characteristics at highway speed.

The Optocator has proved its reliability in industrial applications for over 20 years. During this time, a number of accessories have been developed to protect the Optocator from harsh environments. Water cooled enclosures and air purge systems for dust and heat protection are available.

Subsequent signal processing such as averaging and filter of data can be performed in either the Selcom Signal Processor (SSP) or an Optocator Interface Module (OIM). Analog and digital output formats of the processed signals from the SSP or OIM board make interfacing to an external PC, PLC, other data collection or processing devices easy.

This product information sheet describes the basic specifications of the Optocator models available for various applications.

The Optocator's high accuracy and sampling rate combined with Selcom's experience makes it the perfect choice for the most demanding on-line applications. Improved quality and process control provided by the Optocator ensures short pay-back time on the investment.

LMI Selcom
MEASUREMENT & CONTROL

Optocator™ Laser sensors optimized for various applications

Optocator™ 2008

The Optocator with the longest measuring range and stand-off distance. For demanding industrial applications in heavy, harsh environments. The new flat version of the 2008 is IP65 protected and enables the sensor to be used in narrow spaces.

Typical applications include: Log position in saw mills, log shape for yield optimization, molten metal level control and road surface inspection.

Measuring Ranges, MR: 100-1024 mm
Stand-Off distances, SO: 390-1200 mm
Protection class: IP 65 / Nema 4 (flat version)

Optocator™ 2201

For applications requiring high accuracy and resolution where it is possible to place the sensor close to the measured object.

Typical applications include: Tire inspection, extruded rubber profile, sheet thickness, rail straightness, and part profile.

Measuring Ranges MR: 8, 16 or 32 mm
Stand-Off distance, SO: 95 mm
Protection class: IP 50 / Nema 12

Optocator shown with optional visible light adapter.

Optocator™ 2207

Optocator shown with optional visible light adapter.

For demanding industrial applications or where the object is characterized by large dimensional or position variation.

Typical applications include: Similar applications as 2201, plus road surface measurement, profiling of red hot steel, level control of molten metal up to 1500°C and detection in robotized assembly.

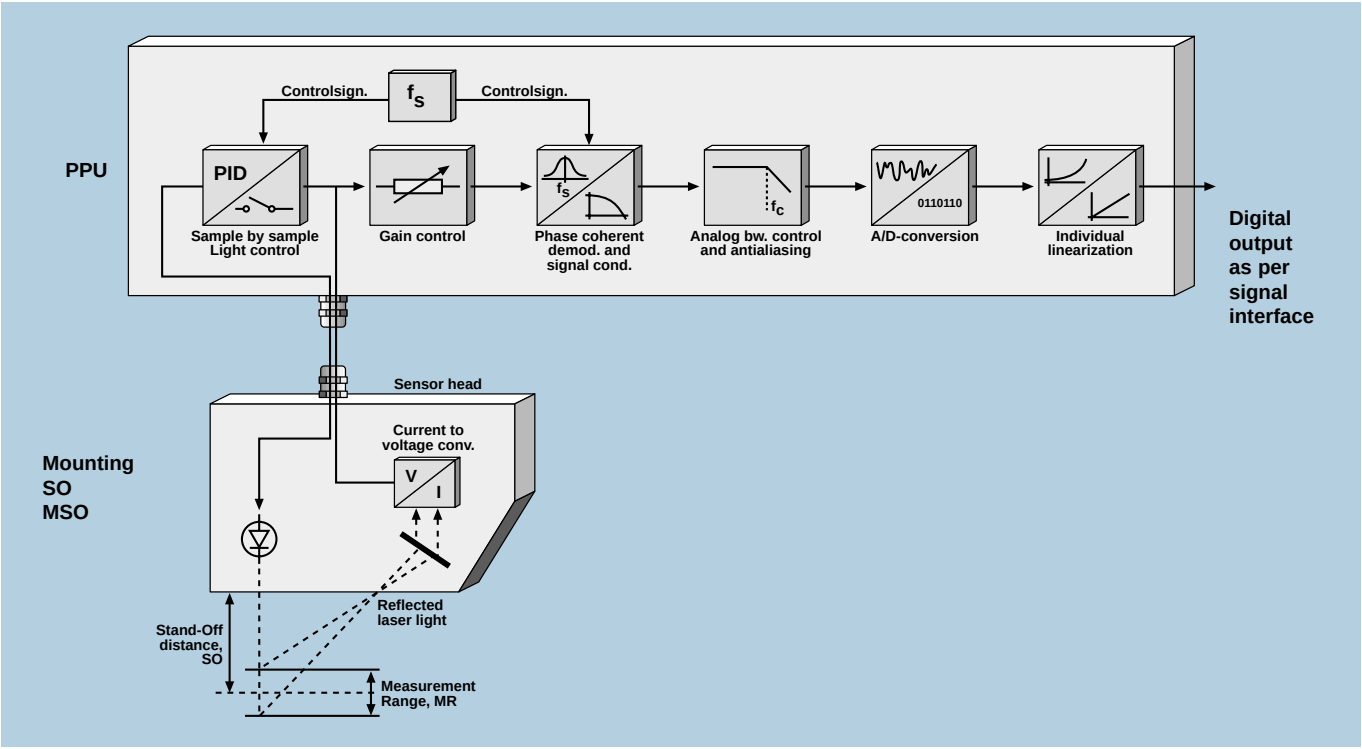
Measuring Ranges, MR: 32-200 mm
Stand-Off distances, SO: 180, 260 or 325 mm
Protection class: IP 65 / Nema 4

Optocator™ 2301

By size the smallest Optocator in the family. The size, high accuracy and resolution makes it suitable for high accuracy inspection and robot guidance applications.

Typical applications include: Seam finding and inspection with industrial robots, electronic component inspection and as coordinate measurement machine probes.

Measuring Ranges, MR: 8, 16, 26 mm
Stand-Off distances, SO: 95 or 180 mm
Protection class: IP 50 / Nema 12



Optocator features

The output signal is a calibrated and true representation of the distance from the sensor to the measured object. The signal can be transmitted over long distances, even in extremely hostile industrial environments.

- High speed pulsing and light level control - secures true data, independent of the measured objects surface colors , textures and speed.
- Individual sensor linearization - each sensor is factory calibrated for consistent linearity and performance making replacement easy.
- Reliable digital data output format - for safe and noise free data transmission in hostile electrical environments.
- All Optocators have been tested, and approved, in accordance with the European CE directive.

How to choose your sensor

The Optocator is available with a wide variety of Measurement Ranges, Stand-Off distances and range of measurement specific enhancements.

Protection classes from IP50 to IP65 are available to ensure full uptime and reliable data in harsh environments, in spite of heat, dust and water spray.

The optimum Optocator selection for you is determined by the specific requirements of your application.

The table below shows the available combinations of Measurement Ranges and Stand Off distances for the different sensor models.

Fore more information on application specific measurement and environmental options, Selcom's experienced sales engineers are available to assist you in finding the optimum solution for your application.

Optocator™ Gauge Probes (standard range)

Type	2008 / IP 50	* 2008 Flat / IP 65	2201	2207	2301	PPU
MR	128; 180; 256; 362; 128; 256; 400; 512; 1024	128 180 330 400	8; 16; 32	32; 64; 100; 128; 80; 200	8; 16; 26	
SO	390; 390; 390; 536; 793; 793; 1178; 1058; 1200	390 390 853 1178	95	180; 180; 180; 260; 325; 325;	95; 180	
MSO	467; 467; 467; 613; 870; 870; 1255; 1135; 1277	467 467 930 1255	184	259; 259; 259; 339; 404; 404	177; 282	
Length	285; 285; 285; 362; 461; 461; 372; 465; 475	289 289 464 369	145	128	95	250
Height	178; 178; 178; 178; 208; 208; 180; 208; 176	168 168 165 158	89	79	83; 101	51
Width	56/90	56	50	44	25; 25	112
Weight	3.0; 3.0; 3.0; 3.0; 3.5; 3,5; 3.0; 3.5	3,0 3,0 3,5 3,0	0.9	0.7	0.3; 0,5	0,9
Light spot at SO	Specifikation on request depending on application.	Specifikation on request depending on application.	0.2	Specifikation on request depending on application.	0.1; 0,1	

Note: All types consist of two units. One probe and one Probe Processing Unit (PPU). The weight figure refers to the probe unit. All measurements in millimetres or kilograms. *Specification on request depending on application (2008 Flat/ IP 65).

Technical Specifications and Definition of terms

Inaccuracy:
±0,1% of MR or better.
The difference between the average of a long series of repetitive measurement and the true value of the specimen measured.

Non linearity:
+/- 0,025% of MR with a mat white paper target.
Peak deviation from a best-fit straight line expressed as a percentage of MR.

Resolution:
0,025 % of MR, digital resolution of serial output.
0,003 % of MR by signal processing.
The smallest detectable change of distance to object.

Scale factor - LSB:
1/4000 of MR.
The smallest digital bit in the data stream from the Optocator.
1 LSB is equal to the scale factor.

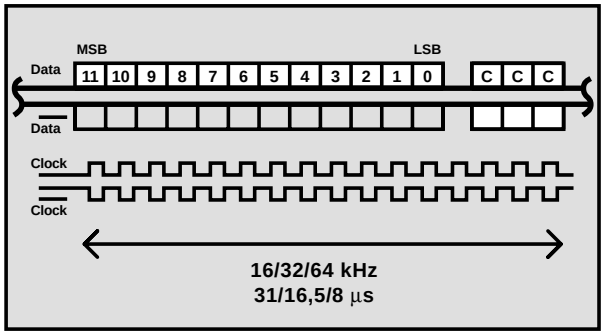
Temperature Stability:
Scale factor change: typical < 0,005 % of MR /°C. Max. 0,01 % of MR/°C.
A measure of the dependability, or consistency, of the measurement over temperature.

Surface Reflectivity - Compensation:
Included, fully automatic. Dynamic range 5×10^6.
Compensation speed down to 8 microseconds, 100%.

Power supply:

+20 V (±1V)	max 100 mA
–20 V (±1V)	max 100 mA
+15 V (+5 -4V)	max 160 mA
+18 V (±3V)	max 150 mA

Temperature range:
Operating 0° to 40 °C (30° to 104 °F)
Storage -30° to 70 °C (-20° to 160 °F)
Relative humidity 10-90%, non-condensing.



Signal interface:
16 bit serial synchronous interface, including 12 bits of measurement data and a 3 bit valid/invalid flag.

Data output: D+$\bar{D}$, C+$\bar{C}$

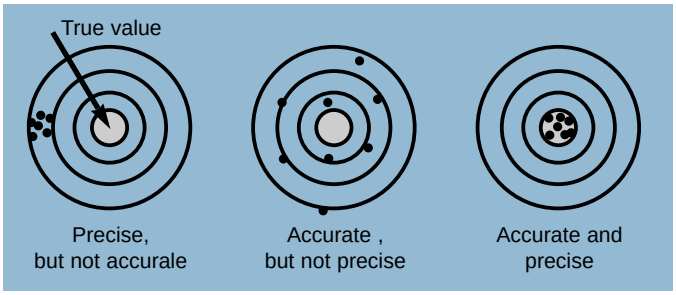
Sampl. frequency kHz:	16	32	64
Bandwidth kHz:	2	5 or 10	20
Response time microsec:	160	65 or 32	16

Voltage U_{OH} >2.0 V, U_{OL} < 0.8 V.

Bandwidth: The band width (BW) is defined as the cut off frequency (-3dB) of the internal pre-A/D anti-alaising filter. It corresponds directly to the highest detectable frequency of distance variations.

Response time:
(Position data, within 10% of final value).
Time required, after application of a step input, for the output to settle and remain within a specified error band around the final value.

Accessories:
Water cooled enclosure.
Air cooled enclosure.
Air purge system.
Extension cable.
IR-viewer.
Visible light adapter.



INVISIBLE LASER RADIATION
AVOID EXPOSURE TO BEAM
MAX PULSE PEAK POWER 20mW
PULS DURATION 32 µS
WAVELENGTH 780 NM
CLASS 3 B LASER PRODUCT
EN 60825: 1991

Specifications subject to change without notification.

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