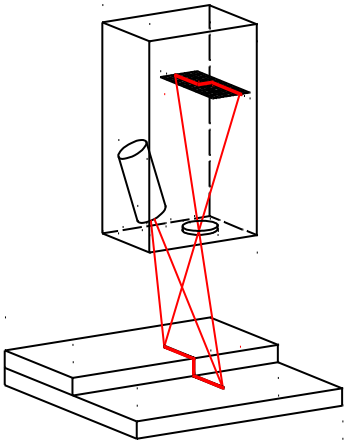
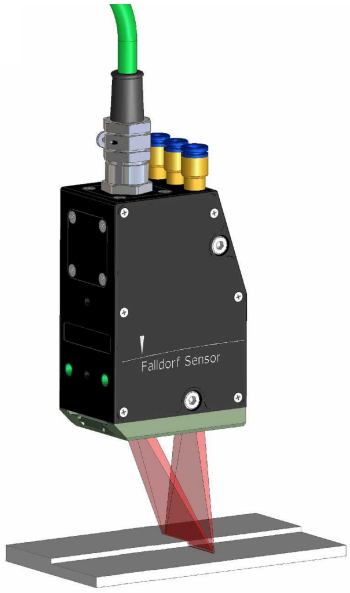
Triangulation

The measurement principle is triangulation: A laser light line is projected onto a surface and viewed from a direction different to the direction of projection by a camera. A variation of surface distance causes a shift of the imaged line at the camera. This means the sensor is acquiring the surface profile.

Triangulation is a robust method. It is insensitive to a variation of work piece surface color or brightness, e.g. caused be rust, dirt or oil.





Principle of Triangulation

Field of View and Resolution for different Sensor Models

standard models	stand-off (without protective shield) [mm]	average lateral field of view [mm]	vertical field of view [mm]	average lateral resolution [µm]	average vertical resolution [µm]
Finesensor II	25	3	0,8	5	5
S4 (Hybridsensor)	30	7	5	15	15
S5 46	46	15	5	20	22
S5_wide 78	78	19	9	25	35
S5_wide 100	100	24	16	32	65
S7 65	65	50	70	56	65
S8	180	160	155	170	440
LD Sensor 215	215	38	66	56	150
Weldsensor	100	15	5	15	20
BaseSensor 109	109	46	73	58	115
BaseSensor 118	118	60	36	60	60

Sensor Head

The sensor head contains a laser line projector, a camera, preprocessing electronics and a digital interface. To operate the sensor in hostile environments the sensor head has an integrated cooling loop for water or air and air ducts to protect the optical windows from contamination. A disposable protective window can be exchanged easily.

connection:	data and supply via M23 industrial connector
laser class:	2M or 3R
operating temperature:	+5 to +40°C or cooled by air or water

Sensor Cabel

type:	shielded twisted pairs for robot or cable track use
l*ength:*	10 / 20 / 30 m (standard 30 m) can be extended

Sensor Computer

type:	PC with integrated 15” LCD, keyboard and touchpad or customer specific computer
operating temperature:	0 to +40 °C
power supply:	100 – 240 V, 50 – 60 Hz, 150 Watt
i*nterfaces:*	to controller or manipulator (PLC / robot): RS232, Ethernet, 24V digital I/O (optional), Profibus (optional), Realtime-Ethernet (optional), to conveyor: incremental encoder input (optional), to external computers: Ethernet

Software

The online profile evaluation is application specific.

E.g. for seam tracking an on-line-evaluation of joint position and gap width and height mismatch is performed. Evaluation parameter sets for different joint types can be selected by PLC/ robot. The joint data is supplied to a PLC / robot CNC controller.

To inspect a welded seam an on-line evaluation of seam-overfill, -underfill, lateral position, high mismatch and radii of profile sections (e.g. left and right to the seam) is performed. All parameters will be compared against limits and may lead to failure signals.

All calculated parameters are displayed in real time charts with their actual limits. Measurements are stored in a circular buffer on harddisk and can be reloaded. A history list indicates trends. A permanent storage is possible.