Z-LASER

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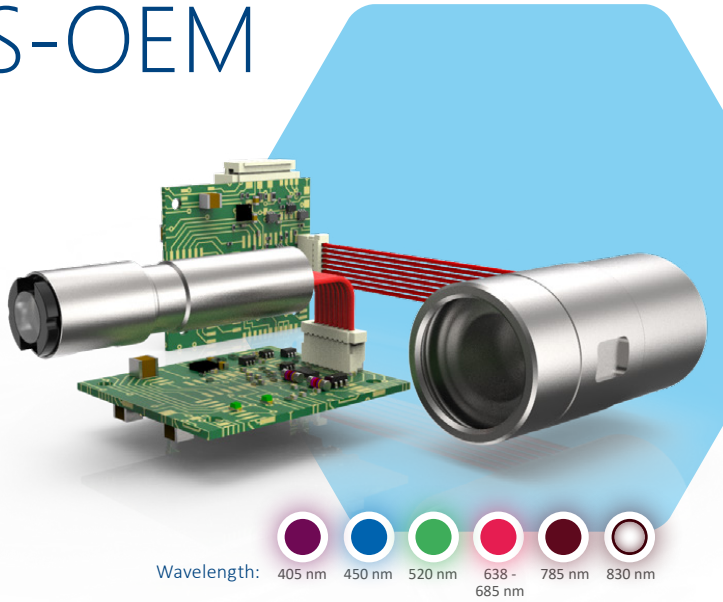
Product Family ZXS-OEM

The opimal module for sophisticated sensors

The structured light laser ZXS sets new standards for machine vision illumination due to its automated production in which all optical components are aligned by a high-accurracy robot.

The ZXS-laser reaches an unrivalled accuracy with its boresight error of less than 0.8 mrad.

The separated electronics enables the user to mount the laser individually. An OEM-Version with a customized electronics for the integration onto an existing PCB is also available.



Wavelength: 405 nm, 450 nm, 520 nm, 638 - 685 nm, 785 nm, 830 nm

IP 67

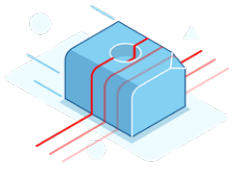
Boresight Accuaracy

High Process Reliability

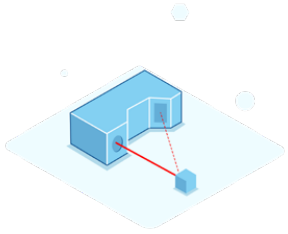
Output Power up to 200 mW

Highlights

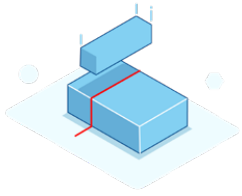
- Industrial standard
- Repeatable product performance due to automated production processes
- Highest reproducibility of beam quality
- Optical output power up to 200 mW
- Wavelengths from 405 – 830 nm
- Manually focusable (ZXS20)
- TTL modulation up to 150 kHz
- Analog intensity control



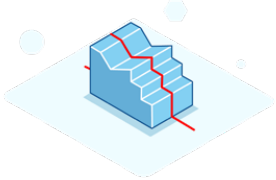
Machine Vision



Triangulation Sensors



High-Precision Positioning Tasks



3D-Measurement

Order Code

Z??	-	XS20	-	?	-	?	-	?	-	?
Power		Product family Size of head		Electronics		F-Focusable		Wavelength		Optics

System specifications

Wavelength	nm	405	450	520	635-685	785	830
Wavelength tolerance	nm (typical)	±10	±10	-5 +10	±10	±10	±4
Wavelength drift	nm / K (typical)	0,06	0,02	0,06	0,25	0,25	0,25
Output power ZXS10	mW	n. a.	≤ 45	≤ 35	≤ 100	≤ 100	≤ 100
Output power ZXS20 (elp)	mW	≤ 160	≤ 60	≤ 40	≤ 100	≤ 80	≤ 200
Output power ZXS20 (flp)	mW	≤ 120	≤ 45	≤ 30	≤ 90	≤ 60	≤ 150
Spatial mode	(typical)	Single Transverse Mode					
RMS noise (20 Hz to 20 MHz, typical)	%	< 0.5					
Peak-to-Peak Noise (20 Hz to 20 MHz, typical)	&	< 1 %					
Boresight error (1)	mrad (typical)	< 0.8 mrad (fixed focus)					
Line orientation (2)	mrad	< 10					
Pointing stability	µrad / K	< 1					
Long-term power stability (24h)	%	±3 over operating temperature range					
Start-up time	sec	< 2					
Laser operation mode		APC					

Electrical specifications

Operating voltage	VDC	9 - 30	9 - 30	9 - 30	5 - 30	5 - 30	5 - 30
Operating current (max. at 25 °C)	mA	< 300	< 300	< 300	< 400	< 500	< 500
Protection		Over temperature protection and LED pre-failure indicator, reverse polarity and transient protection (ESD, burst & surge)					
Electrical isolation		Potential-free housing					
Connection		JST-BM08B-ZESS-TBT					
Power consumption	W	< 2.7	< 2.7	< 2.7	< 2	< 2.5	< 2.5
Communication interfaces		I²C, RS-232 (5 V)					

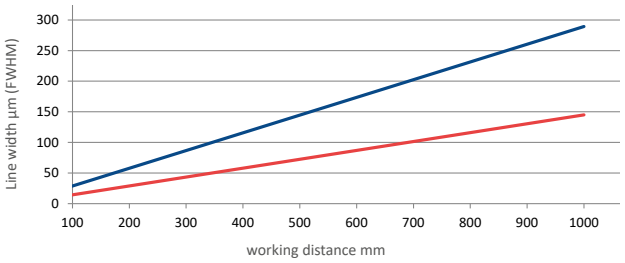
Optical specification

Fan angles (3)	Degrees °	5, 10, 20, 30, 45, 60, 75, 90 (homogeneous lines) 3, 5, 10, 15, 20, 30, 90 (Gaussian line profile)
Line straightness (4)	% (of line length)	< 0.05
Line uniformity (5)	% (typical)	< 25
Dot		Point elliptical
DOE		Multi line, crosses, grids, etc.
Focus range	mm	100 up to 10,000 (or fixed focus available)

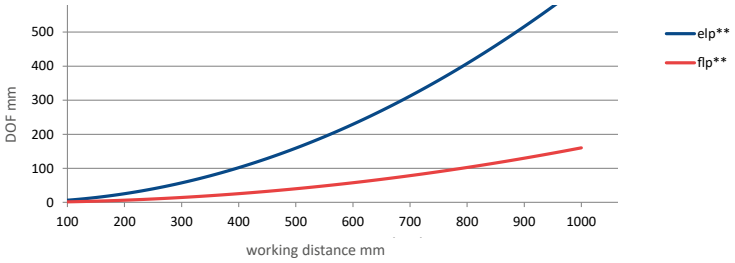
Keynotes

(1) Boresight error	Also known as pitch and skew.
(2) Line orientation	Also known as line tilt (roll) with reference to the indentation in the clamping area
(3) Line length / fan angle	at > 13.5 % Imax
(4) Line straightness	Deviation from best fit line over the middle 80% of the line, for homogeneous lines
(5) Line uniformity	Maximum relative optical power variation over the middle 80% of the line, for homogeneous lines and fixed focus

Line width vs. working distance*



DOF vs. working distance*



Wavelength		Calculation factor for line width		Calculation factor for depth of focus	
		slp**	elp**	slp**	elp**
Blue	405 nm	0.62	0.82	0.70	1.02
Blue	450 nm	0.67	1.83	1.74	4.29
Green	520 nm	0.78	1.20	0.80	2.61
Red	640 nm	1.28	1.00	1.70	0.95
Red	660 nm	1.00	1.00	1.00	1.00
IR	830 nm	1.30	2.11	1.03	2.20

Optical configurations for several line settings are available.
- slp** = standard line Powell; standard setup with medium line thickness and depth of focus.
- elp** = extended line Powell; lines with advanced depth of focus and thicker lines. Recommended for fan angles > 75° at working distances < 500 mm.

The graphs above show the values for line width and depth of focus of a 660 nm laser. To get the values for a different wavelength the factor from the table above has to be multiplied by the values from the graphs.

Example: 660 nm laser focused at 500 mm working distance: line width approx. 150 µm (@ elp** optic); Depth of focus approx. 175 mm (values from the graphs)

Calculated: 405 nm laser focused at 500 mm working distance: line width approx. 150 µm x 0.82 = 123 µm; Depth of focus approx. 175 mm x 1.02 = 179 mm

* Values in the graphs for homogenous line profiles

** Fan angle: 5° - 90°

Software

GUI
Serial communication
I²C, RS-232 (5 V)

Features (e. g.):
- Status query
- Output power control
- System configuration
- Digital Modulation
- Intensity control
- Weighted end of life indication

Digital modulation

Maximum frequency	kHz	up to 150
Rise time (Mod High ➡ 90%)	ns	< 160
Fall time (Mod Low ➡ 10%)	ns	<100
Signaling levels	V	VIL_max < +0.9 VIH_min > +2.2
Operation range	VDC	0 - 30

Analog modulation

Maximum bandwidth	Hz	< 10
Linearity	%	< 5 (from 10 % to 100 % of laser power)
Active range	VDC	0 - 2
Impedance		100 kΩ to internal VCC (3.3 V)
Operation range	VDC	0 - 30

Environmental conditions

Operating temperature	°C / °F	-10 °C to +50 °C / 14 °F to +122 °F
Storage temperature	°C / °F	-40 °C to +85 °C / -40 °F to +185 °F
Humidity	%	< 90 %, non-condensing
Dissipated heat	W	Max. 4 W

Mechanical Specifications - DEPENDING ON LASER HEAD VERSION

Length optic head	mm / inch	ZXS10-OEM 40 / 1.57	ZXS20-OEM 38 / 1.5	ZXS20-F-OEM 56 / 2.2
Diameter head ø	mm	ø 10h7	ø 20h7	ø 20h7
Length of cable between optics and electronics	mm / inch	100 / 3.53 (others on request)		
drivers electonics	mm / inch	34 x 33 / 1.34 x 1.3		
Material		Stainless steel (laser head) / aluminum (housing of electronics)		
Protection class		IP 50 (IP 67 optional)	IP 67	IP 67

6-lead cable

X 1.1 brown	405 nm - 520 nm: 9 - 30 VDC, 15 VA	635 nm - 830 nm: 5 - 30 VDC, 15 VA
X 1.2 orange	Digital modulation TTL	
X 1.3 black	GND	
X 1.4 yellow	Analog modulation (0-2 VDC)	
X 1.5 green	Fail out (open-drain)	
X 1.6 red	Shielding	