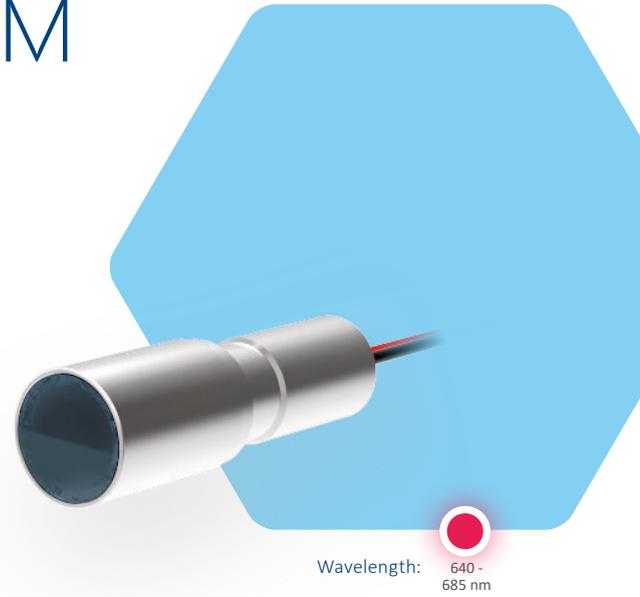


Product Family ZX10-M

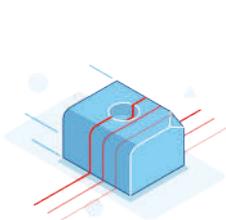
Small size, high performance

The ZX-laser series offers diverse, application specific customization possibilities. The user can choose different red wavelengths depending on the application and material to be inspected. The focusing optics achieves a boresight error of less than 0.8 mrad. The industrial-suited design along with stable performance works perfectly as an integrated module in machine vision applications, sensors or processing machines.

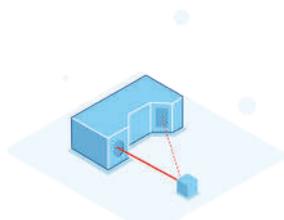


Highlights

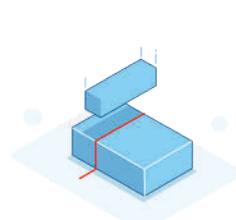
- Repeatable high product quality due to automated production processes
- Highest reproducibility of beam quality
- Optical output power up to 40 mW
- Wavelengths from 640 nm - 685 nm
- Fixed focus
- IP 50 (optional IP 67)



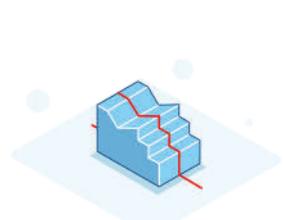
Machine
Vision



Triangulation
Sensors



Positioning
Tasks



3D-Measurement

Order Code

Z??	X10	?	?	?
Power	Product family Size of head	Electronics	Wavelength	Optics

System specifications

Wavelength	nm	640	685
Wavelength tolerance	nm (typical)	±10	±10
Wavelength drift	nm / K (typical)	< 0,25	< 0,25
Output power	mW	30	40
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	
Line orientation ⁽²⁾	mrad	< 10	
Pointing stability	µrad / K	< 10	
Long-term power stability (24h)	%	±3 over the entire temperature range	
Start-up time	µs	< 70	
Laser operation mode		APC	

Electrical specification ⁽³⁾

Operating voltage	VDC	3.5 - 5.5
Operating current (max. at 25 °C)	mA	< 250
Protection		Reverse polarity protection, ESD
Electrical isolation		Potential-free housing
Connection		flying leads
Power consumption	W	< 1.5

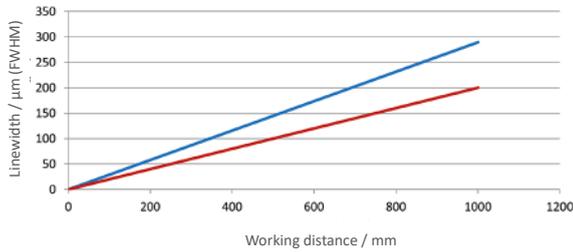
Optical specifications

Fan angles ⁽³⁾	Degrees °	5, 10	20, 30, 45, 60, 75, 90	(homogeneous line)
Line straightness ⁽⁴⁾	% (of line length)	< 0.08	< 0.05	
Line uniformity ⁽⁵⁾	% (typical)	< 25		
Dot		Point elliptical		
DOE		Multi line, crosses, grids, etc.		
Focus range (only available as fixed focus)	mm	< 100 up to 10,000 < 100 up to 980 (5° fan angle)		

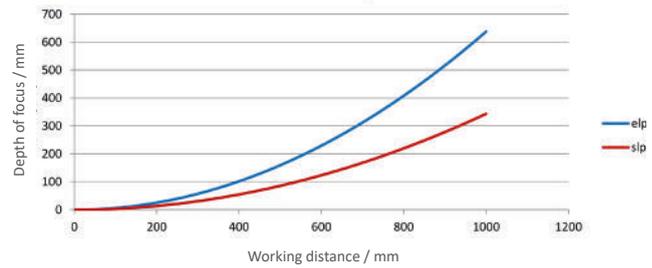
Keynotes

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 In combination with M-electronic (M=mini).	Also available as ND-version (no driver) without driver electronics for OEM applications.
⁴ Line length / fan angle	at > 13.5 % I _{max}
⁵ Line straightness	Deviation from best fit line over the middle 80% of the line, for homogeneous lines
⁶ Line uniformity	Maximum relative optical power variation over the middle 80% of the line, for homogeneous lines and fixed focus

Line thickness vs. working distance*



DOF vs. working distance*



Wavelength		Calculation factor for line width		Calculation factor for depth of focus	
		<i>slp</i>	<i>elp</i>	<i>slp</i>	<i>elp</i>
Red	640 nm	1.28	1.00	1.70	0.95
Red	660 nm	1.00	1.00	1.00	1.00
Red	685 nm	1.68	1.40	1.97	1.99

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: 10° - 90°

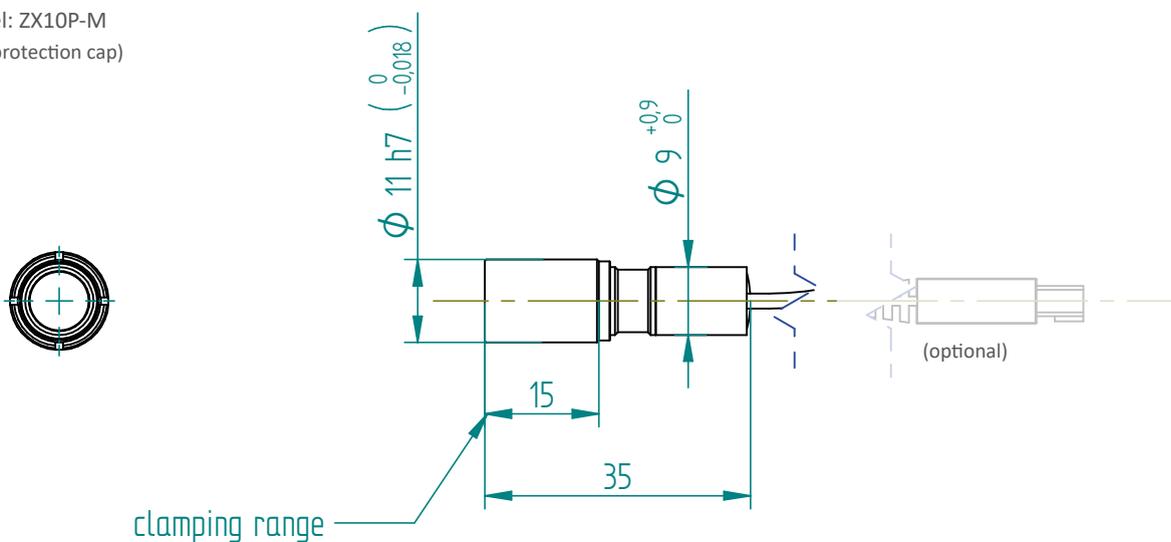
Environmental conditions

Operating temperature	°C / °F	-10 to +50 / 14 to +122
Storage temperature	°C / °F	-40 to +85 / -40 °F to +185
Humidity	%	< 90 non-condensing
Dissipated heat	W	< 1
Shock and vibration		According to IEC EN 61373:2011, cat. 2

Mechanical specifications

Weight	g / lbs	30 / 0.07	
Length	mm / inch	33 / 1.30 in	
Diameter head \varnothing	mm / inch	11h7 / 0.43 in	10h7 / 0.39 in
		with protection cap	without protection cap
Length of cable	mm / inch	2,000 / 78.74 in	
Connection		2 flying leads (optional Texas plug)	
Material		Stainless steel	
Protection class		IP 50 (IP 67 with protection cap)	

Model: ZX10P-M
(with protection cap)



Model: ZX10-M
(without protection cap)

