



## **Z-Trak™ 3D LP1-1K Series**

High-Performance 3D Profiler for In-line  
Measurement and Inspection Applications

# Z-TRAK LP1-1K SERIES

A Series of Factory Calibrated 3D Profile Sensors



## FEATURES

- Factory calibrated ready to deploy
- Robust FIR-Peak detector algorithm delivers high accuracy and stable operations
- Wide model selection covers measurement range from 10 mm to 1100 mm
- Red or blue laser with laser safety class 2M and 3R for wide operating conditions
- Compact IP67 housing for harsh operating environment
- Free License for Sapera™ LT SDK, Sapera Processing RTL and Sherlock™ 8
- 3rd Party Software Support via 16-bit mono and GenICam standard

## High-Performance 3D Profiler for In-line Measurement and Inspection Applications

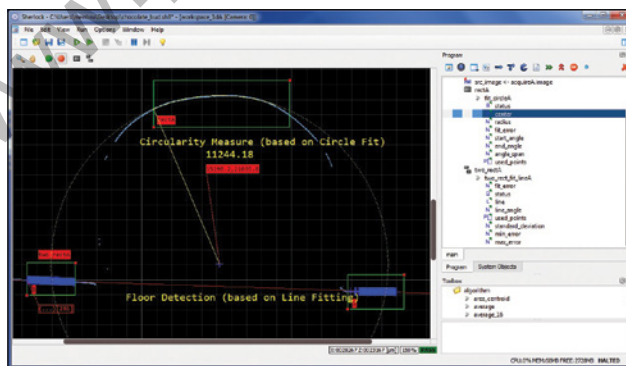
Z-Trak is a series of 3D profile sensors delivering high-resolution, real-time height measurements using laser triangulation. These lightweight IP67 rated profile sensors are ideal for in-line measurement, inspection, identification and guidance applications in automotive, electronics, semiconductor and factory automation markets.

Z-Trak series delivers reliable and repeatable results in varying operating conditions. Z-Trak models handle object widths from 9.7 mm to 1520 mm and height range of 10 mm to 1100 mm. All Z-Trak models are factory calibrated and come with choice of laser options to suit the surface reflectance.

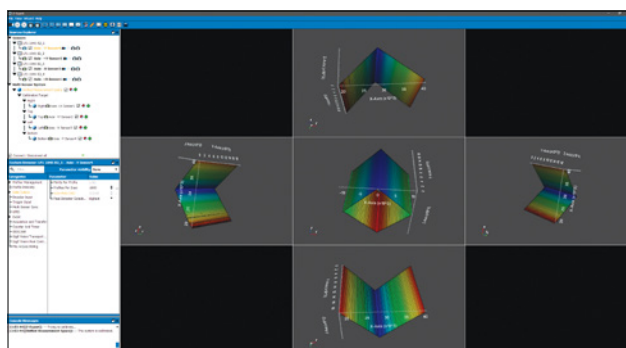
Z-Trak Series features real-time laser line optimization for uniform measurement results, multi-sensor synchronization using generic Gigabit network routers and Power-Over-Ethernet (POE) to simplify setup and configuration. Z-Trak series comes bundled with Teledyne DALSA's field-proven software packages – Sapera LT, Sapera Processing, and Sherlock 8 3D – at no extra cost. In addition, Z-Trak sensors can operate with 3rd party software packages using either GenICam® or proprietary interfaces.

## MULTI-SENSOR CONFIGURATION

Multiple Z-Trak sensors can be combined together to create expanded FOV or to eliminate occlusions. Multiple Z-Trak units can be synchronized together using standard network switches with better than 1µs precision. To further simplify the measurements, a unified coordinate system can be created using Z-Expert graphical tools bundled in Sapera LT. Z-Expert features an intuitive GUI to visualize profiles and 3D range images from multiple sensors at the same time and includes a system calibration wizard to facilitate setup.



**Sherlock 8**

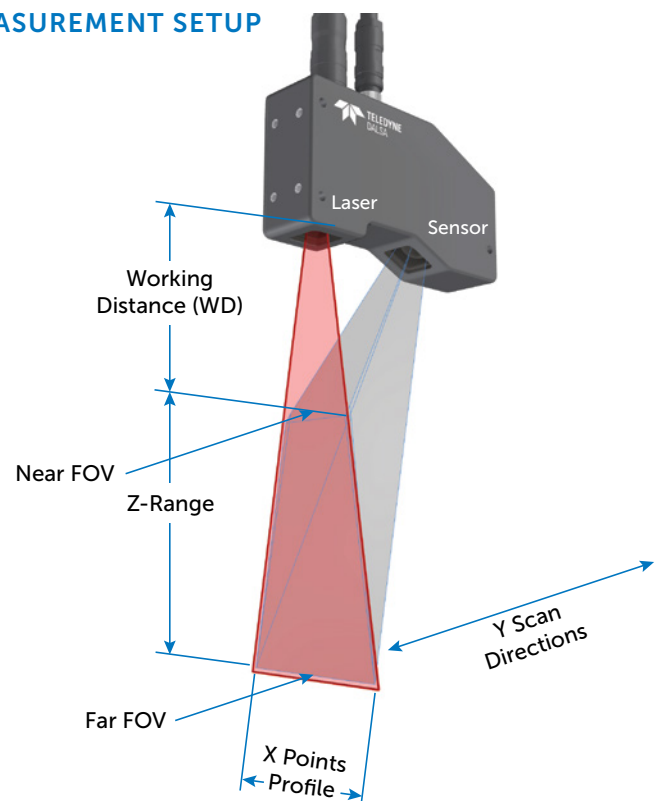


**Z-Expert**

**SPECIFICATIONS<sup>1</sup>**

Function	Description
Scanning Rate	<ul style="list-style-type: none"> <li>Full range profile rate starting from 215 to 740 Hz (varies by model)</li> <li>Up to 3300 (using ROI)</li> </ul>
Connectors	<ul style="list-style-type: none"> <li>1 x M16 24 connector – data, controls and controls</li> <li>1 x M12 12-pin X-coded – Ethernet port</li> </ul>
Lasers	<ul style="list-style-type: none"> <li>Red: 660 nm</li> <li>Blue: 405 nm</li> <li>Safety Class 2M : 15 mW<sup>2</sup> for 660 nm, 10 mW for 405 nm</li> <li>Safety Class 3R: 25 mW<sup>2</sup> for 660 nm, 20 mW for 405 nm</li> </ul>
Laser control	<ul style="list-style-type: none"> <li>Intensity: PWM duty cycle controlled from 0% to 100% or analog control</li> <li>Dynamic laser power control using</li> </ul>
Output Format	<ul style="list-style-type: none"> <li>Individual Profiles or Range Maps</li> <li>Each point includes: Depth (Z), Lateral (X), Reflectance (R) and Laser Peak Width (W)</li> <li>Output formats compatible with <b>Linescan3D</b>: GenICam 3.0 (SFNC 2.3) <ul style="list-style-type: none"> <li>Calibrated Z with uniform X,</li> <li>Calibrated XZ, XZR+W</li> </ul> </li> <li><b>Linescan1D</b>: 16-bit mono</li> <li><b>Areascan 2D</b>: 10-bit/mono</li> <li>World units in micrometers, millimeters and inches</li> </ul>
Temperature	<p><b>Storage:</b></p> <ul style="list-style-type: none"> <li>-40° C to +80° C (-4° F to +176° F) temperature</li> <li>20% to 80% non-condensing relative humidity</li> </ul> <p><b>Operating:</b></p> <ul style="list-style-type: none"> <li>10° C (50° F) to 50° C (122° F)</li> <li>Relative Humidity: up to 90% (non-condensing)</li> </ul>
System	<ul style="list-style-type: none"> <li>1 Gigabit Ethernet 1000BaseT port</li> </ul>
Requirements	<ul style="list-style-type: none"> <li>4GB or higher system memory</li> </ul>
Input/Output	<ul style="list-style-type: none"> <li>2 real time opto-isolated GPI (configurable)</li> <li>2 software driven opto-isolated GPO</li> </ul>
Encoder Input	<ul style="list-style-type: none"> <li>RS422 quadrature (AB) shaft-encoder inputs for external web synchronization</li> <li>Up to 20 MHz frequency, with built in bi-directional jitter tolerance</li> </ul>
Power Supply	<ul style="list-style-type: none"> <li>PoE via 8-pin X-code circular connector (optional)</li> <li>Separate power via 16M 24-pin connector</li> <li>+12V to 36VDC +/-10% with surge protection</li> </ul>

Function	Description
Enclosure	<ul style="list-style-type: none"> <li>Machined aluminum</li> <li>IP67</li> <li>4 x mounting holes</li> </ul>
Software	<ul style="list-style-type: none"> <li>Microsoft® Windows® 10 (32/64-bit) compatible</li> <li>Linux 32/64-bit: Ubuntu/Debian, RHEL/CentOS/Fedora, SLES/openSUSE</li> <li>Kernel: 2.6.32 or higher</li> <li>Fully supported by Teledyne DALSA's software packages: <ul style="list-style-type: none"> <li>Sapera LT 8.60 (or higher)</li> <li>Sherlock 8.0</li> <li>Microsoft Windows</li> <li>Sapera Processing 8.0 (or higher)</li> <li>Linux: Teledyne DALSA GevAPI Framework(SDK) ver. 2.40 or higher</li> </ul> </li> <li>3rd party software: <ul style="list-style-type: none"> <li>MVTec® Halcon®</li> <li>NI® Max/Labview®</li> <li>Cognex® VisionPro®</li> <li>Stemmer CVB</li> </ul> </li> <li>Application development using C++ and Microsoft</li> <li>.Net languages(C++, C# or Visual Basic)</li> </ul>
Markings	<ul style="list-style-type: none"> <li>FCC Class B, CE, ICE</li> <li>ROHS, China RoHS</li> <li>FDA</li> </ul>

**MEASUREMENT SETUP**


**SPECIFICATIONS<sup>1</sup>**

Model	LP1-1010-B2	LP1-1040-B2	LP1-1060-B2
Measurement Range (MR) (mm/in)	10/0.394	40 / 1.575	60 / 2.362
Working Distance (WD) (mm/in)	36 / 1.417	45 / 1.772	66 / 2.598
Field of View (X) (mm/in)	8.4–9.8 / 0.331–0.386	20–27.6 / 0.787–1.087	25.7–39 / 1.012–1.535
Profile Rate (profiles/sec)	up to 3.3K using ROI		
Repeatability <sup>3</sup> (µm/in)	0.2–0.3 / 0.000008–0.000012	0.4–0.6 / 0.000016–0.000024	0.5–0.7 / 0.00002–0.000028
Linearity <sup>4</sup> (±)	< 0.025%	< 0.02%	< 0.02%
X Res. (µm/in)	8.6–10 / 0.00034–0.00039	20–28 / 0.000787–0.001102	26–40 / 0.001024–0.001575
Laser <sup>5</sup> (nm)	Blue:405		
Laser Safety Class	2M		
Case Style (mm)	<b>X10</b> mm: 36(W); 84.8(H); 125.8(L) in: 1.4(W); 3.3(H); 5.0(L)	<b>X20</b> mm: 36(W); 78.4(H); 138.6(L) in: 1.4(W); 3.1(H); 5.5(L)	<b>X20</b> mm: 36(W); 78.4(H); 138.6(L) in: 1.4(W); 3.1(H); 5.5(L)

Model	LP1-1120-R2	LP1-1200-R2	LP1-1250-R2
Measurement Range (MR) (mm/in)	120 / 4.724	200 / 7.874	250 / 9.843
Working Distance (WD) (mm/in)	86 / 3.386	150 / 5.906	175 / 6.89
Field of View (X) (mm/in)	42.8–80.8 / 1.685–3.181	63.7–134.9 / 2.508–5.311	132–268 / 5.197–10.551
Profile Rate (profiles/sec)	up to 3.3K using ROI		
Repeatability <sup>3</sup> (µm/in)	1.5–3 / 0.000059–0.000118	0.7–1.5 / 0.000028–0.000059	1–4 / 0.000039–0.000157
Linearity <sup>4</sup> (±)	< 0.01%		
X Res. (µm/in)	44–83 / 0.001732–0.003268	65–139 / 0.002559–0.005472	137–275 / 0.005–0.011
Laser <sup>5</sup> (nm)	Red:660		
Laser Safety Class	2M		
Case Style (mm)	<b>X20</b> mm: 36(W); 78.4(H); 138.6(L) in: 1.4(W); 3.1(H); 5.5(L)	<b>X20</b> mm: 36(W); 78.4(H); 138.6(L) in: 1.4(W); 3.1(H); 5.5(L)	<b>X30</b> mm: 36(W) x 78.4(H) x 189.6(L) in: 1.4(W) x 3.1(H) x 7.5(L)

Model	LP1-1400-R3	LP1-1800-R3	LP1-11100-R3
Measurement Range (MR) (mm/in)	400 / 15.748	800 / 31.496	1100 / 43.307
Working Distance (WD) (mm/in)	250 / 9.843	400 / 15.748	300 / 11.811
Field of View (X) (mm/in)	223–520 / 8.78–20.472	400–1045 / 15.748–41.142	411–1520 / 16.181–59.843
Profile Rate (profiles/sec)	up to 3.3K using ROI		
Repeatability <sup>3</sup> (µm/in)	2–8 / 0.000079–0.000315	4–12 / 0.000157–0.000472	5–20 / 0.000197–0.000787
Linearity <sup>4</sup> (±)	< 0.01%		
X Res. (µm/in)	229–535 / 0.009–0.021	410–1075 / 0.016–0.042	423–1563 / 0.017–0.062
Laser <sup>5</sup> (nm)	Red:660		
Laser Safety Class	3R		
Case Style (mm)	<b>X30</b> mm: 36(W) x 78.4(H) x 189.6(L) in: 1.4(W) x 3.1(H) x 7.5(L)	<b>X40</b> mm: 36(W) x 77.7(H) x 287.7(L) in: 1.4(W) x 3.0(H) x 11.3(L)	<b>X40</b> mm: 36(W) x 77.7(H) x 287.7(L) in: 1.4(W) x 3.0(H) x 11.3(L)

- 1 Subject to change without notice
- 2 For fan angle of 30°
- 3 Mean  $\pm 2\sigma$
- 4 As a % of full scale
- 5 Contact Teledyne Sales for other laser options


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