TELEDYNE

**Teledyne DALSA**
Industrial Vision Solutions


# 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

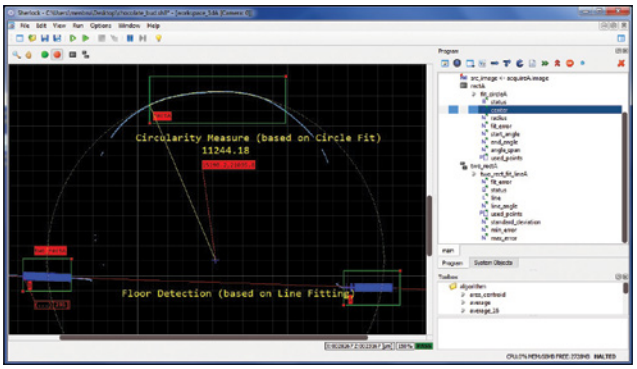
Z-Trak is a series of 3D profile sensors delivering high-resolution, real-time height measurements using laser triangulation. These lightweight IP67 rated profile sensors are ideal for in-line measurement, inspection, identification and guidance applications in automotive, electronics, semiconductor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

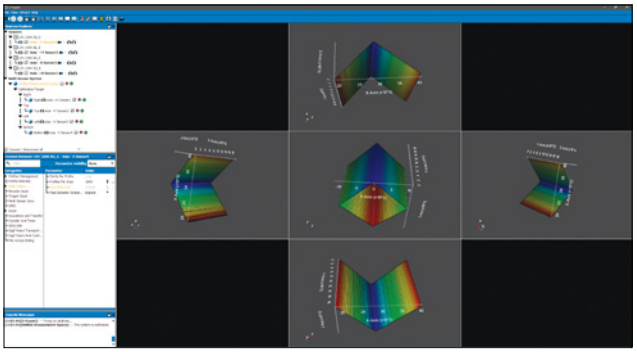
Z-Trak Series features real-time laser line optimization for uniform measurement results, multi-sensor synchronization using generic Gigabit network routers and Power-Over-Ethernet (POE) to simplify setup and configuration. Z-Trak series comes bundled with Teledyne DALSA's field-proven software packages – 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



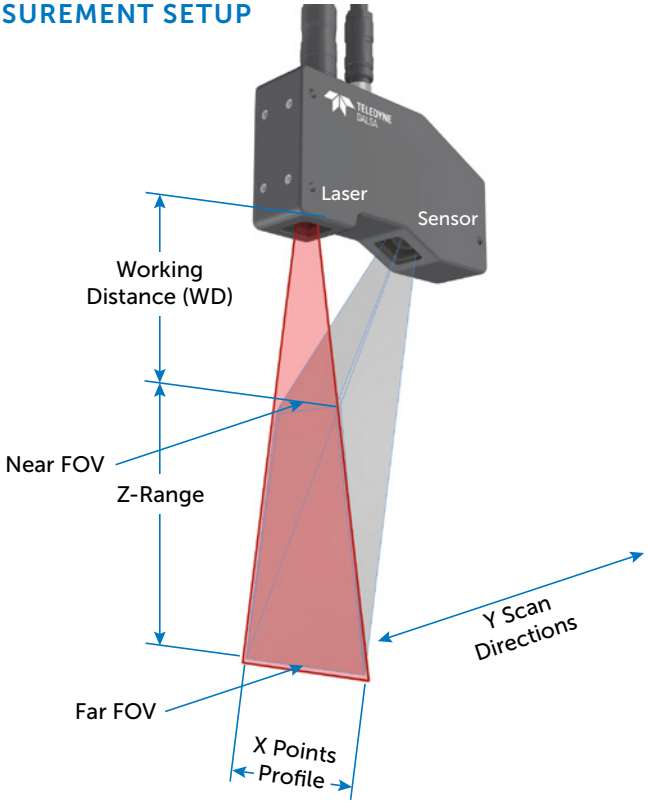
Z-Expert

## SPECIFICATIONS[1]

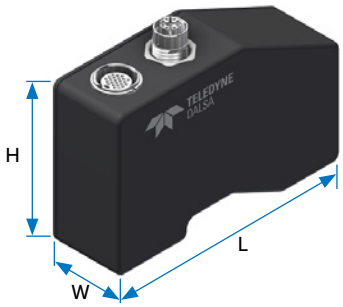
| Function | Description |
|---|---|
| Scanning Rate | • Full range profile rate starting from 215 to 740 Hz (varies by model)<br>• Up to 3300 (using ROI) |
| Connectors | • 1 x M16 24 connector – data, controls and controls<br>• 1 x M12 12-pin X-coded – Ethernet port |
| Lasers | • Red: 660 nm<br>• Blue: 405 nm<br>• Safety Class 2M : 15 mW² for 660 nm, 10 mW for 405 nm<br>• Safety Class 3R: 25 mW² for 660 nm, 20 mW for 405 nm |
| Laser control | • Intensity: PWM duty cycle controlled from 0% to 100% or analog control<br>• Dynamic laser power control using |
| Output Format | • Individual Profiles or Range Maps<br>• Each point includes: Depth (Z), Lateral (X), Reflectance (R) and Laser Peak Width (W)<br>• Output formats compatible with<br>**Linescan3D:** GenICam 3.0 (SFNC 2.3)<br>• Calibrated Z with uniform X,<br>• Calibrated XZ, XZR+W<br>• **Linescan1D:** 16-bit mono<br>• **Areascan 2D:** 10-bit/mono<br>• World units in micrometers, millimeters and inches |
| Temperature | Storage:<br>• -40° C to +80° C (-4° F to +176° F) temperature<br>• 20% to 80% non-condensing relative humidity<br>Operating:<br>• 10° C (50° F) to 50° C (122° F)<br>• Relative Humidity: up to 90% (non-condensing) |
| System | • 1 Gigabit Ethernet 1000BaseT port |
| Requirements | • 4GB or higher system memory |
| Input/Output | • 2 real time opto-isolated GPI (configurable)<br>• 2 software driven opto-isolated GPO |
| Encoder Input | • RS422 quadrature (AB) shaft-encoder inputs for external web synchronization<br>• Up to 20 MHz frequency, with built in bi-directional jitter tolerance |
| Power Supply | • PoE via 8-pin X-code circular connector (optional)<br>• Separate power via 16M 24-pin connector<br>• +12V to 36VDC +/-10% with surge protection |

| Function | Description |
|---|---|
| Enclosure | • Machined aluminum<br>• IP67<br>• 4 x mounting holes |
| Software | • Microsoft® Windows® 10 (32/64-bit) compatible<br>• Linux 32/64-bit: Ubuntu/Debian, RHEL/CentOS/Fedora, SLES/openSUSE Kernel: 2.6.32 or higher<br>• Fully supported by Teledyne DALSA's software packages:<br>• Sapera LT 8.60 (or higher)<br>• Sherlock 8.0<br>• Microsoft Windows<br>• Sapera Processing 8.0 (or higher)<br>• Linux: Teledyne DALSA GevAPI Framework(SDK) ver. 2.40 or higher<br>• 3rd party software:<br>• MVTec® Halcon®<br>• NI® Max/Labview®<br>• Cognex® VisionPro®<br>• Stemmer CVB<br>• Application development using C++ and Microsoft<br>• .Net languages(C++, C# or Visual Basic) |
| Markings | • FCC Class B, CE, ICE<br>• ROHS, China RoHS<br>• FDA |

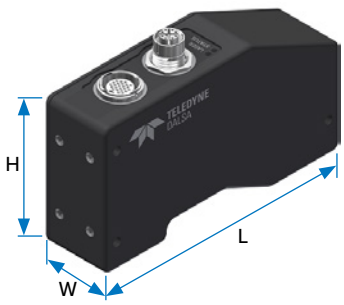
## MEASUREMENT SETUP



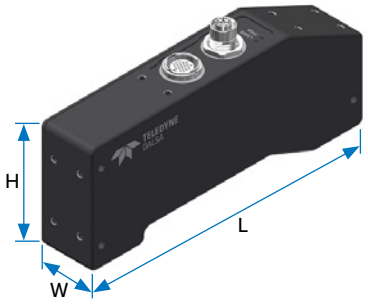
## SPECIFICATIONS[1]




| 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[3] (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[4] (±) | < 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[5] (nm) | Blue:405 | | |
| Laser Safety Class | 2M | | |
| Case Style (mm) | **X10** mm: 36(W); 84.8(H); 125.8(L) in: 1.4(W); 3.3(H); 5.0(L) | **X20** mm: 36(W); 78.4(H); 138.6(L) in: 1.4(W); 3.1(H); 5.5(L) | **X20** 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[3] (µm/in) | 1.5–3 / 0.000059–0.000118 | 0.7–1.5 / 0.000028–0.000059 | 1–4 / 0.000039–0.000157 |
| Linearity[4] (±) | < 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[5] (nm) | Red:660 | | |
| Laser Safety Class | 2M | | |
| Case Style (mm) | **X20** mm: 36(W); 78.4(H); 138.6(L) in: 1.4(W); 3.1(H); 5.5(L) | **X20** mm: 36(W); 78.4(H); 138.6(L) in: 1.4(W); 3.1(H); 5.5(L) | **X30** 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[3] (µm/in) | 2–8 / 0.000079–0.000315 | 4–12 / 0.000157–0.000472 | 5–20 / 0.000197–0.000787 |
| Linearity[4] (±) | < 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[5] (nm) | Red:660 | | |
| Laser Safety Class | 3R | | |
| Case Style (mm) | **X30** mm: 36(W) x 78.4(H) x 189.6(L) in: 1.4(W) x 3.1(H) x 7.5(L) | **X40** mm: 36(W) x 77.7(H) x 287.7(L) in: 1.4(W) x 3.0(H) x 11.3(L) | **X40** 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 ±2*σ
4 As a % of full scale
5 Contact Teledyne Sales for other laser options



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