ECONOMIC & COMPACT
3D GOES HIGH DEFINITION IN HIGH SPEED

HIGH SPEED 3D SCANNING
FOR FASTER PRODUCTION LINES & THROUGHPUT

ULTRA-HIGH RESOLUTION
RESOLVE EXTREMELY FINE FEATURES

SUPERIOR 3D IMAGE QUALITY
BEST REPEATABILITY UNDER CHALLENGING CONDITIONS
### MODEL

<table>
<thead>
<tr>
<th>ECCO 95.010</th>
<th>ECCO 95.040</th>
<th>ECCO 95.100</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Typical field of view</strong>&lt;sup&gt;1&lt;/sup&gt;</td>
<td>near</td>
<td>mid</td>
</tr>
<tr>
<td><strong>Measurement range</strong>&lt;sup&gt;2&lt;/sup&gt;</td>
<td>4 mm</td>
<td>16 mm</td>
</tr>
<tr>
<td><strong>Stand-off distance</strong></td>
<td>23.5 mm</td>
<td>60 mm</td>
</tr>
<tr>
<td><strong>Typical vertical resolution (Z)</strong>&lt;sup&gt;1&lt;/sup&gt;</td>
<td>0.37 – 0.45 µm</td>
<td>1.4 – 1.8 µm</td>
</tr>
<tr>
<td><strong>Typical lateral resolution (Y)</strong>&lt;sup&gt;1&lt;/sup&gt;</td>
<td>5.8 – 6.8 µm</td>
<td>18 – 20 µm</td>
</tr>
<tr>
<td><strong>Weight</strong></td>
<td>Approx. 650 g</td>
<td>Approx. 490 g</td>
</tr>
<tr>
<td><strong>Part number</strong></td>
<td>3.002.152 (laser class 2M)</td>
<td>3.002.153 (laser class 2M)</td>
</tr>
<tr>
<td></td>
<td>3.003.152 (laser class 3B)</td>
<td>3.003.153 (laser class 3B)</td>
</tr>
</tbody>
</table>

### Maximum points / 3D profile

- **Typical scan rate**<sup>2</sup> Approx. from 400 Hz up to 8 kHz
- **Typical 3D point rate** Approx. from 0.7 up to 15 million points/sec

### Interface

- Gigabit Ethernet (1 Gbit/sec)

### Outputs

- 2 x Outputs, 24 VDC (max. 20 mA)

### Trigger

- START Trigger support on Input 1–2
- DATA Trigger support on Quadrature Encoder Input (Max. DATA trigger rate: 1 MHz)
- DATA Trigger support on Input 2 (Max. DATA trigger rate: 10 kHz)

### Input voltage | Power

- 24 VDC, ± 15% ripple | 8.5 W

### Laser wavelength

- 450 nm

### Laser class

- standard | optional 2M | 3B

### Maximum ambient light

- 10,000 lx

### EMC test

- as per EN 61 000–6–2, EN 61 000–6–4

### Vibration / Shock test

- as per EN 60 068–2–6, –27, –29, –64

### Electrical safety

- as per EN 61 010–1–3

### Protection class

- III, as per EN 61 040–3

### Enclosure rating

- IP65

### Air humidity

- Maximum 90%, non-condensing

### Temperature

- operation | storage 0 – 40° C | –20 – 70° C

### Compatible accessories

- Power-I/O-Encoder cable: 6.320.0XX
- Ethernet cable: 6.303.0XX

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<sup>1</sup> Typical values can vary up to 5% due to optical tolerances

<sup>2</sup> Scan rate & point rate are dependent on the configured field of view, measurement range and exposure time. A ‘scan’ by definition considers maximum points/3D profile i.e. full FOV. The typical scan rate range has been estimated considering an exposure time of 1 µsec, min-max MR and full FOV. The typical scan rate can be further boosted by windowing the FOV.

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www.smartray.com

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Subject to change without notice
**MODEL**

<table>
<thead>
<tr>
<th>ECCO 75.030</th>
<th>ECCO 75.100</th>
<th>ECCO 75.200</th>
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</thead>
<tbody>
<tr>
<td><strong>Typical field of view</strong>&lt;sup&gt;1&lt;/sup&gt;</td>
<td>34</td>
<td>36</td>
</tr>
<tr>
<td><strong>Measurement range</strong>&lt;sup&gt;1&lt;/sup&gt;</td>
<td>16 mm</td>
<td>100 mm</td>
</tr>
<tr>
<td><strong>Stand-off distance</strong></td>
<td>60 mm</td>
<td>150 mm</td>
</tr>
<tr>
<td><strong>Typical vertical resolution (Z)</strong>&lt;sup&gt;1&lt;/sup&gt;</td>
<td>1.4 – 1.8 µm</td>
<td>5 – 12 µm</td>
</tr>
<tr>
<td><strong>Typical lateral resolution (Y)</strong>&lt;sup&gt;1&lt;/sup&gt;</td>
<td>18 – 20 µm</td>
<td>42 – 70 µm</td>
</tr>
<tr>
<td><strong>Z-Linearity</strong>&lt;sup&gt;2,5&lt;/sup&gt;</td>
<td>0.01% (0.1 µm/mm)</td>
<td>0.008% (0.08 µm/mm)</td>
</tr>
<tr>
<td><strong>Z-Repeatability</strong>&lt;sup&gt;4,5&lt;/sup&gt;</td>
<td>0.1 µm</td>
<td>0.8 µm</td>
</tr>
<tr>
<td><strong>Weight</strong></td>
<td>Approx. 480 g</td>
<td>Approx. 480 g</td>
</tr>
<tr>
<td><strong>Part number</strong></td>
<td>3.002.121</td>
<td>3.002.120</td>
</tr>
</tbody>
</table>

**Maximum points / 3D profile**
- 1920

**Typical scan rate**<sup>3</sup>
- Approx. from 150 Hz up to 4 kHz

**Typical 3D point rate**<sup>3</sup>
- Approx. from 0.3 up to 7.6 million points/sec

**Interface**
- Gigabit Ethernet (1 Gbit/sec)

**Inputs**
- 4 x Inputs, 5 – 24 VDC
- Quadrature Encoder (AB-Channel, RS-422 standard)

**Outputs**
- 2 x Outputs, 24 VDC (max. 20 mA)

**Trigger**
- START Trigger support on Input 1-4
- DATA Trigger support on Quadrature Encoder Input (Max. DATA trigger rate: 100 kHz)
- DATA Trigger support on Input 2, 3 (Max. DATA trigger rate: 10 kHz)

**Input voltage | Power**
- 24 VDC, ± 15% ripple | 7.5 W

**Laser wavelength**
- 660 nm

**Laser class**
- Standard | Optional
- 2M | –

**Maximum ambient light**
- 10,000 lx

**EMC test**
- as per EN 61 000–6–2, EN 61 000–6–4

**Vibration / Shock test**
- as per EN 60 068–2–6, –27, –29, –64

**Electrical safety**
- as per EN 61 010–1–3

**Protection class**
- III, as per EN 61 040–3

**Enclosure rating**
- IP65

**Air humidity**
- Maximum 90%, non-condensing

**Temperature**
- Operation: 0 – 40 °C
- Storage: -20 – 70 °C

**Compatible accessories**
- Power-I/O-Encoder cable: 6.320.0XX
- Ethernet cable: 6.303.0XX

---

1. Typical values can vary up to 5% due to optical tolerances.
2. Z-Linearity calculated as variation of “bias” (reference value vs. measured value) over the measurement range. The %slope of a best-fit line from a plot of bias over measurement range represents Z-Linearity.
3. Scan rate & point rate are dependent on the configured field of view, measurement range and exposure time. The typical scan/point rate has been estimated with an exposure time of 1 µsec.
4. Experimentally assessed by scanning a measurement target moving over a conveyor belt 50 times. Measurement performed by averaging height values within the Z-Map image. No post-processing filters applied.
5. Measurements performed on a SmartRay standard artifact which is an aluminum flat surface painted matte white.

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**Stand-Off Distance**
Optimum distance between the sensor and your part

**Measurement Range**
How thick is your part?

**Field of View**
How wide is your part?
ECONOMIC & COMPACT
FOR HIGHER SPEED APPLICATIONS

HIGH SCAN RATE FOR FAST PRODUCTION LINES
EXCEPTIONAL VALUE BEST PRICE/PERFORMANCE
SMALLEST LIGHTWEIGHT HOUSING EASY TO FIT ANYWHERE
## Model Specifications

### ECCO 55.020

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
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</thead>
<tbody>
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<td>Typical field of view</td>
<td>near: 22 mm</td>
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<tr>
<td>Measurement range</td>
<td>20 mm</td>
</tr>
<tr>
<td>Stand-off distance</td>
<td>70 mm</td>
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<tr>
<td>Typical vertical resolution (Z)</td>
<td>3.25 – 4.75 µm</td>
</tr>
<tr>
<td>Typical lateral resolution (Y)</td>
<td>35 – 40 µm</td>
</tr>
<tr>
<td>Z-Linearity</td>
<td>0.01% (0.1 µm/mm)</td>
</tr>
<tr>
<td>Weight</td>
<td>Approx. 180 g</td>
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<tr>
<td>Part number</td>
<td>3.002.095</td>
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### ECCO 55.050

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<th>Specification</th>
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<tbody>
<tr>
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<td>near: 58 mm</td>
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<tr>
<td>Measurement range</td>
<td>60 mm</td>
</tr>
<tr>
<td>Stand-off distance</td>
<td>150 mm</td>
</tr>
<tr>
<td>Typical vertical resolution (Z)</td>
<td>13.5 – 27 µm</td>
</tr>
<tr>
<td>Typical lateral resolution (Y)</td>
<td>85 – 115 µm</td>
</tr>
<tr>
<td>Z-Linearity</td>
<td>0.01% (0.1 µm/mm)</td>
</tr>
<tr>
<td>Weight</td>
<td>Approx. 180 g</td>
</tr>
<tr>
<td>Part number</td>
<td>3.002.105</td>
</tr>
</tbody>
</table>

### ECCO 55.100

<table>
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<tr>
<th>Specification</th>
<th>Value</th>
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</thead>
<tbody>
<tr>
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<td>near: 88 mm</td>
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<tr>
<td>Measurement range</td>
<td>100 mm</td>
</tr>
<tr>
<td>Stand-off distance</td>
<td>150 mm</td>
</tr>
<tr>
<td>Typical vertical resolution (Z)</td>
<td>19 – 53.5 µm</td>
</tr>
<tr>
<td>Typical lateral resolution (Y)</td>
<td>136 – 228 µm</td>
</tr>
<tr>
<td>Z-Linearity</td>
<td>0.01% (0.1 µm/mm)</td>
</tr>
<tr>
<td>Weight</td>
<td>Approx. 180 g</td>
</tr>
<tr>
<td>Part number</td>
<td>3.002.110</td>
</tr>
</tbody>
</table>

### Maximum Points / 3D Profile

- Maximum points: 640
- Typical scan rate: Approx. from 400 Hz up to 6 kHz
- Typical 3D point rate: Approx. from 0.3 up to 3.9 million points/sec

### Interface

- Fast Ethernet (100 Mbit/sec)

### Inputs

- 4 x Inputs, 5 – 24 VDC
- Quadrature Encoder (AB–Channel, RS-422 standard)

### Outputs

- 2 x Outputs, 24 VDC (max. 20 mA)
- DATA Trigger support on Quadrate Encoder Input (Max. DATA trigger rate: 100 kHz)
- DATA Trigger support on Input 2, 3 (Max. DATA trigger rate: 10 kHz)

### Input Voltage | Power

- 24 VDC, ± 15% ripple | 4.5 W

### Laser Wavelength

- 660 nm

### Laser Class

- 2M

### Maximum Ambient Light

- 10,000 lx

### EMC Test

- as per EN 61 000-6-2, EN 61 000-6-4

### Vibration / Shock Test

- as per EN 60 068-2-6, -27, -29, -64

### Electrical Safety

- as per EN 61 010-1-3

### Protection Class

- III, as per EN 61 040-3

### Enclosure Rating

- IP65

### Air Humidity

- Maximum 90%, non-condensing

### Temperature

- Operation: 0 – 40° C | Storage: -20 – 70° C

### Compatible Accessories

- Power-I/O cable: 6.310.0XX
- Ethernet cable: 6.302.0XX
- Encoder cable: 6.307.0XX

---

1. Typical values can vary up to 5% due to optical tolerances
2. Z-Linearity calculated as variation of “bias” (reference value vs. measured value) over the measurement range. The %slope of a best-fit line from a plot of bias over measurement range represents Z-Linearity
3. Scan rate & point rate are dependent on the configured field of view, measurement range and exposure time. The typical scan/point rate has been estimated with an exposure time of 3 µsec
4. Experimentally assessed by scanning a measurement target moving over a conveyor belt 50 times. Measurement performed by averaging height values within the Z-Map image. No post-processing filters applied
5. Measurements performed on a SmartRay standard artifact which is an aluminum flat surface painted matte white
ECONOMIC & COMPACT
FOR STRAIGHTFORWARD APPLICATIONS

STANDARD SCAN RATE FOR STRAIGHTFORWARD APPLICATIONS
EXCEPTIONAL VALUE BEST PRICE/PERFORMANCE
SMALLEST LIGHTWEIGHT HOUSING EASY TO FIT ANYWHERE
### MODEL

<table>
<thead>
<tr>
<th></th>
<th>ECCO 35.050</th>
<th>ECCO 35.100</th>
</tr>
</thead>
<tbody>
<tr>
<td>Typical field of view</td>
<td>near</td>
<td>mid</td>
</tr>
<tr>
<td>Measurement range</td>
<td>60 mm</td>
<td>100 mm</td>
</tr>
<tr>
<td>Stand-off distance</td>
<td>150 mm</td>
<td>150 mm</td>
</tr>
<tr>
<td>Typical vertical resolution (Z)</td>
<td>8.5 – 16.5 µm</td>
<td>11.5 – 32.5 µm</td>
</tr>
<tr>
<td>Typical lateral resolution (Y)</td>
<td>57 – 80 µm</td>
<td>82 – 135 µm</td>
</tr>
<tr>
<td>Z-Linearity 2.5</td>
<td>0.02% (0.2 µm/mm)</td>
<td>0.01% (0.1 µm/mm)</td>
</tr>
<tr>
<td>Z-Repeatability 4.5</td>
<td>1.8 µm</td>
<td>3.8 µm</td>
</tr>
<tr>
<td>Weight</td>
<td>Approx. 180 g</td>
<td>Approx. 180 g</td>
</tr>
<tr>
<td>Part number</td>
<td>3.002.005</td>
<td>3.002.010</td>
</tr>
</tbody>
</table>

### Maximum points / 3D profile
- 752

### Typical scan rate
- Approx. from 100 Hz up to 500 Hz

### Typical 3D point rate
- Approx. from 0.07 up to 0.3 million points/sec

### Interface
- Fast Ethernet (100 Mbit/sec)

### Inputs
- 4 x Inputs, 5 – 24 VDC
- Quadrature Encoder (AB–Channel, RS–422 standard)

### Outputs
- 2 x Outputs, 24 VDC (max. 20 mA)

### Trigger
- START Trigger support on Input 1
- DATA Trigger support on Quadrature Encoder Input (Max. DATA trigger rate: 100 kHz)
- DATA Trigger support on Input 2, 3 (Max. DATA trigger rate: 10 kHz)

### Input voltage | Power
- 24 VDC, ± 15% ripple | 4.5 W

### Laser wavelength
- 660 nm

### Laser class
- Standard | Optional
- 2M | –

### Maximum ambient light
- 10,000 lx

### EMC test
- as per EN 61 000–6–2, EN 61 000–6–4

### Vibration / Shock test
- as per EN 60 068–2–6, –27, –29, –64

### Electrical safety
- as per EN 61 010–1–3

### Protection class
- III, as per EN 61 040–3

### Enclosure rating
- IP65

### Air humidity
- Maximum 90%, non-condensing

### Temperature
- 0 – 40° C | –20 – 70° C

### Compatible accessories
- Power–I/O cable: 6.310.0XX
- Ethernet cable: 6.302.0XX
- Encoder cable: 6.307.0XX

---

1. Typical values can vary up to 5% due to optical tolerances
2. Z-Linearity calculated as variation of “bias” (reference value vs. measured value) over the measurement range. The %slope of a best-fit line from a plot of bias over measurement range represents Z-Linearity
3. Scan rate & point rate are dependent on the configured field of view, measurement range and exposure time. The typical scan/point rate has been estimated with an exposure time of 3 µsec
4. Experimentally assessed by scanning a measurement target moving over a conveyor belt 50 times. Measurement performed by averaging height values within the Z-Map image. No post-processing filters applied
5. Measurements performed on a SmartRay standard artifact which is an aluminum flat surface painted matte white
### MODEL: SR5650@85

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Typical field of view</strong></td>
<td>near</td>
</tr>
<tr>
<td><strong>Measurement range</strong></td>
<td>4 mm</td>
</tr>
<tr>
<td><strong>Stand-off distance</strong></td>
<td>85 mm</td>
</tr>
<tr>
<td><strong>Typical vertical resolution (Z)</strong></td>
<td>2.1 - 2.2</td>
</tr>
<tr>
<td><strong>Typical lateral resolution (Y)</strong></td>
<td>25 - 26 µm</td>
</tr>
<tr>
<td><strong>Z-Linearity</strong></td>
<td>0.03% (0.3 µm/mm)</td>
</tr>
<tr>
<td><strong>Z-Repeatability</strong></td>
<td>0.6 µm</td>
</tr>
<tr>
<td><strong>Weight</strong></td>
<td>Approx. 2300 g</td>
</tr>
<tr>
<td><strong>Part number</strong></td>
<td>3.003.030</td>
</tr>
</tbody>
</table>

### Maximum points / 3D profile
- Approx. from 4 kHz up to 25 kHz
- Approx. from 5 up to 32 million points/sec

### Interface
- Gigabit Ethernet (1 Gbit/sec)
- Quadrate Encoder (AB-Channel, RS-422 standard)

### Outputs
- 2 x Outputs, 24 VDC (max. 20 mA)

### Trigger
- START Trigger support on Input 1
- DATA Trigger support on Quadrature Encoder Input (Max. DATA trigger rate: 100 kHz)
- DATA Trigger support on Input 2, 3 (Max. DATA trigger rate: 10 kHz)

### Input voltage | Power
- 24 VDC, ± 15% ripple | 13 W

### Laser wavelength
- 660 nm

### Laser class
- standard | optional 3R | –

### Maximum ambient light
- 10,000 lx

### EMC test
- as per EN 61 000–6–2, EN 61 000–6–4

### Vibration / Shock test
- as per EN 60 068–2–6, –27, –29, –64

### Electrical safety
- as per EN 61 010–1–3

### Protection class
- III, as per EN 61 040–3

### Enclosure rating
- IP65

### Air humidity
- Maximum 90%, non-condensing

### Temperature
- operation | storage 0 – 40 °C | –20 – 70 °C

### Compatible accessories
- Power-I/O cable: 6.310.0XX
- Ethernet cable: 6.302.0XX
- Encoder cable: 6.307.0XX

---

1. Typical values can vary up to 10% due to optical tolerances
2. Z-Linearity calculated as variation of “bias” (reference value vs. measured value) over the measurement range. The %slope of a best-fit line from a plot of bias over measurement range represents Z-Linearity
3. Scan rate & point rate are dependent on the configured field of view, measurement range and exposure time. The typical scan/point rate has been estimated with an exposure time of 3 µsec
4. Experimentally assessed by scanning a measurement target moving over a conveyor belt 50 times. Measurement performed by averaging height values within the Z-Map image. No post-processing filters applied
5. Measurements performed on a SmartRay standard artifact which is an aluminum flat surface painted matte white
## Model Overview

<table>
<thead>
<tr>
<th>Parameter</th>
<th>SR9628@160</th>
<th>SR9628@500</th>
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<tbody>
<tr>
<td><strong>Measurement range</strong></td>
<td>60 mm</td>
<td>140 mm</td>
</tr>
<tr>
<td><strong>Stand-off distance</strong></td>
<td>160 mm</td>
<td>500 mm</td>
</tr>
<tr>
<td><strong>Typical vertical resolution (Z)</strong></td>
<td>6.5 - 9 µm</td>
<td>46 - 56 µm</td>
</tr>
<tr>
<td><strong>Typical lateral resolution (Y)</strong></td>
<td>92 - 110 µm</td>
<td>225 - 310 µm</td>
</tr>
<tr>
<td><strong>Z-Linearity</strong></td>
<td>0.008% (4.8 µm/mm)</td>
<td>0.025% (35 µm/mm)</td>
</tr>
<tr>
<td><strong>Z-Repeatability</strong></td>
<td>1.4 µm</td>
<td>6 µm</td>
</tr>
<tr>
<td><strong>Weight</strong></td>
<td>Approx. 1900 g</td>
<td>Approx. 1900 g</td>
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<tr>
<td>**Part number (laser class 2M</td>
<td>3B)**</td>
<td>3.003.001</td>
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<td></td>
<td>3.003.025</td>
<td>3.003.026</td>
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</table>

### Technical Specifications

- **Maximum points / 3D profile**: 1272
- **Typical scan rate**: Approx. from 2.5 kHz up to 25 kHz
- **Typical 3D point rate**: Approx. from 3.2 up to 32 million points/sec
- **Interface**: Gigabit Ethernet (1 Gbit/sec)
- **Inputs**: 4 x Inputs, 5 - 24 VDC
- **Quadrature Encoder (AB-Channel, RS-422 standard)**
- **Outputs**: 2 x Outputs, 24 VDC (max. 20 mA)
- **Trigger**: START trigger support on Input 1
- **DATA trigger support on Quadrature Encoder Input (Max. DATA trigger rate: 100 kHz)**
- **DATA trigger support on Input 2, 3 (Max. DATA trigger rate: 10 kHz)**
- **Input voltage | Power**: 24 VDC, ± 15% ripple | 13 W
- **Laser wavelength**: 660 nm
- **Laser class**: 2M | 3B standard | optional
- **Maximum ambient light**: 10,000 lx
- **EMC test**: as per EN 61 000-6-2, EN 61 000-6-4
- **Vibration / Shock test**: as per EN 60 068-2-6, -27, -29, -64
- **Electrical safety**: as per EN 61 010-1-3
- **Protection class**: III, as per EN 61 040-3
- **Enclosure rating**: IP65
- **Air humidity**: Maximum 90%, non-condensing
- **Temperature**: 0 - 40° C | -20 - 70° C
- **Compatible accessories**: Power-I/O cable: 6.310.0XX
- **Ethernet cable**: 6.302.0XX
- **Encoder cable**: 6.307.0XX

### Additional Notes

1. Typical values can vary up to 5% due to optical tolerances
2. Z-Linearity calculated as variation of “bias” (reference value vs. measured value) over the measurement range. The %slope of a best-fit line from a plot of bias over measurement range represents Z-Linearity
3. Scan rate & point rate are dependent on the configured field of view, measurement range and exposure time. The typical scan/point rate has been estimated with an exposure time of 1 µsec
4. Experimentally assessed by scanning a measurement target moving over a conveyor belt 50 times. Measurement performed by averaging height values within the Z-Map image. No post-processing filters applied
5. Measurements performed on a SmartRay standard artifact which is an aluminum flat surface painted matte white