

SmartRay 



# ECCO

3D VISION SENSORS | MOST ECONOMIC AND COMPACT 3D SENSOR IN IT'S CLASS | FOR ACCURATE 3D VISION & METROLOGY APPLICATIONS



# ABOUT US...

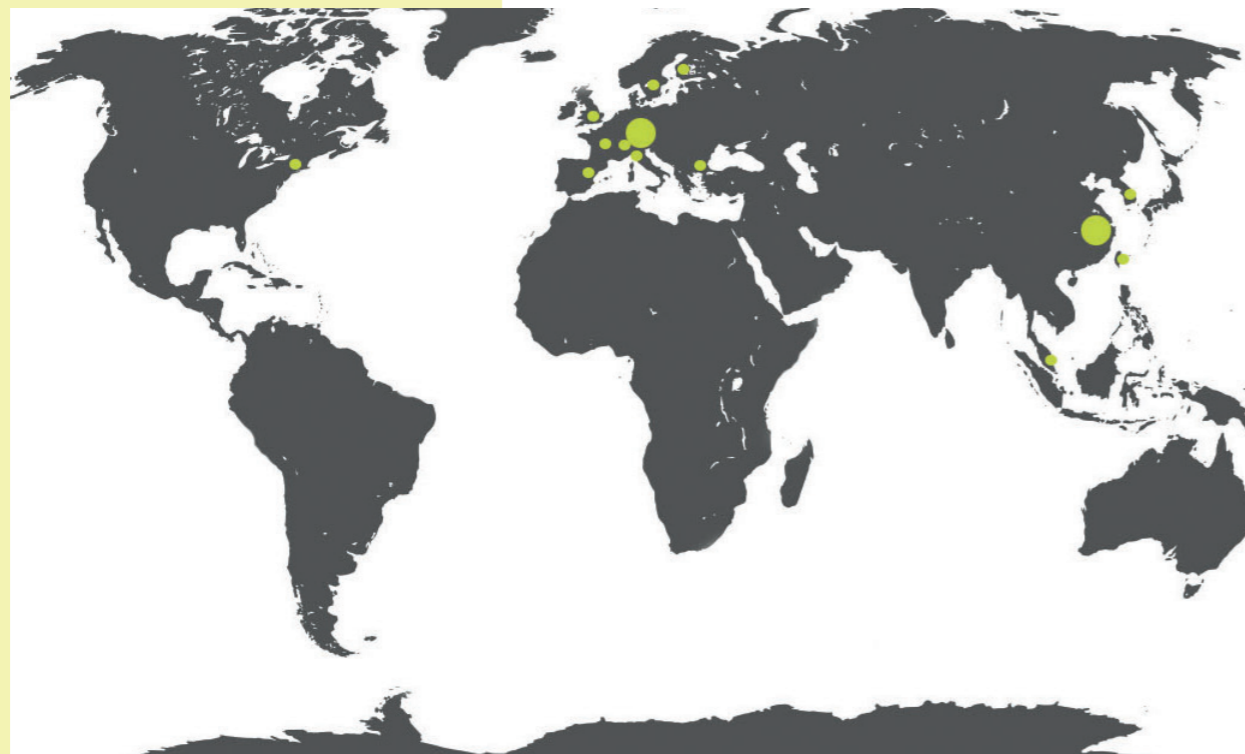
## ABOUT THE COMPANY

SmartRay is a leading 3D Sensor company for Vision and Metrology applications; helping manufacturing companies to improve product quality, guide automation and reduce production costs. By focusing only on 3D, SmartRay has built a comprehensive portfolio of products that combine new technologies with German engineering to create a range of 3D sensors that can be fitted anywhere, are quick to set up and easy to deploy.

**VISION. METROLOGY.**



**HEAD OFFICE. MUNICH**



**IMPROVE.**  
PRODUCT QUALITY

**REDUCE.**  
PRODUCTION COSTS

# WE LIVE 3D



**HIGH PERFORMANCE**  
**SMALL SIZE**  
**LIGHTWEIGHT**  
**ROBUST HOUSING**  
**ECONOMIC PRICE**

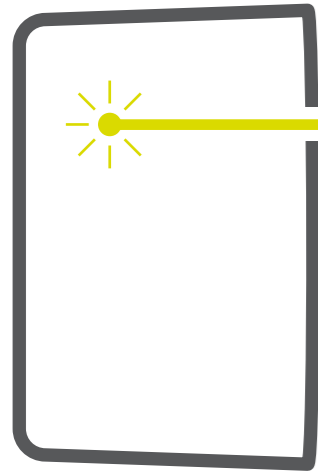
SmartRay 3D Sensors combine laser triangulation with innovative image formation technology to create detailed 3D images that can be processed by any 3rd party vision software. The latest ECCO™ family brings a new design philosophy to the 3D sensor market that delivers high performance, small size, lightweight and robust housing at an economic price.

Headquartered in Munich, Germany, SmartRay also has operations in China and expanding global coverage through a network of distributors and system integrators. For more details, visit SmartRay at [www.smartray.com](http://www.smartray.com)



[www.smartray.com](http://www.smartray.com)

SmartRay **E**conomic and **C**ompact range of 3D Sensors, the ECCO™ family is revolutionising the 3D sensor market, combining high performance and great value in a family of economical, compact industrial products.



## INTEGRATED OPTICS

With optics and laser illumination included in every 3D Sensor, we have eliminated the need for lenses and lighting to be evaluated, tested and purchased for each application.



## RESOLUTION

By incorporating the latest high resolution image sensors into our products, we can measure more accurately, detect smaller defects and control automation more precisely than other 3D Sensors.



## REFLECTIVITY

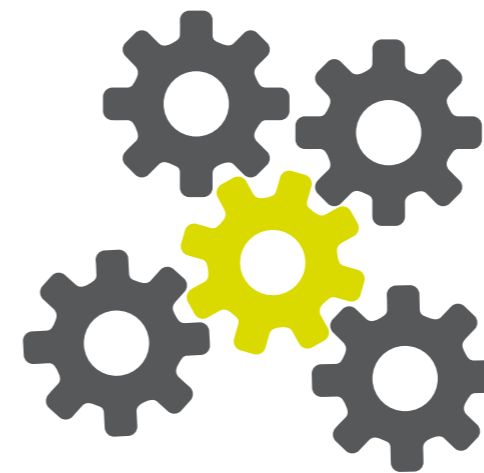
Our unique filtering technology helps our 3D Sensors create high quality, reliable images of products with reflective surfaces that would otherwise be impossible to inspect or measure.

At SmartRay we focus on a number of core proprietary technologies that when deployed together redefine the 3D Sensor market. Here are just a few of the SmartRay innovations incorporated into our products:



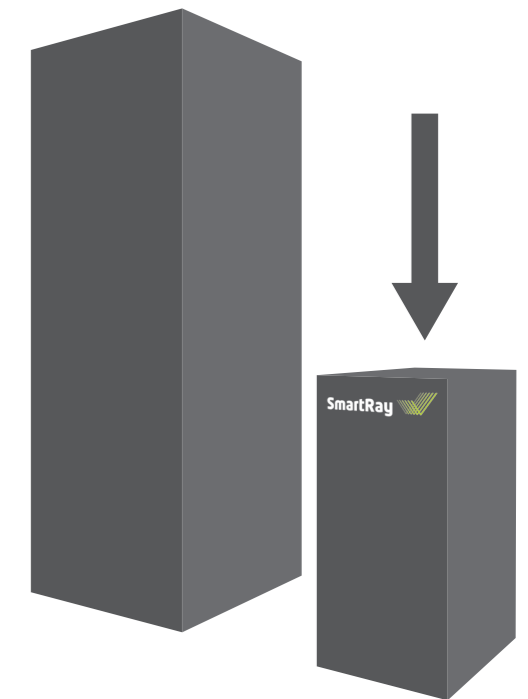
## CALIBRATION

All our sensors are pre-calibrated, so they deliver precise, repeatable measurements, right down to the micrometer range, as soon as they are installed.



## SOFTWARE INTEGRATION

To ensure our 3D Sensors can be used with as wide a range of vision software as possible, we have created a set of communication and set up software tools that are quick and easy to use.



## SIZE

By carefully miniaturising every component, we have created the smallest, lightest range of 3D Sensors available anywhere, so they are easier to fit on any production line.

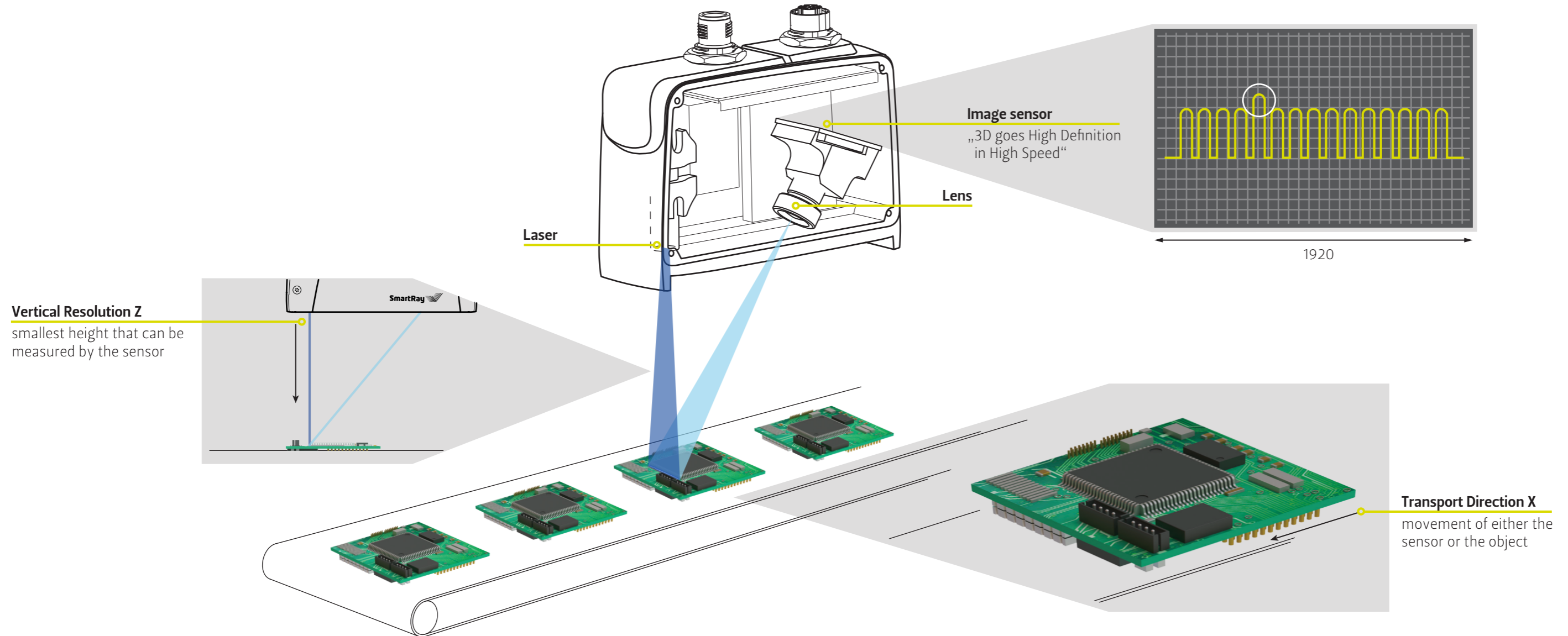
...**ABOUT ECCO**  
**ABOUT OUR PRODUCTS**



# ECCO 3D SENSORS TECHNOLOGY

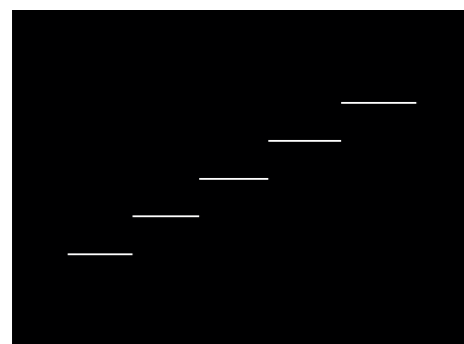
SmartRay 3D Sensors work based on the principle of laser triangulation. A laser line is projected onto the object, which is reflected back onto an image sensor. Due to the angle between the laser line and the image sensor, the reflected laser

line appears at different positions in the image depending on the height of the object at each point. The 3D Sensor measures the profile of the object. Relative movement between the object and the 3D Sensor creates a full 3D model of the object.

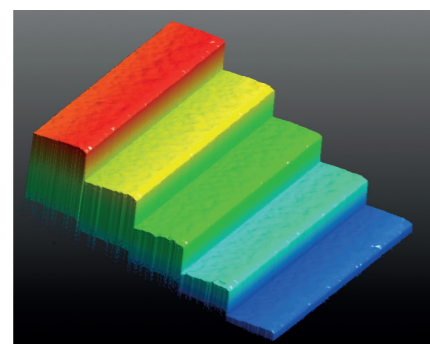


## Do more with SmartRay 3D™

SmartRay's 3D Sensors capture the Intensity and Laser Line Thickness information from your part. By using our 3D Sensors, you will also have the 2D information available. 3D = 2D + more!



To inspect and measure use the 3D PointCloud or the "Z-Maps". The height of the object is displayed in real mm.



Z-Map with 3D Visualization in mm



Intensity



Laser Line Thickness

# ECCO FAMILY

## CHOOSING THE RIGHT SENSOR

Based on laser triangulation, The ECCO™ Family of 3D Sensors

offer the most economic and compact 3D sensor in it's class for vision and metrology applications.



### **ECCO 35** WHEN SIZE & PRICE IS VITAL

Entry-level 3D sensor series for simple applications when compact size and low price is vital



### **ECCO 75** FOR HIGH DEFINITION SCANNING

High-level 3D sensor series in HD (High Definition) for challenging applications demanding high resolution and repeatability



### **ECCO 95** FOR HIGH DEFINITION & HIGH SPEED

Premium 3D sensor series in HD and High Speed for challenging applications demanding ultra-high resolution, repeatability and high speed



### **ECCO 95+** FOR GLASS & SPECULAR SURFACES

Specialized 3D sensor to measure flat glass and specular, highly reflective surfaces in high definition and high speed.

### **ECCO 55** WHEN SIZE MATTERS IN HIGH SPEED

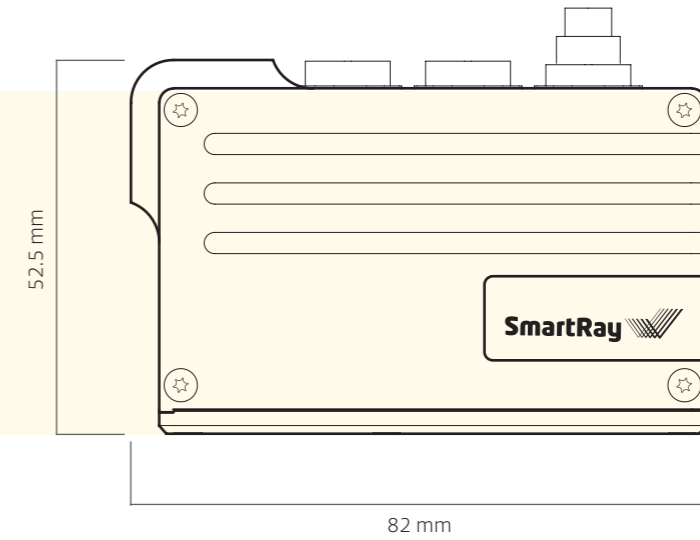
Mid-level 3D sensor series for standard applications demanding compact size and high speed

# ECCO 35 | ECCO 55

## SPECIFICATIONS

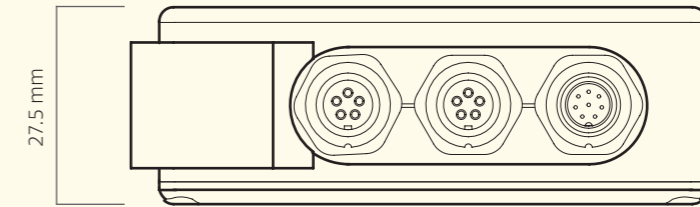
### MODEL ECCO 35.050 ECCO 35.100

Typical field of view <sup>1</sup> near   mid   far	41   <b>49</b>   57 mm	61   <b>82</b>   103 mm
Measurement range <sup>1</sup>	60 mm	100 mm
Stand-off distance	150 mm	150 mm
Typical vertical resolution (Z) <sup>1</sup>	8.5 – 16.5 µm	11.5 – 32.5 µm
Typical lateral resolution (Y) <sup>1</sup>	57 – 80 µm	82 – 135 µm
Z-Linearity <sup>2,5</sup>	0.02% (0.2 µm/mm)	0.01% (0.1 µm/mm)
Z-Repeatability <sup>4,5</sup>	1.8 µm	3.8 µm
Weight	Approx. 180 g	Approx. 180 g
Part number	3.002.005	3.002.010

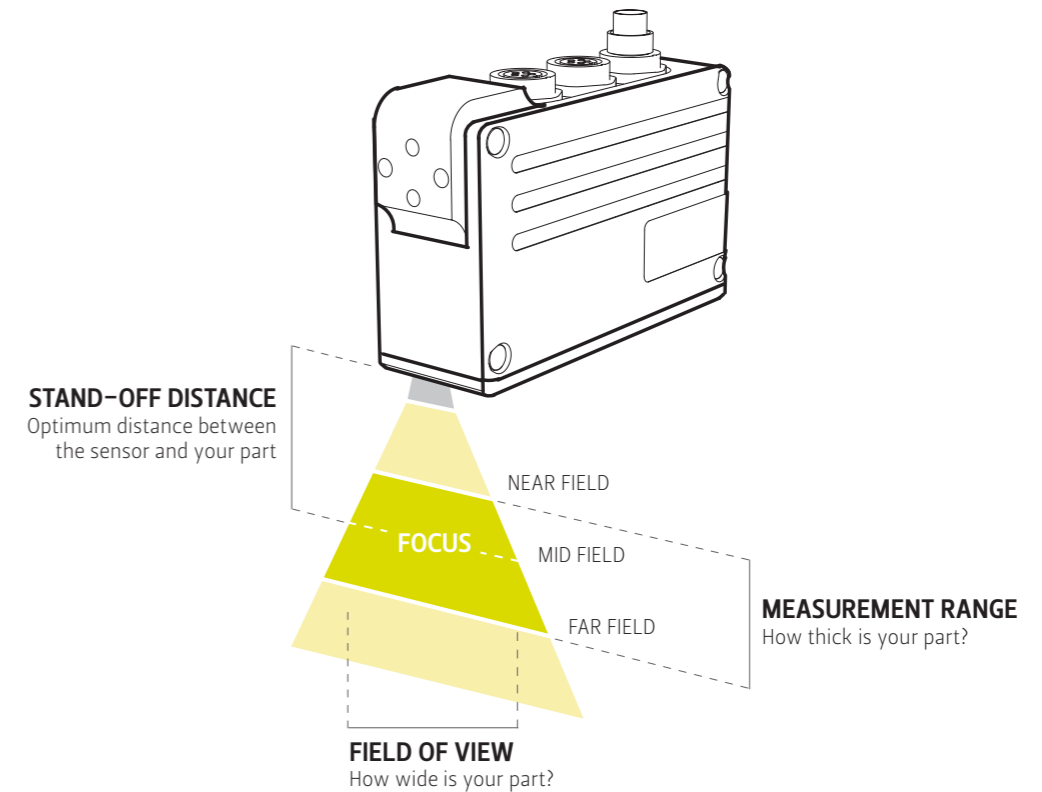


### MODEL ECCO 55.020 ECCO 55.050 ECCO 55.100

Typical field of view <sup>1</sup> near   mid   far	22   <b>24</b>   26 mm	58   <b>69</b>   81 mm	88   <b>118</b>   148 mm
Measurement range <sup>1</sup>	20 mm	60 mm	100 mm
Stand-off distance	70 mm	150 mm	150 mm
Typical vertical resolution (Z) <sup>1</sup>	3.25 – 4.75 µm	13.5 – 27 µm	19 – 53.5 µm
Typical lateral resolution (Y) <sup>1</sup>	35 – 40 µm	85 – 115 µm	136 – 228 µm
Z-Linearity <sup>2,5</sup>	0.01% (0.1 µm/mm)	0.01% (0.1 µm/mm)	0.01% (0.1 µm/mm)
Z-Repeatability <sup>4,5</sup>	3.8 µm	1 µm	4.2 µm
Weight	Approx. 180 g	Approx. 180 g	Approx. 180 g
Part number	3.002.095	3.002.105	3.002.110



ECCO 35.050 | ECCO 35.100  
ECCO 55.020 | ECCO 55.050 | ECCO 55.100



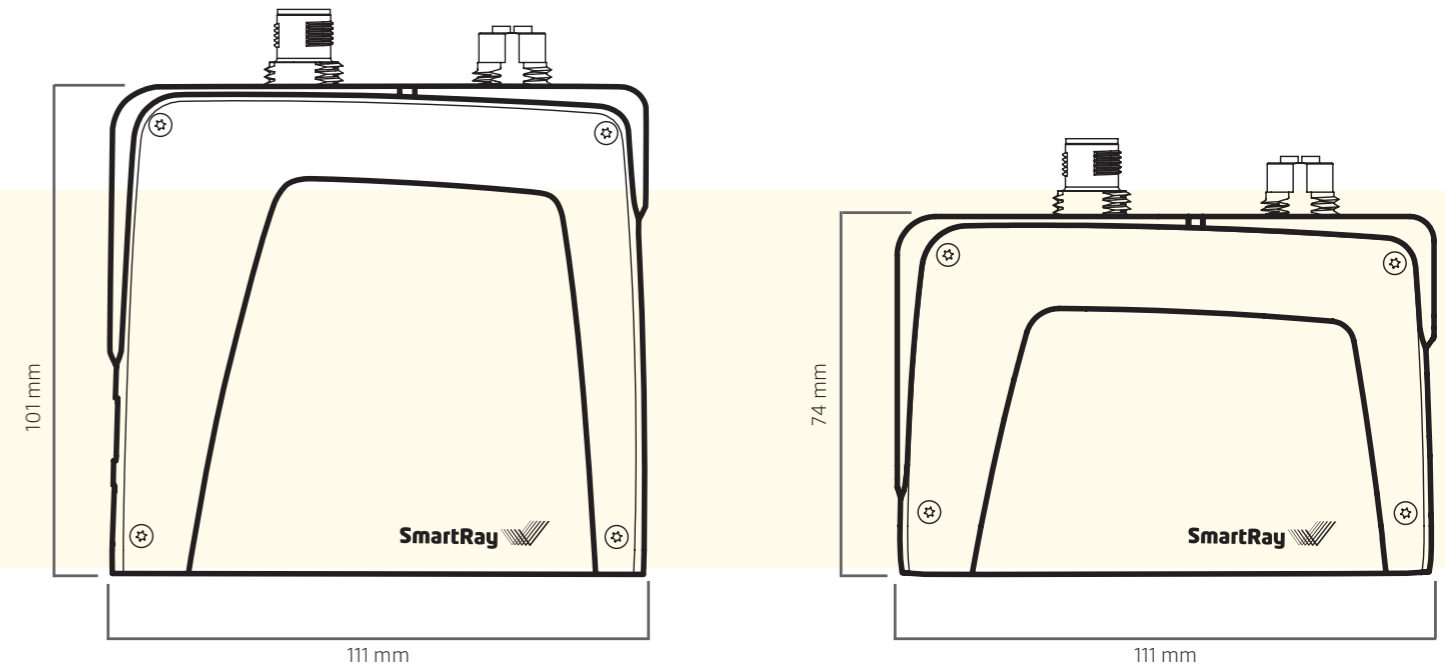
<sup>1</sup> Typical values can vary up to 5% due to optical tolerances  
<sup>2</sup> Z-Linearity calculated as a variation of „bias“ (reference value vs. measured value) over the measurement range  
<sup>3</sup> Scan rate & point rate are dependent on the configured field of view, measurement range and exposure time. A „scan“ by definition considers maximum points/3D profile i.e. full FOV. The typical scan/point 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  
<sup>4</sup> Experimentally assessed by scanning a fixed measurement target 4100 times successively within short time interval. No post-processing filters applied  
<sup>5</sup> Measurements performed on a SmartRay standard artifact which is an aluminium flat matt surface painted matte white

# ECCO 75 | ECCO 95

## SPECIFICATIONS

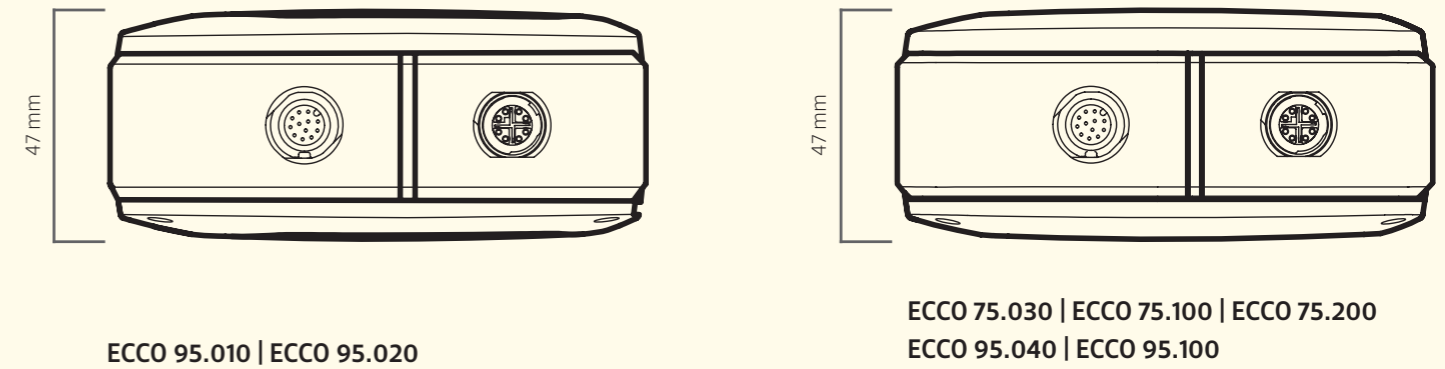
### MODEL      ECCO 75.030      ECCO 75.100      ECCO 75.200

<b>Typical field of view</b> <sup>1</sup> near   mid   far	34   <b>36</b>   38 mm	72   <b>98</b>   124 mm	125   <b>190</b>   250 mm
<b>Measurement range</b> <sup>1</sup>	16 mm	100 mm	250 mm
<b>Stand-off distance</b>	60 mm	150 mm	325 mm
<b>Typical vertical resolution (Z)</b> <sup>1</sup>	1.4 – 1.8 µm	5 – 12 µm	12 – 50 µm
<b>Typical lateral resolution (Y)</b> <sup>1</sup>	18 – 20 µm	42 – 70 µm	66 – 138 µm
<b>Z-Linearity</b> <sup>2,5</sup>	0.01% (0.1 µm/mm)	0.008% (0.08 µm/mm)	0.01% (0.1 µm/mm)
<b>Z-Repeatability</b> <sup>4,5</sup>	0.8 µm	0.8 µm	2.5 µm
<b>Weight</b>	Approx. 480 g	Approx. 480 g	Approx. 480 g
<b>Part number</b>	laser class 2M 3.002.121 laser class 3B 3.003.121	3.002.120 3.003.120	3.002.124 3.003.124



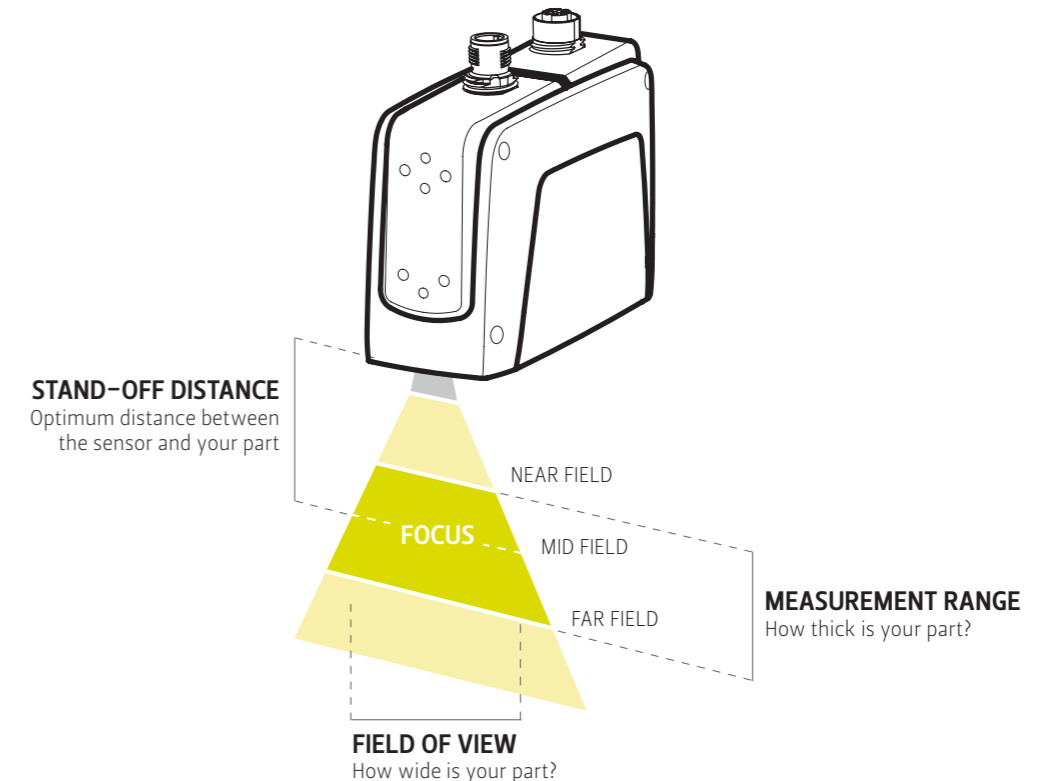
### MODEL      ECCO 95.010      ECCO 95.020      ECCO 95.040      ECCO 95.100

<b>Typical field of view</b> <sup>1</sup> near   mid   far	10.5   <b>11</b>   11.5 mm	22   <b>25</b>   28 mm	34   <b>36</b>   38 mm	72   <b>98</b>   124 mm
<b>Measurement range</b> <sup>1</sup>	5 mm	20 mm	16 mm	100 mm
<b>Stand-off distance</b>	23.5 mm	60 mm	60 mm	150 mm
<b>Typical vertical resolution (Z)</b> <sup>1</sup>	0.37 – 0.45 µm	1.1 – 1.6 µm	1.4 – 1.8 µm	5 – 12 µm
<b>Typical lateral resolution (Y)</b> <sup>1</sup>	5.8 – 6.8 µm	11.5 – 14.5 µm	18 – 20 µm	42 – 70 µm
<b>Z-Linearity</b> <sup>2,5</sup>	0.015% (0.015 µm/mm)	0.005% (0.005 µm/mm)	0.006% (0.006 µm/mm)	0.002% (0.002 µm/mm)
<b>Z-Repeatability</b> <sup>4,5</sup>	0.1 µm	0.2 µm	0.4 µm	2 µm
<b>Weight</b>	Approx. 650 g	Approx. 650 g	Approx. 490 g	Approx. 490 g
<b>Part number</b>	laser class 2M 3.002.152 laser class 3R 3.004.152 laser class 3B 3.003.152	3.002.151 3.004.151 3.003.151	3.002.153 3.004.153 3.003.153	3.002.150 3.004.150 3.003.150



### MODEL      ECCO 95.200      MODEL      ECCO 95.015G

<b>Typical field of view</b> <sup>1</sup> near   mid   far	125   <b>190</b>   250 mm	<b>Typical field of view</b> <sup>1</sup> near   mid   far	11   <b>12</b>   11 mm
<b>Measurement range</b> <sup>1</sup>	250 mm	<b>Measurement range</b> <sup>1</sup>	5.6 mm
<b>Stand-off distance</b>	325 mm	<b>Stand-off distance</b>	23.5 mm
<b>Typical vertical resolution (Z)</b> <sup>1</sup>	12 – 50 µm	<b>Typical vertical resolution (Z)</b> <sup>1</sup>	0.42 – 0.54 µm
<b>Typical lateral resolution (Y)</b> <sup>1</sup>	66 – 138 µm	<b>Typical lateral resolution (Y)</b> <sup>1</sup>	6.0 – 6.8 µm
<b>Z-Linearity</b> <sup>2,5</sup>	0.015% (0.015 µm/mm)	<b>Z-Linearity</b> <sup>2,5</sup>	0.015% (0.015 µm/mm)
<b>Z-Repeatability</b> <sup>4,5</sup>	3.3 µm	<b>Z-Repeatability</b> <sup>4,5</sup>	0.15 µm
<b>Weight</b>	Approx. 490 g	<b>Mounting distance</b>	65 mm
<b>Part number</b>	laser class 2M 3.006.154 laser class 3R 3.008.154 laser class 3B 3.007.154	<b>Laser wavelength</b>	450 nm (brilliant blue laser)
		<b>Laser class</b>	standard   optional 3B
		<b>Maximum points   3D profile</b>	1920
		<b>Weight</b>	Approx. 775 g
		<b>Part number</b>	laser class 3B 3.003.191



<sup>1</sup> Typical values can vary up to 5% due to optical tolerances  
<sup>2</sup> Z-Linearity calculated as a variation of „bias“ (reference value vs. measured value) over the measurement range  
<sup>3</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/point 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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<sup>5</sup> Measurements performed on a SmartRay standard artifact which is an aluminium flat matt surface painted matte white

# SMARTRAY DEVKIT (SDK)

## EASY TO GET STARTED



### STANDARDIZED TERMINOLOGY

improved usability for programmers with clear and self explanatory function names & error codes

### MULTI-SENSOR SUPPORT EXTENSION

improvements in API to better support data acquisitions & parameterization in a multi-sensor\* 3D application  
 \*maximum number of sensors supported by API increased from 4 up to 64 sensors

### 3D DATA FORMAT SELECTOR

choose preferred 3d data format (PIL, ZIL) and seamlessly receive data without additional computation

### SYNCHRONOUS FUNCTION CALLS

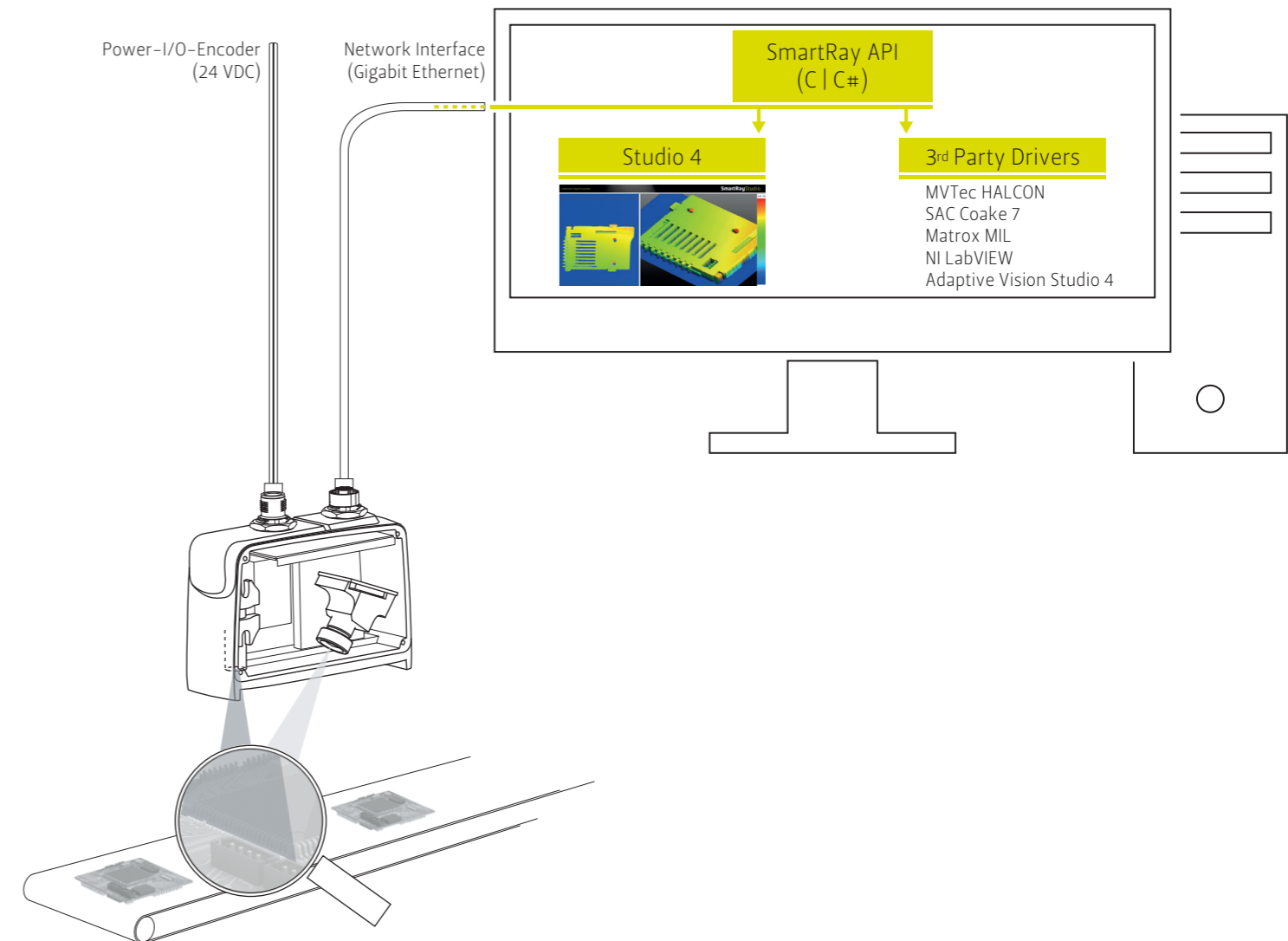
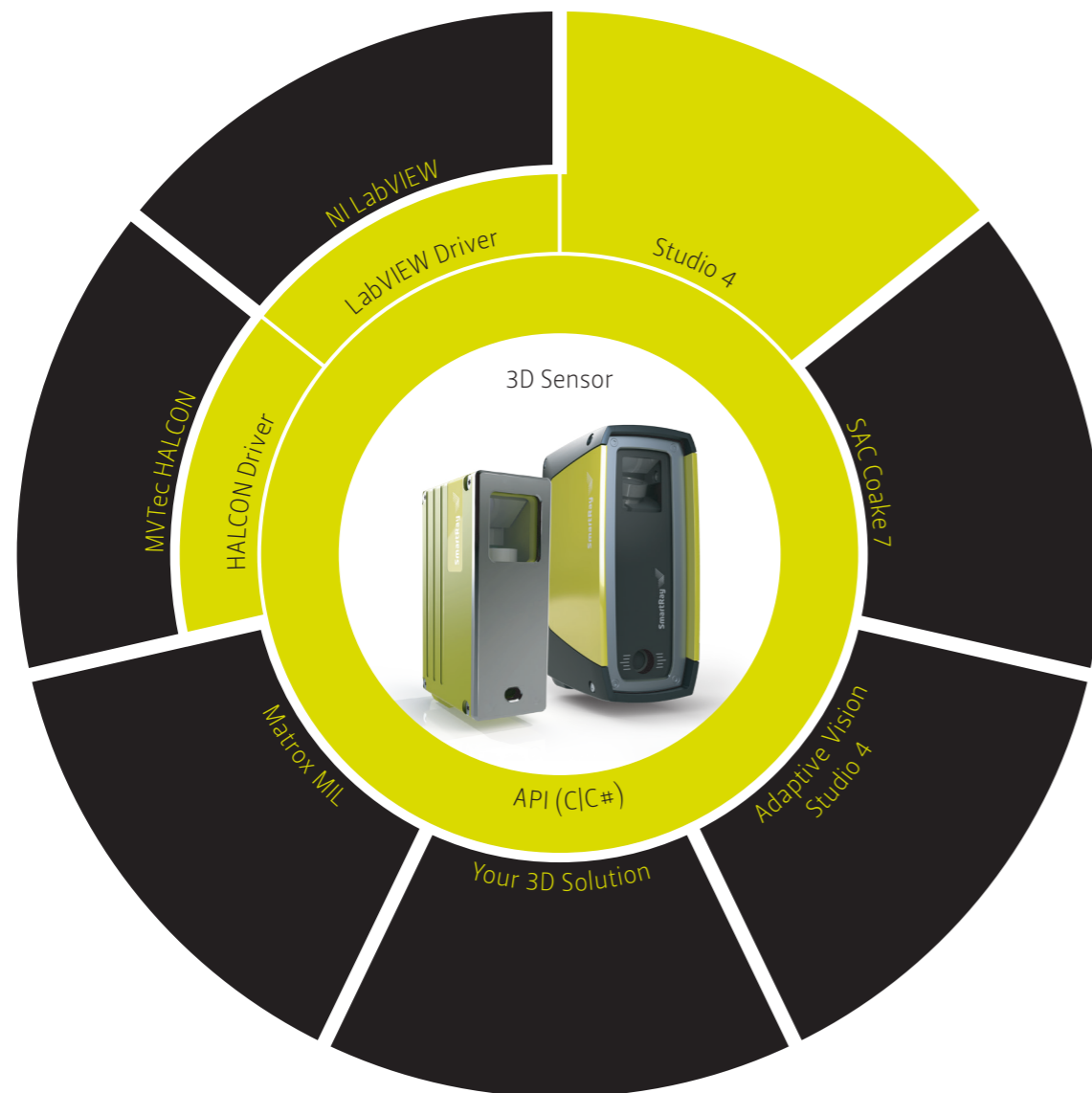
rely on function return calls instead of asynchronous callbacks for most commonly used functions  
 (Ex: Connect Sensor)

### QUICK START WITH NEW API SAMPLE

save integration time using new „API Sample“ which demonstrates ease of usage (source code available)

### BACKWARD COMPATIBLE

no need to modify existing/old software application as backward compatibility is ensured down to API 4.2.1.32





**SMARTRAY GMBH**

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