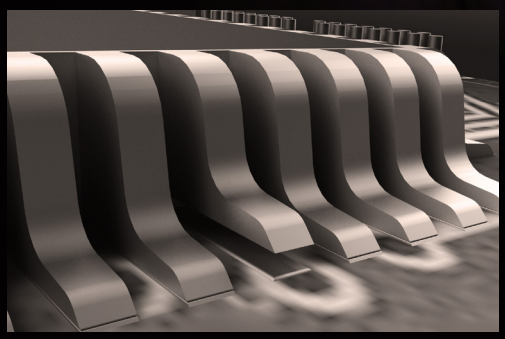
SmartRay CUTTING-EDGE 3D SENSORS FOR INSPECTION, GUIDANCE AND MEASUREMENT

ECCO 95



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

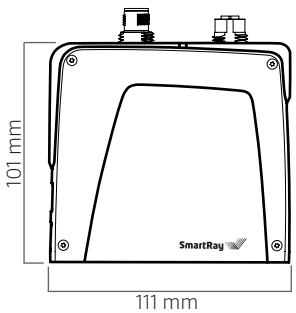
SUPERIOR 3D IMAGE QUALITY
BEST REPEATABILITY UNDER CHALLENGING CONDITIONS

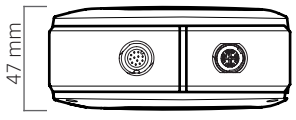
MODEL	ECCO 95.010	ECCO 95.040	ECCO 95.100
Typical field of view [1] near | **mid** | far	10.5 | **11** | 11.5 mm	34 | **36** | 38 mm	72 | **98** | 124 mm
Measurement range [1]	4 mm	16 mm	100 mm
Stand-off distance	23.5 mm	60 mm	150 mm
Typical vertical resolution (Z) [1]	0.37 – 0.45 µm	1.4 – 1.8 µm	5 – 12 µm
Typical lateral resolution (Y) [1]	5.8 – 6.8 µm	18 – 20 µm	42 – 70 µm
Weight	Approx. 650 g	Approx. 490 g	Approx. 490 g
Part number	3.002.152 (laser class 2M) 3.003.152 (laser class 3B)	3.002.153 (laser class 2M) 3.003.153 (laser class 3B)	3.002.150 (laser class 2M) 3.003.150 (laser class 3B)

Maximum points / 3D profile	1920
Typical scan rate [2]	Approx. from 400 Hz up to 8 kHz
Typical 3D point rate [2]	Approx. from 0.7 up to 15 million points/sec
Interface	Gigabit Ethernet (1 Gbit/sec)
Inputs	2 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 1-2 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

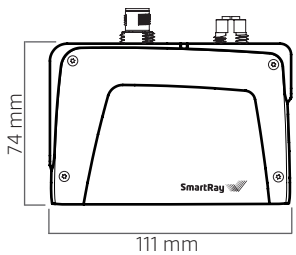
1 Typical values can vary up to 5% due to optical tolerances
2 Scan rate & point rate are dependent on the configured field of view, measurement range and exposure time. A ‚scan' by definition considers maximum points/3D profile i.e. full FOV. The typical scan/point rate range has been estimated considering an exposure time of 1 µsec, min-max MR and full FOV. The typical scan rate can be further boosted by windowing the FOV

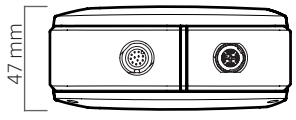
ECCO 95.010

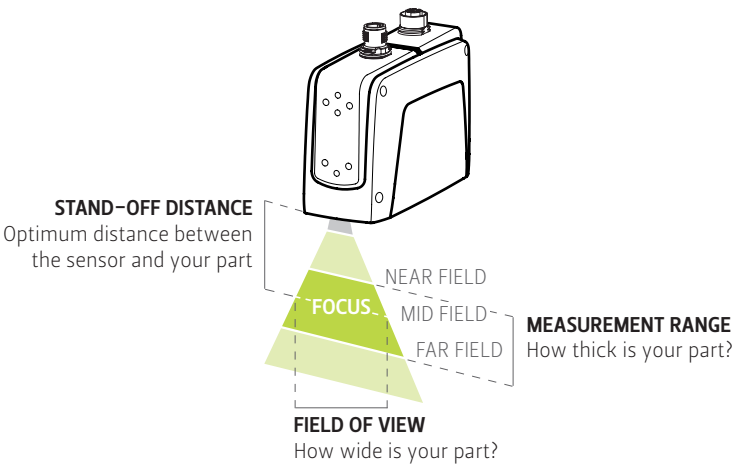




ECCO 95.040 | ECCO 95.100







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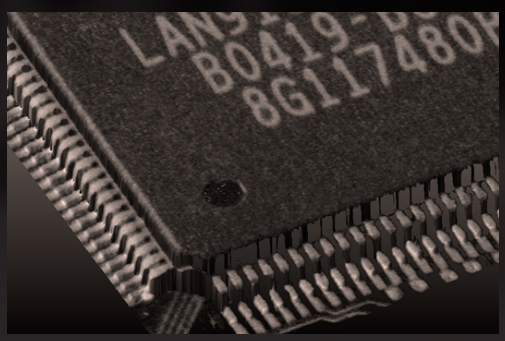
SmartRay CUTTING-EDGE 3D SENSORS FOR INSPECTION, GUIDANCE AND MEASUREMENT

ECCO 75



3D GOES HD

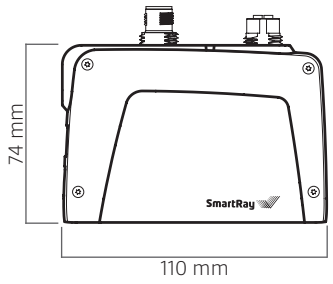
HIGH DEFINITION SENSORS OPEN UP RANGE OF NEW 3D APPLICATIONS

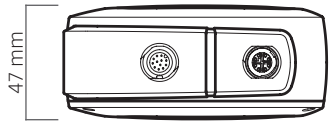
HIGHEST RESOLUTION IDENTIFY SMALLER DEFECTS
INCREASED ACCURACY FOR PRECISE MEASUREMENT
MORE 3D POINTS/SEC FOR FAST PRODUCTION LINES
LARGER FIELD OF VIEW SCAN BIGGER OBJECTS

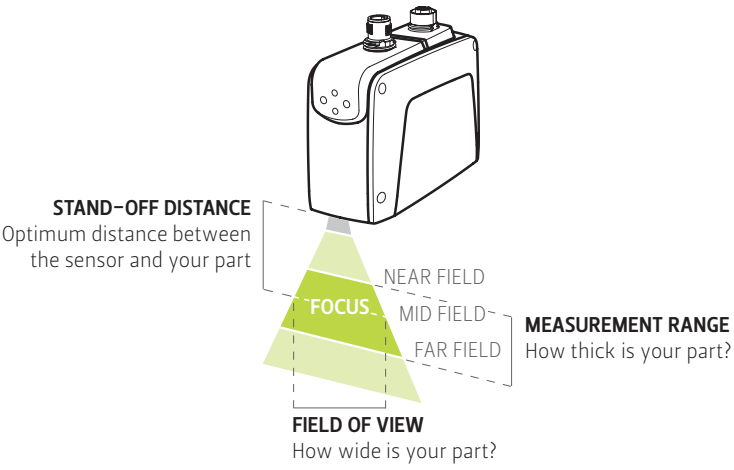
MODEL	ECCO 75.030	ECCO 75.100	ECCO 75.200
Typical field of view [1] near | **mid** | far	34 | **36** | 38 mm	72 | **98** | 124 mm	125 | **190** | 250 mm
Measurement range [1]	16 mm	100 mm	250 mm
Stand-off distance	60 mm	150 mm	325 mm
Typical vertical resolution (Z) [1]	1.4 – 1.8 µm	5 – 12 µm	12 – 50 µm
Typical lateral resolution (Y) [1]	18 – 20 µm	42 – 70 µm	66 – 138 µm
Z-Linearity [2,5]	0.01% (0.1 µm/mm)	0.008% (0.08 µm/mm)	0.01% (0.1 µm/mm)
Z-Repeatability [4,5]	0.1 µm	0.8 µm	6 µm
Weight	Approx. 480 g	Approx. 480 g	Approx. 480 g
Part number	3.002.121	3.002.120	3.002.124

Maximum points / 3D profile	1920
Typical scan rate [3]	Approx. from 150 Hz up to 4 kHz
Typical 3D point rate [3]	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 | storage	0 – 40° C | -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 asessed by scanning a measurement target moving over a conveyor belt 50 times. Measurement perfomed 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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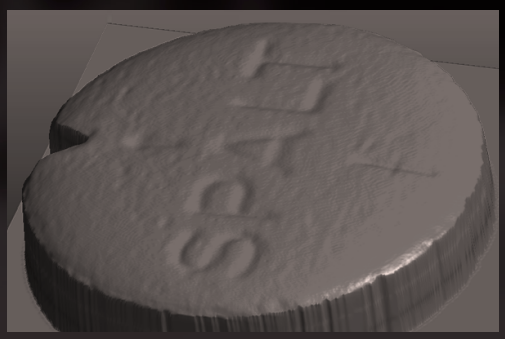
SmartRay CUTTING-EDGE 3D SENSORS FOR INSPECTION, GUIDANCE AND MEASUREMENT

ECCO55



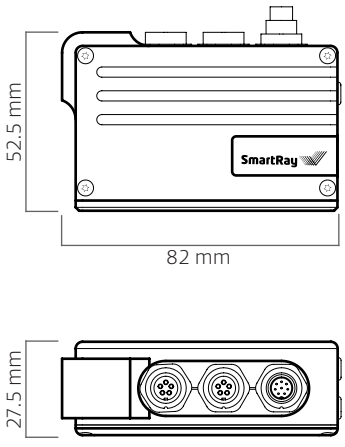
ECONOMIC & COMPACT
FOR HIGHER SPEED APPLICATIONS

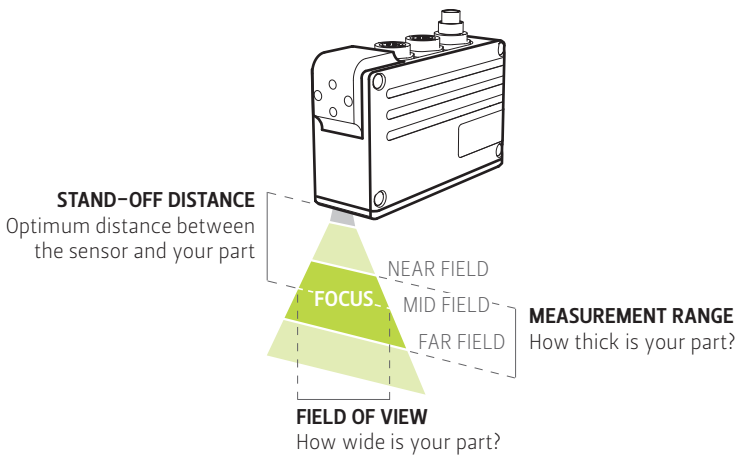
HIGH SCAN RATE FOR FAST PRODUCTION LINES
EXCEPTIONAL VALUE BEST PRICE/PERFORMANCE
SMALLEST LIGHTWEIGHT HOUSING EASY TO FIT ANYWHERE

MODEL	ECCO 55.020	ECCO 55.050	ECCO 55.100
Typical field of view [1] near | **mid** | far	22 | **24** | 26 mm	58 | **69** | 81 mm	88 | **118** | 148 mm
Measurement range [1]	20 mm	60 mm	100 mm
Stand-off distance	70 mm	150 mm	150 mm
Typical vertical resolution (Z) [1]	3.25 – 4.75 µm	13.5 – 27 µm	19 – 53.5 µm
Typical lateral resolution (Y) [1]	35 – 40 µm	85 – 115 µm	136 – 228 µm
Z-Linearity [2,5]	0.01% (0.1 µm/mm)	0.01% (0.1 µm/mm)	0.01% (0.1 µm/mm)
Z-Repeatability [4,5]	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

Maximum points / 3D profile	640
Typical scan rate [3]	Approx. from 400 Hz up to 6 kHz
Typical 3D point rate [3]	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)
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 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 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 asessed by scanning a measurement target moving over a conveyor belt 50 times. Measurement perfomed 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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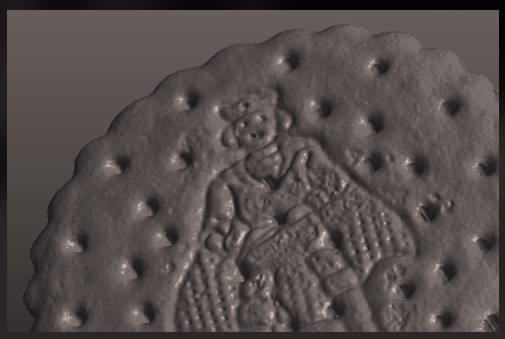
SmartRay CUTTING-EDGE 3D SENSORS FOR INSPECTION, GUIDANCE AND MEASUREMENT

ECCO 35



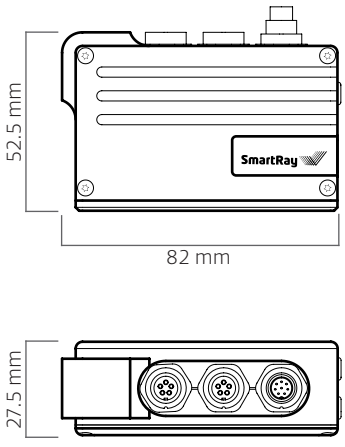
ECONOMIC & COMPACT
FOR STRAIGHTFORWARD APPLICATIONS

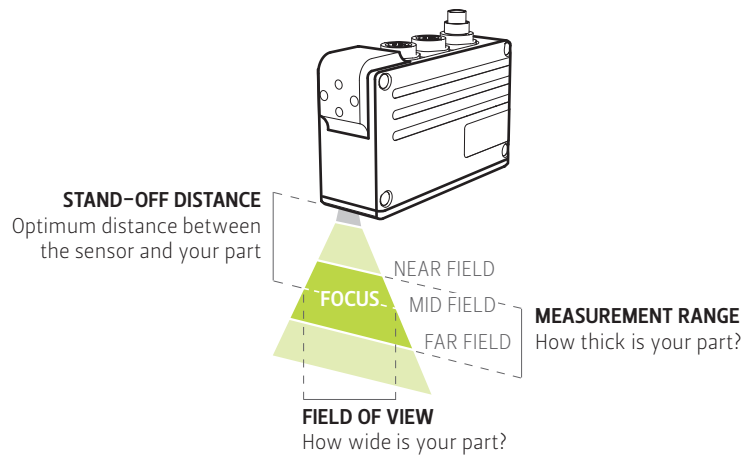
STANDARD SCAN RATE FOR STRAIGHTFORWARD APPLICATIONS
EXCEPTIONAL VALUE BEST PRICE/PERFORMANCE
SMALLEST LIGHTWEIGHT HOUSING EASY TO FIT ANYWHERE

MODEL	ECCO 35.050	ECCO 35.100
Typical field of view [1] near | **mid** | far	41 | **49** | 57 mm	61 | **82** | 103 mm
Measurement range [1]	60 mm	100 mm
Stand-off distance	150 mm	150 mm
Typical vertical resolution (Z) [1]	8.5 – 16.5 µm	11.5 – 32.5 µm
Typical lateral resolution (Y) [1]	57 – 80 µm	82 – 135 µm
Z-Linearity [2,5]	0.02% (0.2 µm/mm)	0.01% (0.1 µm/mm)
Z-Repeatability [4,5]	1.8 µm	3.8 µm
Weight	Approx. 180 g	Approx. 180 g
Part number	3.002.005	3.002.010

Maximum points / 3D profile	752
Typical scan rate [3]	Approx. from 100 Hz up to 500 Hz
Typical 3D point rate [3]	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 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 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 asessed by scanning a measurement target moving over a conveyor belt 50 times. Measurement perfomed 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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MODEL SR5650@85

Typical field of view [1]	near | **mid** | far	26.5 | **27** | 27.5 mm
Measurement range [1]		4 mm
Stand-off distance		85 mm
Typical vertical resolution (Z) [1]		2.1 – 2.2
Typical lateral resolution (Y) [1]		25 – 26 µm
Z-Linearity [2,5]		0.03% (0.3 µm/mm)
Z-Repeatability [4,5]		0.6 µm
Weight		Approx. 2300 g
Part number		3.003.030

Maximum points / 3D profile		1272
Typical scan rate [3]		Approx. from 4 kHz up to 25 kHz
Typical 3D point rate [3]		Approx. from 5 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	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
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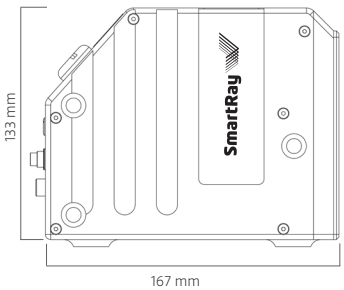
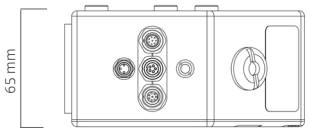
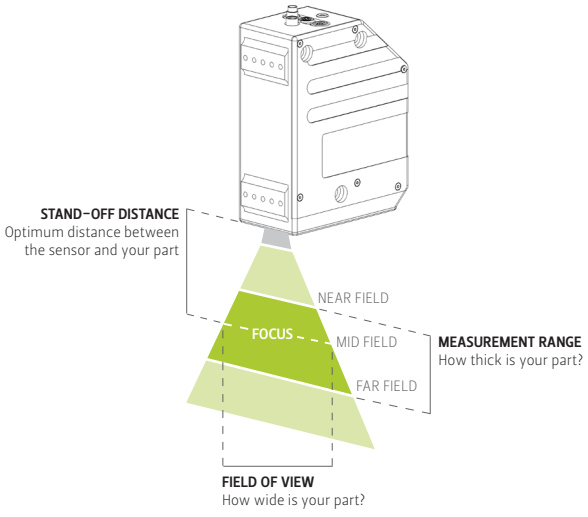
3 Scan rate & point rate are dependent on the configured field of view, measurement range and exposure time. The typical scan/point rate has been estimated with an exposure time of 3 µsec
4 Experimentally asessed by scanning a measurement target moving over a conveyor belt 50 times. Measurement perfomed 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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MODEL		SR9628@160	SR9628@500
Typical field of view [1]	near | mid | far	118 | 130 | 142 mm	295 | 310 | 328 mm
Measurement range [1]		60 mm	140 mm
Stand-off distance		160 mm	500 mm
Typical vertical resolution (Z) [1]		6.5 - 9 µm	46 - 56 µm
Typical lateral resolution (Y) [1]		92 - 110 µm	225 - 310µm
Z-Linearity [2,5]		0.008% (4.8 µm/mm)	0.025% (35 µm/mm)
Z-Repeatability [4,5]		1.4 µm	6 µm
Weight		Approx. 1900 g	Approx. 1900 g
Part number (laser class 2M | 3B)		3.003.001 | 3.003.002	3.003.025 | 3.003.026

Maximum points / 3D profile	1272
Typical scan rate [3]	Approx. from 2.5 kHz up to 25 kHz
Typical 3D point rate [3]	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 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 cable: 6.310.0XX Ethernet cable: 6.302.0XX Encoder cable: 6.307.0XX

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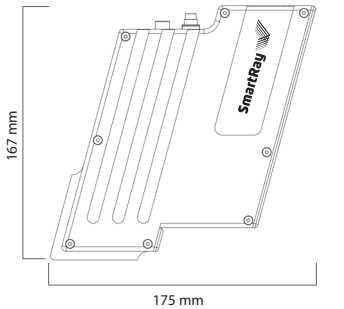

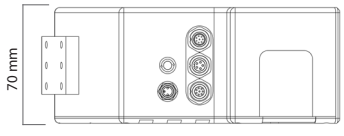

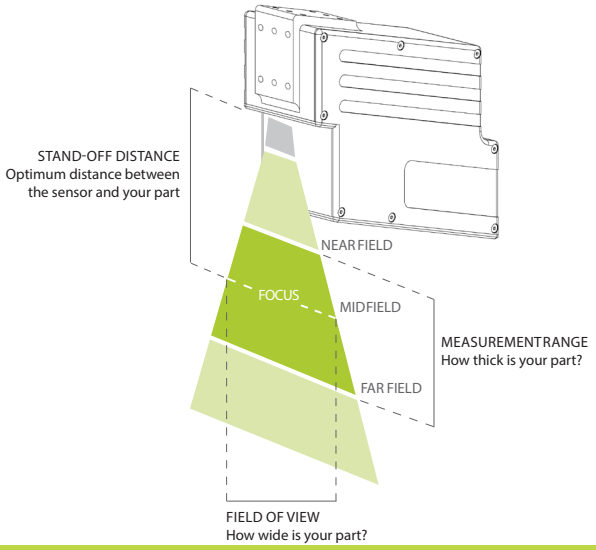

SmartRay GmbH
Bürgermeister-Finsterwalder-Ring 12 | 82515 Wolfratshausen | Germany

www.smartray.de