

Sd = 30 ... 130 mm

- response time < 0,9 ms
- teachable measuring range $S_r > 2$ mm

general data

adjustment	Teach-in: button / external
power on indication	LED green
soiled lens indicator	LED red
light source	pulsed red laser diode
wave length	650 nm
laser class	2
beam type	point

measuring distance Sd = 30 ... 70 mm

Teach-in range min.	> 2 mm
resolution	0,004 ... 0,02 mm
linearity error	$\pm 0,012 \dots \pm 0,06$ mm
beam diameter	1 ... 0,2 mm

measuring distance Sd = 30 ... 130 mm

Teach-in range min.	> 3 mm
resolution	0,005 ... 0,06 mm
linearity error	$\pm 0,015 \dots \pm 0,2$ mm
beam diameter	2 ... 1 mm

electrical data

response time / release time	< 0,9 ms
voltage supply range +Vs	12 ... 28 VDC
current consumption max. (no load)	100 mA
output circuit	analog
short circuit protection	yes
reverse polarity protection	yes, Vs to GND

mechanical data

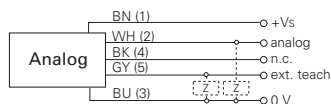
width / diameter	20,6 mm
height / length	65 mm
depth	50 mm
type	rectangular
housing material	die-cast zinc
front (optics)	glass
connection types	connector M12 5 pin, rotatable

ambient conditions

operating temperature	0 ... +50 °C
protection class	IP 67



connection diagram



connectors

ES 34CP2B	5 pin	2 m straight (shielded)
ES 34CP5B	5 pin	5 m straight (shielded)

additional cable connectors and field wireable connectors, see accessories

accessories

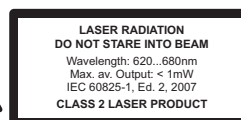
mounting bracket	10131521
protector cap	10156878

for details, see accessories section

remarks

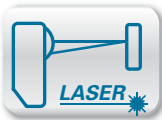
Missed measurements up to 30 cycles will be suppressed. During this time the analog output stays on hold.

laser warning

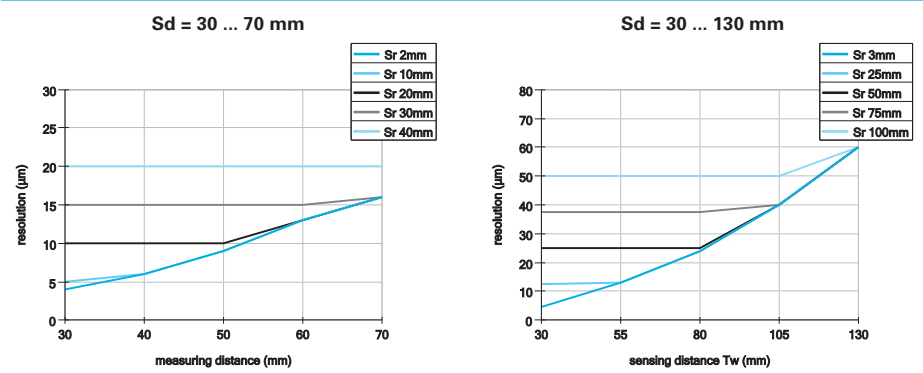


Complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to laser notice No. 50, dated June 24, 2007

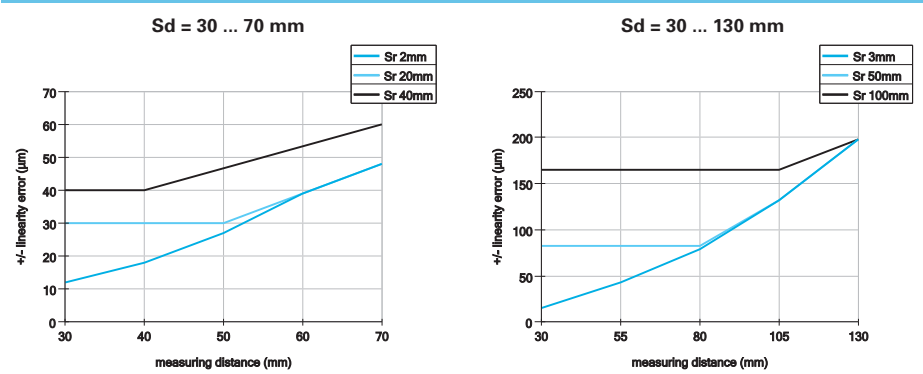
order reference	measuring distance Sd	output signal	load resistance (analog U)	load resistance (analog I)
OADM 20I2441/S14C	30 ... 70 mm	4 ... 20 mA	-	< (+Vs - 6 V) / 0,02 A
OADM 20I2460/S14C	30 ... 130 mm	4 ... 20 mA	-	< (+Vs - 6 V) / 0,02 A
OADM 20U2441/S14C	30 ... 70 mm	0 ... 10 VDC	> 100 kOhm	-
OADM 20U2460/S14C	30 ... 130 mm	0 ... 10 VDC	> 100 kOhm	-



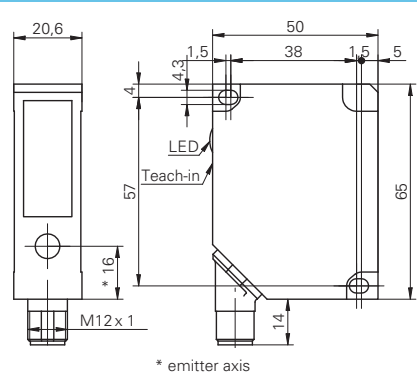
resolution

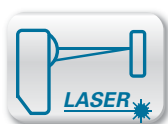


linearity errors



dimension drawing





Sd = 50 ... 600 mm

- response time < 0,9 ms
- teachable measuring range $S_r > 5$ mm

general data

adjustment	Teach-in: button / external
power on indication	LED green
soiled lens indicator	LED red
light source	pulsed red laser diode
wave length	650 nm
laser class	2
beam type	point
beam diameter	2 mm

measuring distance Sd = 50 ... 300 mm

Teach-in range min.	> 5 mm
resolution	0,01 ... 0,33 mm
linearity error	$\pm 0,03 \dots \pm 1$ mm

measuring distance Sd = 100 ... 600 mm

Teach-in range min.	> 10 mm
resolution	0,015 ... 0,67 mm
linearity error	$\pm 0,05 \dots \pm 2$ mm

electrical data

response time / release time	< 0,9 ms
voltage supply range +Vs	12 ... 28 VDC
current consumption max. (no load)	100 mA
output circuit	analog
short circuit protection	yes
reverse polarity protection	yes, Vs to GND

mechanical data

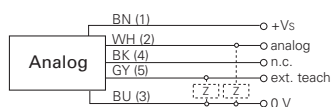
width / diameter	20,6 mm
height / length	65 mm
depth	50 mm
type	rectangular
housing material	die-cast zinc
front (optics)	glass
connection types	connector M12 5 pin, rotatable

ambient conditions

operating temperature	0 ... +50 °C
protection class	IP 67



connection diagram



connectors

ES 34CP2B	5 pin	2 m straight (shielded)
ES 34CP5B	5 pin	5 m straight (shielded)

additional cable connectors and field wireable connectors, see accessories

accessories

mounting bracket	10131521
protector cap	10156878

for details, see accessories section

remarks

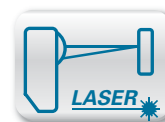
For objects with a reflectivity < 7% (OADM 20x2480/S14C), the response / release time is increased automatically up to max. 2,8 ms. Missed measurements up to 30 cycles will be suppressed. During this time the analog output stays on hold.

laser warning

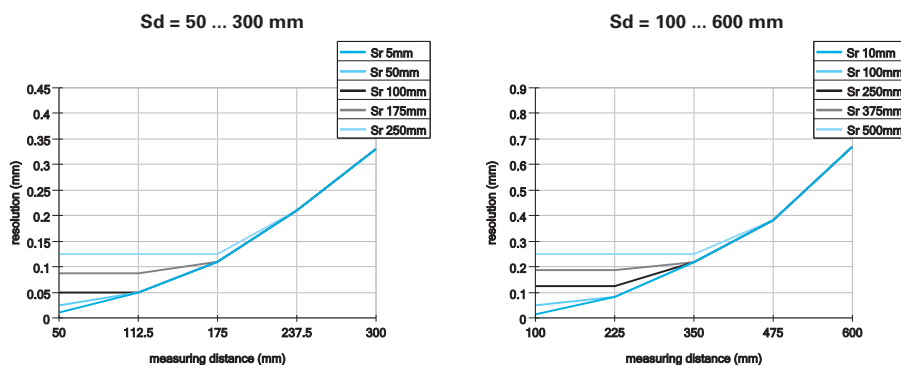


Complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to laser notice No. 50, dated June 24, 2007

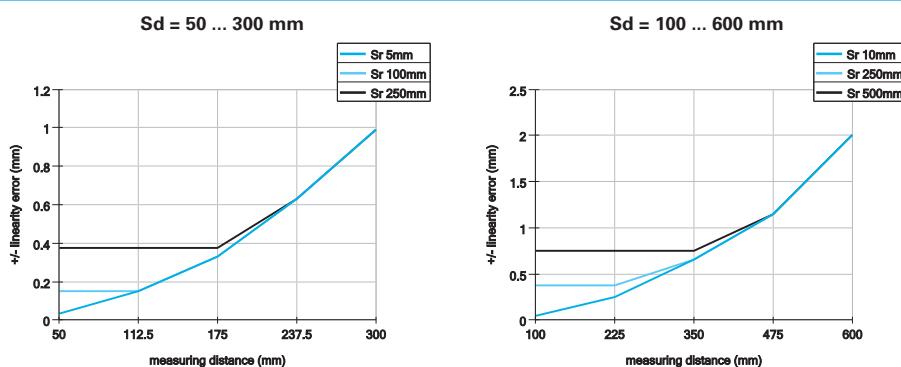
order reference	measuring distance Sd	output signal	load resistance (analog U)	load resistance (analog I)
OADM 20I2472/S14C	50 ... 300 mm	4 ... 20 mA	-	< (+Vs - 6 V) / 0,02 A
OADM 20I2480/S14C	100 ... 600 mm	4 ... 20 mA	-	< (+Vs - 6 V) / 0,02 A
OADM 20U2472/S14C	50 ... 300 mm	0 ... 10 VDC	> 100 kOhm	-
OADM 20U2480/S14C	100 ... 600 mm	0 ... 10 VDC	> 100 kOhm	-



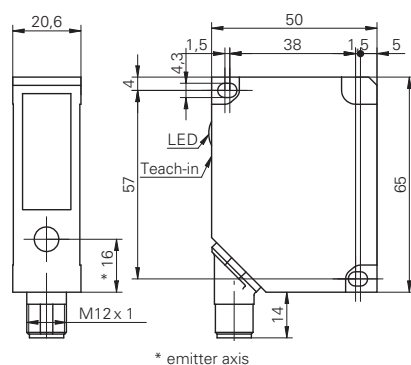
resolution

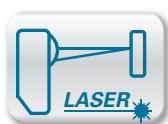


linearity errors



dimension drawing





Sd = 30 ... 300 mm

- response time < 0,9 ms
- teachable measuring range $S_r > 2$ mm
- resolution up to 4 μ m

general data

adjustment	Teach-in: button / external
power on indication	LED green
soiled lens indicator	LED red
light source	pulsed red laser diode
wave length	650 nm
laser class	2

measuring distance Sd = 30 ... 70 mm

Teach-in range min.	> 2 mm
resolution	0,004 ... 0,02 mm
linearity error	$\pm 0,012 \dots \pm 0,06$ mm
temperature drift	< 0,015 % Sde/K

measuring distance Sd = 30 ... 130 mm

Teach-in range min.	> 3 mm
resolution	0,005 ... 0,06 mm
linearity error	$\pm 0,015 \dots \pm 0,2$ mm
temperature drift	< 0,03 % Sde/K

measuring distance Sd = 50 ... 300 mm

Teach-in range min.	> 5 mm
resolution	0,01 ... 0,33 mm
linearity error	$\pm 0,03 \dots \pm 1$ mm
temperature drift	< 0,03 % Sde/K

electrical data

response time / release time	< 0,9 ms
voltage supply range +Vs	12 ... 28 VDC
current consumption max. (no load)	100 mA
output circuit	analog
output signal	4 ... 20 mA / 0 ... 10 VDC
load resistance (analog I)	< (+Vs - 6 V) / 0,02 A
load resistance (analog U)	> 100 kOhm
output current	< 100 mA
alarm output	PNP
short circuit protection	yes
reverse polarity protection	yes, Vs to GND

mechanical data

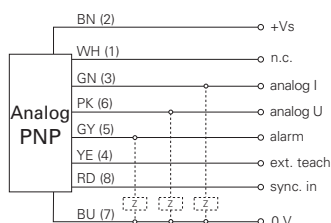
type	rectangular
housing material	die-cast zinc
front (optics)	glass
connection types	connector M12 8 pin, rotatable

ambient conditions

operating temperature	0 ... +50 °C
protection class	IP 67



connection diagram



connectors

ESG 34FP0200B	8 pin	2 m straight (shielded)
ESG 34FP0500B	8 pin	5 m straight (shielded)

additional cable connectors and field wireable connectors, see accessories

accessories

mounting bracket	10131521
protector cap	10156878

for details, see accessories section

laser warning



Complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to laser notice No. 50, dated June 24, 2007

order reference	measuring distance Sd	beam type	beam width	beam height	beam diameter	ambient light immunity
OADM 20I6441/S14F	30 ... 70 mm	point	-	-	1 ... 0,2 mm	< 50 kLux
OADM 20I6460/S14F	30 ... 130 mm	point	-	-	2 ... 1 mm	< 40 kLux
OADM 20I6472/S14F	50 ... 300 mm	point	-	-	2 mm	< 8 kLux
OADM 20I6541/S14F	30 ... 70 mm	line	1 ... 0,2 mm	2 mm	-	< 50 kLux
OADM 20I6560/S14F	30 ... 130 mm	line	2 ... 1 mm	3 ... 5 mm	-	< 40 kLux
OADM 20I6572/S14F	50 ... 300 mm	line	2,5 mm	4 ... 12 mm	-	< 8 kLux

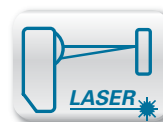


Figure 10 consists of three line graphs showing the relationship between resolution (μm) and measuring distance (mm) for different sensor resolutions (Sr) and measuring distances (Sd).

Graph 1: Sd = 30 ... 70 mm

This graph shows resolution (μm) on the y-axis (0 to 30) versus measuring distance (mm) on the x-axis (30 to 70). The legend indicates Sr values: 2mm, 10mm, 20mm, 30mm, and 40mm. The resolution increases linearly with measuring distance for all Sr values, starting from approximately 4 μm at 30 mm and reaching about 16 μm at 70 mm.

Graph 2: Sd = 30 ... 130 mm

This graph shows resolution (μm) on the y-axis (0 to 80) versus sensing distance Tw (mm) on the x-axis (30 to 130). The legend indicates Sr values: 3mm, 25mm, 50mm, 75mm, and 100mm. The resolution increases linearly with sensing distance for all Sr values, starting from approximately 4 μm at 30 mm and reaching about 60 μm at 130 mm.

Graph 3: Sd = 50 ... 300 mm

This graph shows resolution (mm) on the y-axis (0 to 0.45) versus measuring distance (mm) on the x-axis (50 to 300). The legend indicates Sr values: 5mm, 50mm, 100mm, 175mm, and 250mm. The resolution increases linearly with measuring distance for all Sr values, starting from approximately 0.02 mm at 50 mm and reaching about 0.35 mm at 300 mm.

Figure 10 consists of three line graphs showing the relationship between measuring distance (mm) on the x-axis and $\pm$ linearity error (μm) on the y-axis. The graphs are for different sensor resolutions (Sd) and sensor resolutions (Sr).

Graph 1: Sd = 30 ... 70 mm

This graph shows the relationship for Sd = 30 ... 70 mm. The x-axis ranges from 30 to 70 mm, and the y-axis ranges from 0 to 70 μm . The legend indicates four data series: Sr 2mm (blue), Sr 20mm (cyan), Sr 40mm (black), and Sr 2mm (blue). The error increases linearly with measuring distance for all series.

measuring distance (mm)	Sr 2mm (μm)	Sr 20mm (μm)	Sr 40mm (μm)
30	12	30	40
40	18	30	40
50	28	30	48
60	38	40	55
70	48	50	62

Graph 2: Sd = 30 ... 130 mm

This graph shows the relationship for Sd = 30 ... 130 mm. The x-axis ranges from 30 to 130 mm, and the y-axis ranges from 0 to 250 μm . The legend indicates four data series: Sr 3mm (blue), Sr 50mm (cyan), Sr 100mm (black), and Sr 3mm (blue). The error increases linearly with measuring distance for all series.

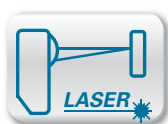
measuring distance (mm)	Sr 3mm (μm)	Sr 50mm (μm)	Sr 100mm (μm)
30	15	85	165
55	45	85	165
80	80	85	165
105	135	140	165
130	200	200	200

Graph 3: Sd = 50 ... 300 mm

This graph shows the relationship for Sd = 50 ... 300 mm. The x-axis ranges from 50 to 300 mm, and the y-axis ranges from 0 to 1.2 mm. The legend indicates four data series: Sr 5mm (blue), Sr 100mm (cyan), Sr 250mm (black), and Sr 5mm (blue). The error increases linearly with measuring distance for all series.

measuring distance (mm)	Sr 5mm (mm)	Sr 100mm (mm)	Sr 250mm (mm)
50	0.05	0.15	0.38
112.5	0.15	0.15	0.38
175	0.35	0.35	0.38
237.5	0.65	0.65	0.65
300	1.00	1.00	1.00

[illegible]



Sd = 100 ... 1000 mm

- response time < 0,9 ms
- teachable measuring range $S_r > 10$ mm
- resolution up to 15 μ m

general data

adjustment	Teach-in: button / external
power on indication	LED green
soiled lens indicator	LED red
light source	pulsed red laser diode
wave length	650 nm
laser class	2

measuring distance Sd = 100 ... 600 mm

Teach-in range min.	> 10 mm
resolution	0,015 ... 0,67 mm
linearity error	$\pm 0,05$... ± 2 mm
temperature drift	< 0,03 % Sde/K

measuring distance Sd = 200 ... 1000 mm

Teach-in range min.	> 20 mm
resolution	0,12 ... 2,5 mm
linearity error	$\pm 0,48$... ± 10 mm
temperature drift	< 0,06 % Sde/K

electrical data

response time / release time	< 0,9 ms
voltage supply range +Vs	12 ... 28 VDC
current consumption max. (no load)	100 mA
output circuit	analog
output signal	4 ... 20 mA / 0 ... 10 VDC
load resistance (analog I)	< (+Vs - 6 V) / 0,02 A
load resistance (analog U)	> 100 kOhm
output current	< 100 mA
alarm output	PNP
short circuit protection	yes
reverse polarity protection	yes, Vs to GND

mechanical data

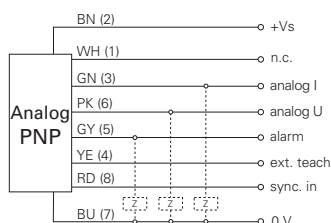
width / diameter	20,6 mm
height / length	65 mm
depth	50 mm
type	rectangular
housing material	die-cast zinc
front (optics)	glass
connection types	connector M12 8 pin, rotatable

ambient conditions

operating temperature	0 ... +50 °C
protection class	IP 67



connection diagram



connectors

ESG 34FP0200B	8 pin	2 m straight (shielded)
ESG 34FP0500B	8 pin	5 m straight (shielded)

additional cable connectors and field wireable connectors, see accessories

accessories

mounting bracket	10131521
protector cap	10156878

for details, see accessories section

remarks

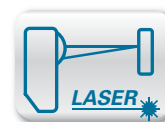
For objects with a reflectivity < 7 % (OADM 20I6x80/S14F) or < 15 % (OADM 20I6x81/S14F) the response time/release time is increased automatically up to 2,8 ms.

laser warning

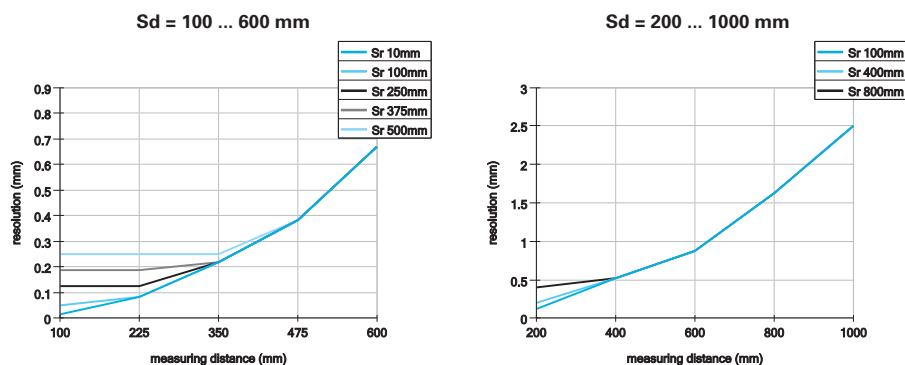


Complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to laser notice No. 50, dated June 24, 2007

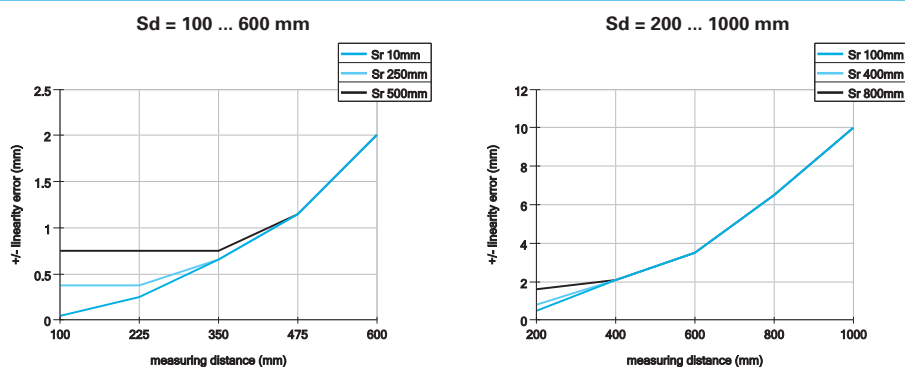
order reference	measuring distance Sd	beam type	beam width	beam height	beam diameter	ambient light immunity
OADM 20I6480/S14F	100 ... 600 mm	point	-	-	2 mm	< 10 kLux
OADM 20I6481/S14F	200 ... 1000 mm	point	-	-	2 mm	< 5 kLux
OADM 20I6580/S14F	100 ... 600 mm	line	2,5 mm	5,5 ... 21 mm	-	< 10 kLux
OADM 20I6581/S14F	200 ... 1000 mm	line	2,5 mm	8,5 ... 35 mm	-	< 5 kLux



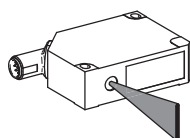
resolution



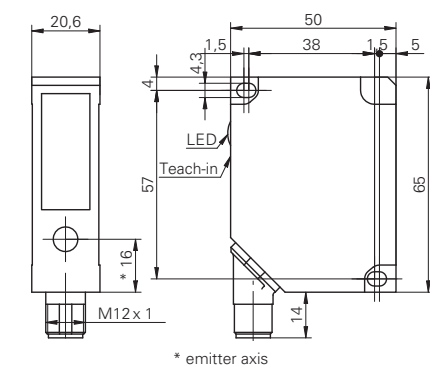
linearity errors

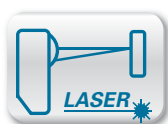


beam alignment (line)



dimension drawing





Sd = 30 ... 250 mm

- serial interface RS 485
- resolution up to 50 µm
- also with laser line for rough surfaces

general data

adjustment	no
power on indication	LED green
soiled lens indicator	LED red
light source	pulsed red laser diode
wave length	650 nm
laser class	2

measuring distance Sd = 30 ... 50 mm

resolution	< 0,01 mm
linearity error	± 0,03 mm
temperature drift	< 0,015 % Sde/K

measuring distance Sd = 30 ... 130 mm

resolution	0,05 ... 0,07 mm
linearity error	± 0,15 ... ± 0,22 mm
temperature drift	< 0,03 % Sde/K

measuring distance Sd = 50 ... 250 mm

resolution	0,1 ... 0,3 mm
linearity error	± 0,3 ... ± 0,8 mm
temperature drift	< 0,03 % Sde/K

electrical data

response time / release time	< 10 ms
voltage supply range +Vs	12 ... 28 VDC
current consumption max. (no load)	100 mA
output circuit	RS 485
baud rate	19200
output current	< 100 mA
alarm output	push-pull
short circuit protection	yes
reverse polarity protection	yes, Vs to GND

mechanical data

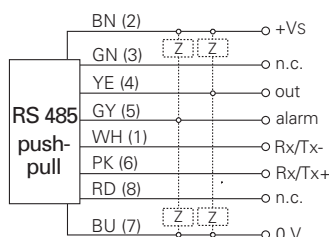
width / diameter	20,6 mm
height / length	65 mm
depth	50 mm
type	rectangular
housing material	die-cast zinc
front (optics)	glass
connection types	connector M12 8 pin, rotatable

ambient conditions

operating temperature	0 ... +50 °C
protection class	IP 67



connection diagram



connectors

ESG 34FP0200B	8 pin	2 m straight (shielded)
ESG 34FP0500B	8 pin	5 m straight (shielded)

additional cable connectors and field wireable connectors, see accessories

accessories

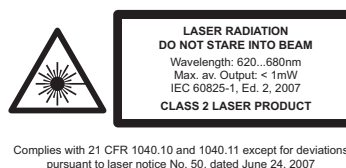
mounting bracket	10131521
protector cap	10156878

for details, see accessories section

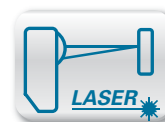
remarks

The sensor has a switching output (out) that is activated when the measurement is determined within the range between threshold 1 and threshold 2. Both thresholds can be set via interface.

laser warning

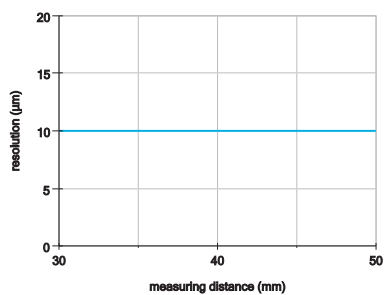


order reference	measuring distance Sd	beam type	beam width	beam height	beam diameter	ambient light immunity
OADM 20S4440/S14F	30 ... 50 mm	point	-	-	1 ... 0,4 mm	< 10 kLux
OADM 20S4460/S14F	30 ... 130 mm	point	-	-	2 ... 1 mm	< 7 kLux
OADM 20S4470/S14F	50 ... 250 mm	point	-	-	2 mm	< 3 kLux
OADM 20S4540/S14F	30 ... 50 mm	line	1 ... 0,4 mm	2 mm	-	< 10 kLux
OADM 20S4560/S14F	30 ... 130 mm	line	2 ... 1 mm	3 ... 5 mm	-	< 4 kLux
OADM 20S4570/S14F	50 ... 250 mm	line	2,5 mm	4 ... 10 mm	-	< 2,5 kLux

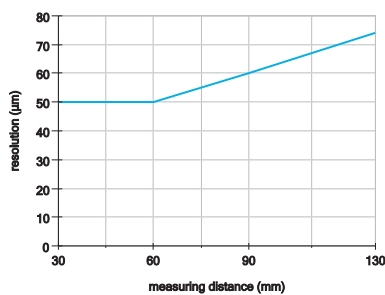


resolution

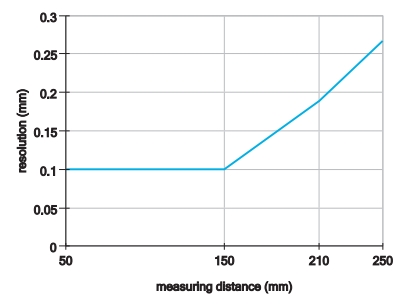
Sd = 30 ... 50 mm



Sd = 30 ... 130 mm

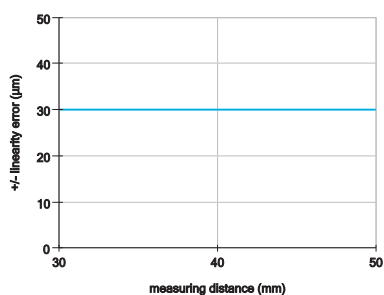


Sd = 50 ... 250 mm

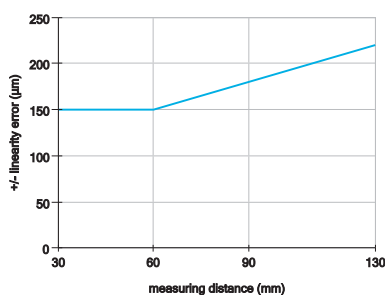


linearity errors

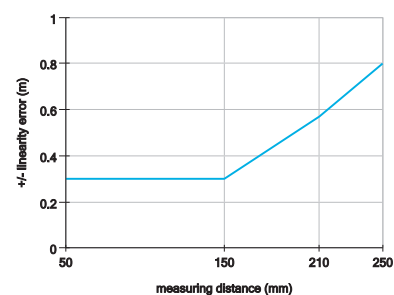
Sd = 30 ... 50 mm



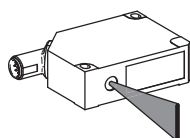
Sd = 30 ... 130 mm



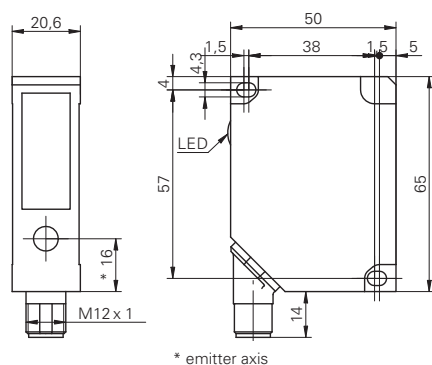
Sd = 50 ... 250 mm

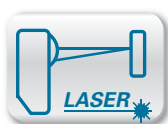


beam alignment (line)



dimension drawing





Sd = 100 ... 1000 mm

- serial interface RS 485
- resolution up to 0,2 mm
- also with laser line for rough surfaces

general data

adjustment	no
power on indication	LED green
soiled lens indicator	LED red
light source	pulsed red laser diode
wave length	650 nm
laser class	2

measuring distance Sd = 100 ... 500 mm

resolution	0,2 ... 0,5 mm
linearity error	± 0,8 ... ± 2 mm
temperature drift	< 0,04 % Sde/K

measuring distance Sd = 200 ... 1000 mm

resolution	0,6 ... 2,5 mm
linearity error	± 2,4 ... ± 10 mm
temperature drift	< 0,06 % Sde/K

electrical data

response time / release time	< 10 ms
voltage supply range +Vs	12 ... 28 VDC
current consumption max. (no load)	100 mA
output circuit	RS 485
baud rate	19200
output current	< 100 mA
alarm output	push-pull
short circuit protection	yes
reverse polarity protection	yes, Vs to GND

mechanical data

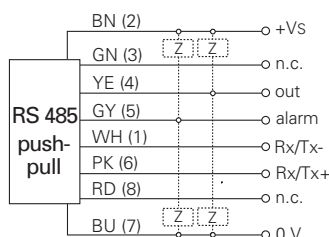
width / diameter	20,6 mm
height / length	65 mm
depth	50 mm
type	rectangular
housing material	die-cast zinc
front (optics)	glass
connection types	connector M12 8 pin, rotatable

ambient conditions

operating temperature	0 ... +50 °C
protection class	IP 67



connection diagram



connectors

ESG 34FP0200B	8 pin	2 m straight (shielded)
ESG 34FP0500B	8 pin	5 m straight (shielded)

additional cable connectors and field wireable connectors, see accessories

accessories

mounting bracket	10131521
protector cap	10156878

for details, see accessories section

remarks

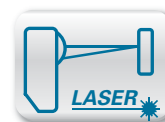
The sensor has a switching output (out) that is activated when the measurement is determined within the range between threshold 1 and threshold 2. Both thresholds can be set via interface.

laser warning



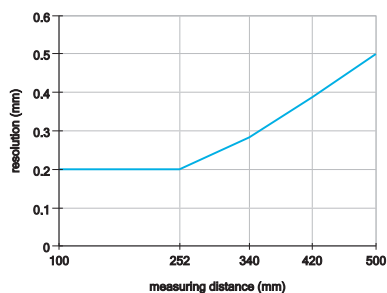
Complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to laser notice No. 50, dated June 24, 2007

order reference	measuring distance Sd	beam type	beam width	beam height	beam diameter	ambient light immunity
OADM 20S4471/S14F	100 ... 500 mm	point	-	-	2 mm	< 16 kLux
OADM 20S4481/S14F	200 ... 1000 mm	point	-	-	2 mm	< 3 kLux
OADM 20S4571/S14F	100 ... 500 mm	line	2,5 mm	5,5 ... 18 mm	-	< 12 kLux
OADM 20S4581/S14F	200 ... 1000 mm	line	2,5 mm	8,5 ... 35 mm	-	< 2,5 kLux

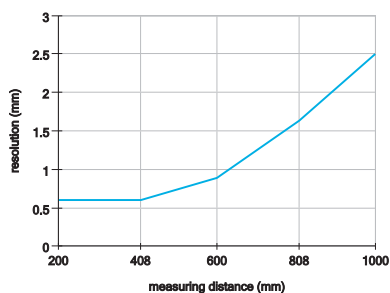


resolution

Sd = 100 ... 500 mm

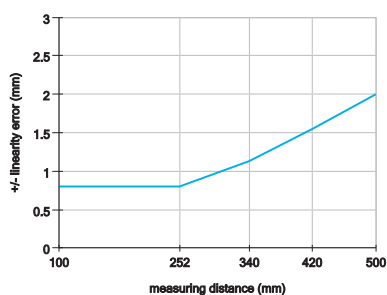


Sd = 200 ... 1000 mm

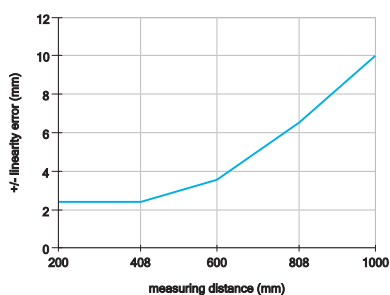


linearity errors

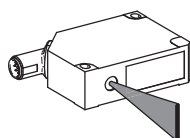
Sd = 100 ... 500 mm



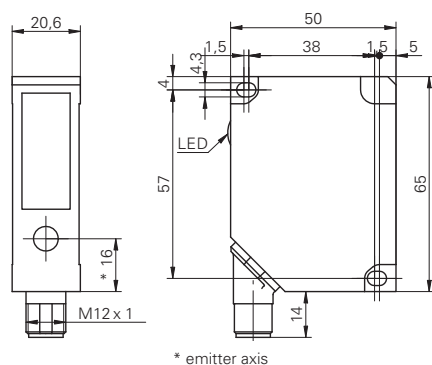
Sd = 200 ... 1000 mm

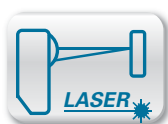


beam alignment (line)



dimension drawing





Sd = 50 ... 1000 mm

- for demanding applications
- very high ambient light immunity
- extremely vibration resistant



general data

adjustment	Teach-in: button / external
power on indication	LED green
soiled lens indicator	LED red
light source	pulsed red laser diode
wave length	650 nm
laser class	2
beam type	line
temperature drift	< 0,04 % Sde/K

measuring distance Sd = 50 ... 300 mm

Teach-in range min.	> 5 mm
resolution	0,01 ... 0,4 mm
linearity error	± 0,2 ... ± 1,5 mm
beam width	2 mm
beam height	6 ... 11 mm

measuring distance Sd = 100 ... 600 mm

Teach-in range min.	> 10 mm
resolution	0,015 ... 0,8 mm
linearity error	± 0,5 ... ± 3,4 mm
beam width	2 mm
beam height	7 ... 17 mm

measuring distance Sd = 200 ... 1000 mm

Teach-in range min.	> 20 mm
resolution	0,12 ... 3 mm
linearity error	± 0,36 ... ± 9 mm
beam width	3 ... 1 mm
beam height	8 ... 25 mm

electrical data

voltage supply range +Vs	12 ... 28 VDC
current consumption max. (no load)	100 mA
output signal	4 ... 20 mA / 0 ... 10 VDC
load resistance (analog I)	< (+Vs - 6 V) / 0,02 A
load resistance (analog U)	> 100 kOhm
output current	< 100 mA
alarm output	PNP
reverse polarity protection	yes, Vs to GND

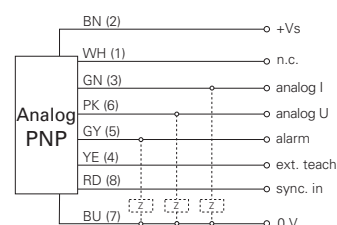
mechanical data

type	rectangular
housing material	die-cast zinc
front (optics)	glass
connection types	cable 8 pin, 2 m

ambient conditions

operating temperature	-20 ... +60 °C
protection class	IP 67

connection diagram



accessories

mounting bracket	10131521
protector cap	10156878
for details, see accessories section	

remarks

Fault suppression
If the laser beam is interrupted or if measurement faults occur, the analog outputs and the alarm output remain at their most recent valid value for a max. of 300 ms. Every valid value is immediately passed on to the outputs. If no valid value appears within 300 ms, the analog outputs switch to 4 mA / 0 V and the alarm output goes to HIGH.

Vibration stability:
- IEC 60068-2-6 (30 g, 10-2000 Hz, per axis)

Random stability:
- IEC 60068-2-64 (0,4 g²/Hz, 20-1000 Hz, per axis)

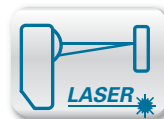
Bump stability:
- IEC 60068-2-29 (75 g, 6 ms, 4000 pulses per axis and direction)

laser warning

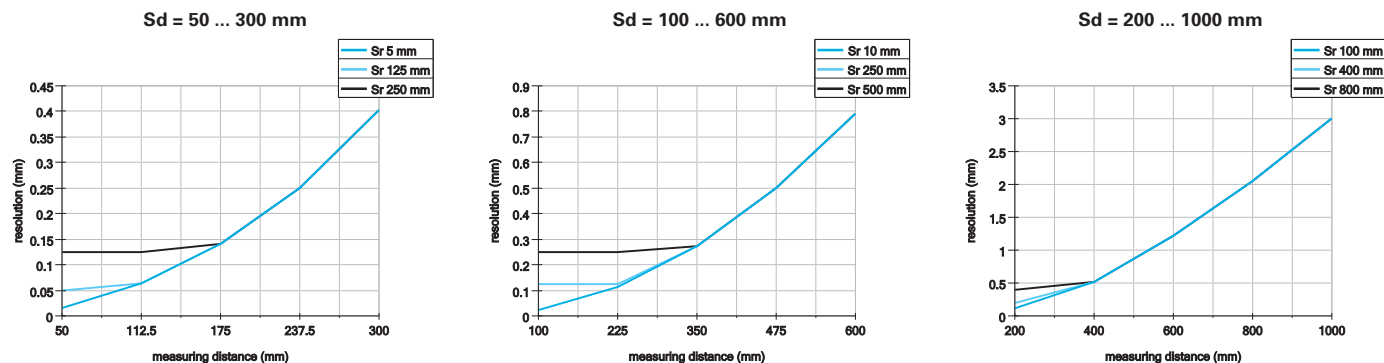


Complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to laser notice No. 50, dated June 24, 2007

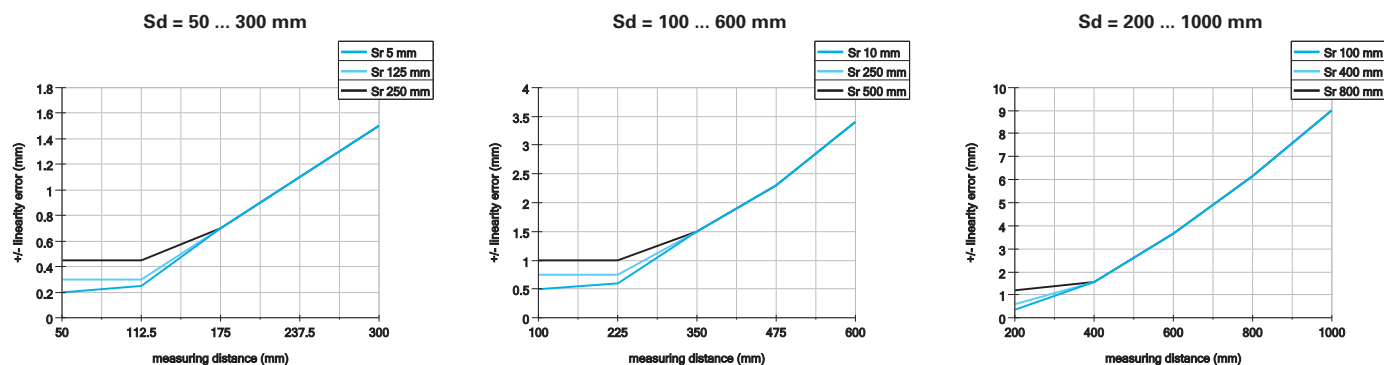
order reference	measuring distance Sd	response time / release time	short circuit protection	ambient light immunity
OADM 2016591	50 ... 300 mm	< 2 ms	yes	< 100 kLux
OADM 2016592	100 ... 600 mm	< 2,5 ms	yes	< 100 kLux
OADM 2016593	200 ... 1000 mm	< 3,5 ms	-	< 60 kLux



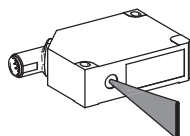
resolution



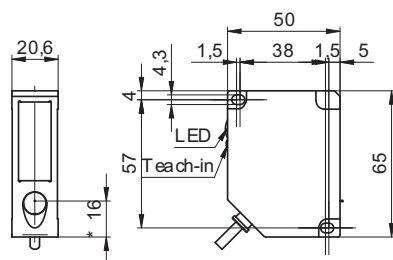
linearity errors



beam alignment (line)



dimension drawing



* emitter axis