

GS 754B CCD Forked Photoelectric Sensors

Technical description
configuration version 1.0



Sales and Service

Germany

Sales Region North

Phone 07021/573-306
 Fax Int. + 54 1148 361053

Postal code areas
 20000-38999
 40000-65999
 97000-97999

Sales Region South

Phone 07021/573-307
 Fax 07021/9850911

Postal code areas
 66000-96999

Sales Region East

Phone 035027/629-106
 Fax 035027/629-107

Postal code areas
 01000-19999
 39000-39999
 98000-99999

Worldwide

AR (Argentina)

Condelectric S.A.
 Tel. Int. + 54 1148 361053
 Fax Int. + 54 1148 361053

AT (Austria)

Schmachtl GmbH
 Tel. Int. + 43 732 7646-0
 Fax Int. + 43 732 7646-785

AU + NZ (Australia + New Zealand)

Balluff-Leuze Pty. Ltd.
 Tel. Int. + 61 3 9720 4100
 Fax Int. + 61 3 9738 2677

BE (Belgium)

Leuze electronic nv/sa
 Tel. Int. + 32 2253 16-00
 Fax Int. + 32 2253 15-36

BG (Bulgaria)

ATICS
 Tel. Int. + 359 2 847 6244
 Fax Int. + 359 2 847 6244

BR (Brasil)

Leuze electronic Ltda.
 Tel. Int. + 55 11 5180-6130
 Fax Int. + 55 11 5180-6141

CH (Switzerland)

Leuze electronic AG
 Tel. Int. + 41 41 784 5656
 Fax Int. + 41 41 784 5657

CL (Chile)

Imp. Tec. Vignola S.A.I.C.
 Tel. Int. + 56 3235 11-11
 Fax Int. + 56 3235 11-28

CN (China)

Leuze electronic Trading
 (Shenzhen) Co. Ltd.
 Tel. Int. + 86 755 862 64909
 Fax Int. + 86 755 862 64901

CO (Colombia)

Componentes Electronicas Ltda.
 Tel. Int. + 57 4 3511049
 Fax Int. + 57 4 3511019

CZ (Czech Republic)

Schmachtl CZ s.r.o.
 Tel. Int. + 420 244 0015-00
 Fax Int. + 420 244 9107-00

DK (Denmark)

Leuze electronic Scandinavia ApS
 Tel. Int. + 45 48 173200

ES (Spain)

Leuze electronic S.A.
 Tel. Int. + 34 93 4097900
 Fax Int. + 34 93 49035820

FI (Finland)

SKS-automatio Oy
 Tel. Int. + 358 20 764-61
 Fax Int. + 358 20 764-6820

FR (France)

Leuze electronic Sarl.
 Tel. Int. + 33 160 0512-20
 Fax Int. + 33 160 0503-65

GB (United Kingdom)

Leuze electronic Ltd.
 Tel. Int. + 44 14 8040 85-00
 Fax Int. + 44 14 8040 38-08

GR (Greece)

UTEKO A.B.E.E.
 Tel. Int. + 30 211 1206 900
 Fax Int. + 30 211 1206 999

HK (Hong Kong)

Sensortech Company
 Tel. Int. + 852 26510188
 Fax Int. + 852 26510388

HR (Croatia)

Tipteh Zagreb d.o.o.
 Tel. Int. + 385 1 381 6574
 Fax Int. + 385 1 381 6577

HU (Hungary)

Kvaik Automatik Kft.
 Tel. Int. + 36 1 272 2242
 Fax Int. + 36 1 272 2244

ID (Indonesia)

P.T. Yabestindo Mitra Utama
 Tel. Int. + 62 21 92861859
 Fax Int. + 62 21 6451044

IL (Israel)

Galco electronics Ltd.
 Tel. Int. + 972 3 9023456
 Fax Int. + 972 3 9021990

IN (India)

M + V Marketing Sales Pvt Ltd.
 Tel. Int. + 91 124 4121623
 Fax Int. + 91 124 434223

IT (Italy)

Leuze electronic S.r.l.
 Tel. Int. + 39 02 26 1106-43
 Fax Int. + 39 02 26 1106-40

JP (Japan)

C. Illies & Co., Ltd.
 Tel. Int. + 81 3 3443 4143
 Fax Int. + 81 3 3443 4118

KE (Kenia)

Profa-Tech Ltd.
 Tel. Int. + 254 20 828095/6
 Fax Int. + 254 20 828129

KR (South Korea)

Leuze electronic Co., Ltd.
 Tel. Int. + 82 31 3828228
 Fax Int. + 82 31 3828522

MK (Macedonia)

Tipteh d.o.o. Skopje
 Tel. Int. + 389 70 399 474
 Fax Int. + 389 23 174 197

MX (Mexico)

Movitren S.A.
 Tel. Int. + 52 81 8371 8616
 Fax Int. + 52 81 8371 8588

MY (Malaysia)

Ingermark (M) SDN BHD
 Tel. Int. + 60 360 3427-88
 Fax Int. + 60 360 3421-88

NG (Nigeria)

SABROW HI-TECH E. & A. LTD.
 Tel. Int. + 234 80333 86366
 Fax Int. + 234 80333 84463518

NL (Netherlands)

Leuze electronic BV
 Tel. Int. + 31 418 65 35-44
 Fax Int. + 31 418 65 38-08

NO (Norway)

Elteco A/S
 Tel. Int. + 47 35 56 20-70
 Fax Int. + 47 35 56 20-99

PL (Poland)

Balluff Sp. z o. o.
 Tel. Int. + 48 71 338 49 29
 Fax Int. + 48 71 338 49 30

PT (Portugal)

LA2P, Lda.
 Tel. Int. + 351 21 4 447070
 Fax Int. + 351 21 4 447075

RO (Romania)

O BOYLE s.r.l.
 Tel. Int. + 40 2 56201346
 Fax Int. + 40 2 56221036

RS (Republic of Serbia)

Tipteh d.o.o. Beograd
 Tel. Int. + 381 11 3131 057
 Fax Int. + 381 11 3018 326

RU (Russian Federation)

ALL IMPEX 2001
 Tel. Int. + 7 495 9213012
 Fax Int. + 7 495 6482092

SE (Sweden)

Leuze electronic Scandinavia ApS
 Tel. Int. +46 380-490951

SG + PH (Singapore + Philippines)

Balluff Asia Pte Ltd
 Tel. Int. + 65 6252 43-84
 Fax Int. + 65 6252 90-60

SI (Slovenia)

Tipteh d.o.o.
 Tel. Int. + 386 1200 51-50
 Fax Int. + 386 1200 51-51

SK (Slovakia)

Schmachtl SK s.r.o.
 Tel. Int. + 421 2 58275600
 Fax Int. + 421 2 58275601

TH (Thailand)

Industrial Electrical Co. Ltd.
 Tel. Int. + 66 2 642 6700
 Fax Int. + 66 2 642 4250

TR (Turkey)

Leuze electronic San.ve Tic.Ltd.Sti.
 Tel. Int. + 90 216 456 6704
 Fax Int. + 90 216 456 3650

TW (Taiwan)

Great Colue Technology Co., Ltd.
 Tel. Int. + 886 2 2983 80-77
 Fax Int. + 886 2 2983 33-73

UA (Ukraine)

SV Altera OOO
 Tel. Int. + 38 044 4961888
 Fax Int. + 38 044 4961818

US + CA (United States + Canada)

Leuze electronic, Inc.
 Tel. Int. + 1 248 486-4466
 Fax Int. + 1 248 486-6699

ZA (South Africa)

Contapulse Controls (PTY). Ltd.
 Tel. Int. + 27 116 1575-56
 Fax Int. + 27 116 1575-13

1	General information	5
1.1	Explanation of symbols	5
1.2	Declaration of conformity	5
2	Safety Notices	6
2.1	Safety standards	6
2.2	Approved purpose	6
2.3	Organizing measures	6
3	Controls and indicators	7
4	Description	8
4.1	General description	8
5	Optical data	8
6	LED indicators	9
7	Device configuration	10
7.1	General information	10
7.1.1	Terminal program	10
7.2	Basic configuration of the terminal program (interface P)	10
7.3	Configuration of the measurement, analysis and output procedures over interface P ...	10
7.3.1	Configuration table for GS 754B ... -27.....	11
8	Precision and linearity	13
9	Error messages (interfaces P and M 12)	14
10	Digital measurement value output (P and M 12 interfaces)	16
10.1	ASCII format for P and M12 interfaces	16
10.2	Binary format for the P and M12 interfaces	18
11	Analog measurement value output (interface M 12)	20
12	Typical areas of application	21
12.1	Diameter detection	21
12.2	ASCII display via RS 232 (P and M12 interfaces)	21
12.2.1	Binary display via RS 232 (P and M12 interfaces)	22

13	Edge detection and height verification	23
14	Special configurations	24
14.1	Teachable single-object- and edge-measurement for devices with analog output. . .	24
14.1.1	Teach-in in the middle of the measurement field	24
14.1.2	Teach-in at the end of the measurement field	24
14.1.3	Teach-in at the start of the measurement field.	25
14.2	Changeover of the edge assignment for single-object measurement	25
14.3	Edge measurement for non-continuous objects	26
14.4	Level changeover for switching output PIN 2	26
14.4.1	Standard function	26
14.4.2	Standard function, inverted	26
14.4.3	Photoelectric sensor function, dark switching	27
14.4.4	Photoelectric sensor function, light switching	27

1 General information

1.1 Explanation of symbols

The symbols used in this technical description are explained below.

**Attention**

This symbol precedes text messages which must strictly be observed. Failure to comply with this information results in injuries to personnel or damage to the equipment.

**Notice**

This symbol indicates text passages containing important information.

1.2 Declaration of conformity

The GS 754B CCD forked photoelectric sensors have been developed and manufactured in accordance with the applicable European standards and directives.

**Notice**

A corresponding Declaration of Conformity can be requested from the manufacturer.

The manufacturer of the GS 754B CCD Forked Photoelectric Sensors, Leuze electronic GmbH+Co. in D-73277 Owen/Teck, possesses a certified quality assurance system in accordance with ISO 9001.



2 Safety Notices

2.1 Safety standards

The GS 754B CCD Forked Photoelectric Sensors were developed in accordance with the applicable safety standards and tested by the manufacturer.

2.2 Approved purpose

In connection with a connected control system or evaluation unit, GS 754B CCD forked photoelectric sensors are used to detect and measure small objects in industrial production processes.

**Attention**

The protection of personnel and the device cannot be guaranteed if the device is operated in a manner not corresponding to its intended use.

**Attention**

Access and changes to the device, except where expressly described in this operating manual, are not authorized.

2.3 Organizing measures

All information in this technical description, particularly the "Safety Notices" section must be observed without fail.

Keep this technical description in a safe place. It should be available at all times.

Observe the locally applicable legal regulations and the rules of the employer's liability insurance association.

Mounting, commissioning and maintenance of the device must only be carried out by qualified personnel. Electrical work must be carried out by a certified electrician.

Repairs, particularly opening the housing, may only be performed by the manufacturer or a person authorized by the manufacturer.

3 Controls and indicators

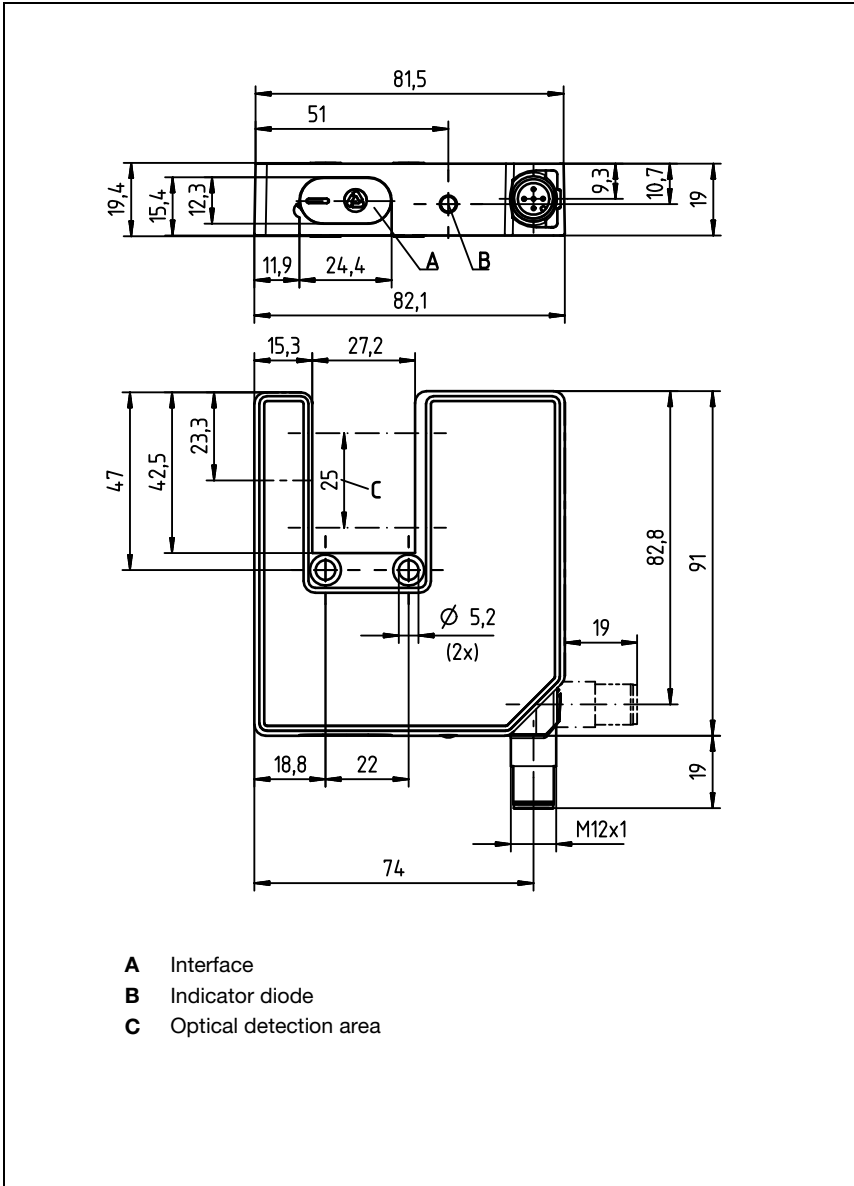


Figure 3.1: Positioning of the controls and indicators

4 Description

4.1 General description

The central part of the unit is an optical sensor that generates a horizontal band of light (figure 3.1). The band of light illuminates a CCD line array camera. This CCD array produces an output signal that depends on the number of illuminated pixels.

The system has a permanent calibration and guarantees maximum precision and stability at all times.

Every sensor features two interfaces (see figure 3.1).

1. Interface P (standard interface RS 232):
programming interface for configuring the measurement modes and for visualizing the measurement values.
2. Interface M12 (process interface):
data for the control system are transmitted via this interface. Depending on the sensor type used, the measurement values are output either in analog or digital form.

Depending on the sensor type used, not all measurement values are available at the P and M12 interfaces.

Example: Analog interface can only output one measurement value at a time. The digital interface can output any number of measurement values.

5 Optical data

GS 754B ... -27...		
	Output modes 1 ... 5	Output mode 7
Measurement range	25 mm	25 mm
Mouth width	27 mm	27 mm
Mouth depth	42 mm	42 mm
Resolution	≤ 0.1 mm over the entire measurement range	≥ 0.014 mm per measurement level
Smallest object	≥ 0.5 mm	≥ 0.5 mm
Light source	infrared LED	infrared LED
Wavelength	850 nm	850 nm

Table 5.1: Optical data

6 LED indicators

LED	Meaning
green, continuous light	ready
green, flashing	interference

Table 6.1: LED indicators

7 Device configuration

7.1 General information

Parameterization cannot be carried out via the M12 interface. For this purpose, use appropriate cable KB-ODS96-....

To perform the parametrization, you require a PC with an RS 232 interface and a terminal program with the following setting.

7.1.1 Terminal program

To do this, you can use any terminal or modem program that can access the serial interface(s) of your PC directly.

Under Microsoft® Windows® 95/98/NT/2000, you can use the HyperTerminal, for example.

7.2 Basic configuration of the terminal program (interface P)

Transmission rate	9600 bit/s
Data bits	8
Parity	no
Stop bits	1
Protocol	no

Table 7.1: Basic configuration of the terminal program (interface P)

7.3 Configuration of the measurement, analysis and output procedures over interface P

The appropriate configuration is activated by entering ASCII characters. Letters may be entered in either capital or lowercase form.

By entering the ASCII character "R", the state on delivery is restored. However, "R" has no effect on the configuration of the switching output (PNP, NPN, push-pull).

Configuration examples can be found at the end of the document.

7.3.1 Configuration table for GS 754B ... -27...

ASCII commands		Available for interface
Output mode		
1	output cycle approx. 3sec.	serial and analog
2	output cycle approx. 1sec.	serial and analog
3	output cycle approx. 500msec.	serial and analog
4	output cycle approx. 250msec.	serial and analog
5	output cycle approx. 100msec.	serial and analog
7	max. output cycle approx. 12msec. (default)	serial and analog
Averaging		
M,m	averaging across the specified output cycle period	serial and analog
A,a	output of individual measurement value (default)	serial and analog
Object number		
Q,q	single-object measurement (default)	serial (only modes 1-5)
W,w	measurement of two objects	serial (only modes 1-5)
E,e	measurement of three objects	serial (only modes 1-5)
Evaluation process		
=	diameter detection	serial and analog
-	edge detection (default)	serial and analog
!	non-continuous objects	serial and analog
?	homogeneous objects (default)	serial and analog
F,f	foil detection	serial and analog
Reset		
R,r	reset with config. switching output (7,a,-,o,?) reset with config. teach input (7,a,-,t,?)	serial and analog
Edge assignment for analog output (single-object measurement)		
D,d	object diameter	analog
\$	edge middle	analog
(inner edge (default)	analog
)	outer edge	analog
Changing over teach input / switching output (PIN 2)		
T,t	teach input function	analog
O,o	switching output function	serial and analog

Level changeover for switching output (PIN 2), entries apply to PNP switching output		
<	standard function (default) (chap. 9)	serial and analog
>	standard function, inverted (chap. 9)	serial and analog
*	photoelectric sensor function, dark switching (presence monitoring)	serial and analog
#	photoelectric sensor function, light switching (presence monitoring)	serial and analog
P,p	PNP switching output (default)	serial and analog
N,n	NPN switching output	serial and analog
G,g	push-pull switching output	serial and analog

Table 7.2: Parameterizing commands GS 754B -27 ...

8 Precision and linearity

The maximum theoretical measuring range is 28.6mm (2048 * 14µm).

The maximum measuring range is dependent on the output mode.

Measurement values of the serial and analog interfaces are linearized.

The sensor makes the measurement values available in the following resolutions, depending on the output mode chosen:

Measurement resolution:

	Output modes 1 ... 5	Output mode 7
Serial interface	0.1 mm (ASCII)	0.014 mm (binary)
Analog interface	0.1 mm (current/voltage)	0.014 mm (current/voltage)

Linearity in output modes 1 ... 5:

In output modes 1 ... 5, the measurement values are scaled. These measurement values are scaled to the standard 4 ... 20mA interface via the internal microcontroller. The resulting measurement field for output modes 1 ... 5 is 25.3 mm (1807 * 14 µm).

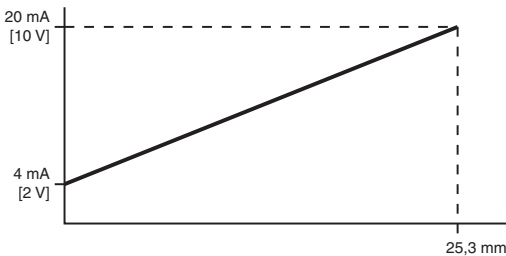


Figure 8.1: Linearity in output modes 1 ... 5

Linearity in output mode 7:

In output mode 7, the measurement values are not scaled. Each measurement value is directly output by the internal microcontroller. The resulting measurement field for output mode 7 is 25.3 mm (1807 * 14µm) and the output current 0 ... 21.37mA.

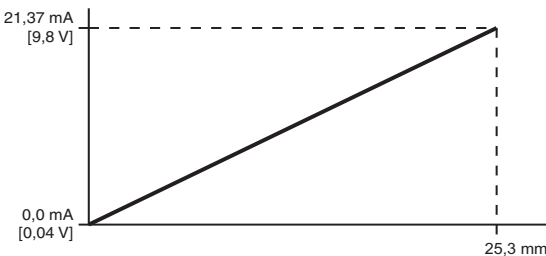


Figure 8.2: Linearity in output mode 7

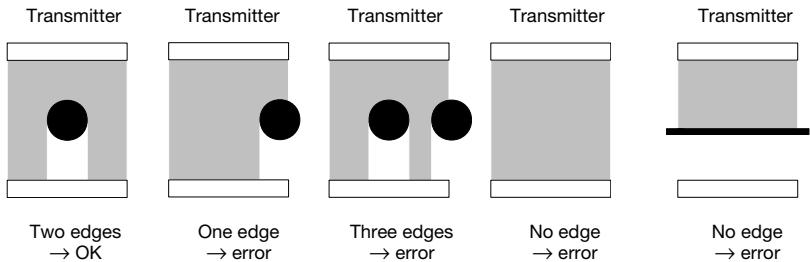
9 Error messages (interfaces P and M12)

Errors vary depending on the configured measurement, analysis and output variants. The errors are output at interfaces P and M12.

		Fewer edges than specified		More edges than specified		Light path fully blocked	
		Middle pos.	Diameter	Middle pos.	Diameter	Middle pos.	Diameter
Serial output	Modes 1 ... 5	000	000	555	555	999	999
	Mode 7						
Analog current	Modes 1 ... 5	3.5 mA		>20 mA	>20 mA		
	Mode 7	0 mA					
Analog voltage	Modes 1 ... 5	1.75 V		>10 V	>10 V		
	Mode 7	0 V					
Switching output pin 2	Modes 1 ... 5	High level (+24V)		High level (+24V)	High level (+24V)		

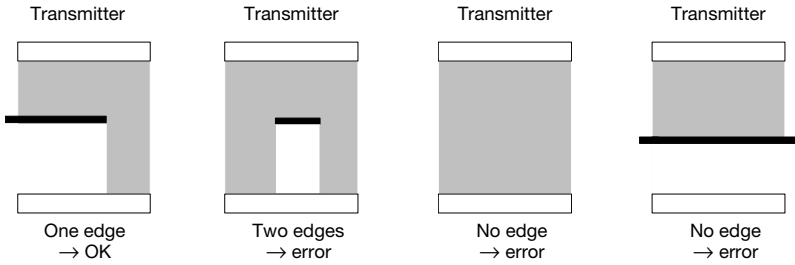
Example of diameter detection:

In this setting, the sensor expects two object edges. If more or fewer object edges are detected, an error message is output.



Example of edge detection:

In this setting, the sensor expects only one object edge. If more or fewer object edges are detected, an error message is output.



10 Digital measurement value output (P and M 12 interfaces)

The measurement value output is dependent on the type of sensor used and the configuration set.

There are a number of different output modes available.

These are divided into two primary output variants:

1. Output modes 1, 2, 3, 4, 5:
the measurement value output is performed at 0.3Hz, 1Hz, 2Hz, 4Hz or 10Hz. The measurement values are linearized by the sensor and converted to mm values. Conversion of the pixel data is no longer necessary. The sensor transmits the measurement values to interfaces P and M12. The digital information is, in this case, transmitted in ASCII format and can be read using the monitor program. The resolution is 0.1 mm.
2. Output mode 7:
the measurement value output is performed at 80Hz. The sensor transmits the measurement values to interfaces P and M12. In this case, digital information is transmitted in binary format and can be read with the monitor program. The resolution is 0.014 mm.
3. Output mode 7 + foil (F):
measurement value output is performed at 400Hz, otherwise it functions as described under point 2.
4. Foil mode F:
in foil mode "F", the mode 1 ... 5 output cycles can be selected. This can be useful for specific applications in combination with the determination of average "M". In this case, the cycle times from table 7.2 vary slightly.

The various output formats are explained on the following pages using examples.

10.1 ASCII format for P and M12 interfaces

Readable ASCII data are only output via the digital interfaces in output modes 1, 2, 3, 4, 5. The resolution is 0.1 mm.

ASCII commands		Measurement value output in ASCII format
=, q, 5	Diameter detection	Middle-Pos.:125 Diameter:020
-, q, 5	Edge detection	Edge-Pos.:185

Table 10.1: ASCII format for P and M12 interfaces

Example of diameter detection:

Middle-Pos.: 125 (equivalent to 12.5 mm)
 Diameter: 020 (equivalent to 2.0 mm)

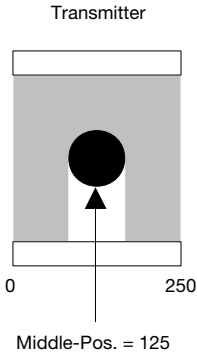


Figure 10.1: Ex. diameter detection (ASCII format)

The middle of the object is located at CCD position 12.5mm.
 The object diameter is 2.0mm.

Example of edge detection:

Edge-Pos.: 185 (equivalent to 18.5mm)

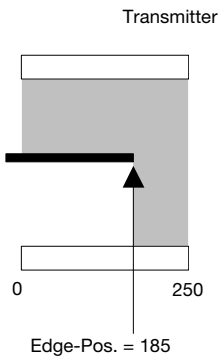


Figure 10.2: Ex. edge detection (ASCII format)

The edge of the object is located at CCD position 18.5mm.

10.2 Binary format for the P and M 12 interfaces

Binary data is only output via the digital interfaces in output mode 7. This binary data cannot be displayed by the terminal program.

The resolution is 0.014 mm.

ASCII commands	
=, q, 7	Diameter detection
-, q, 7	Edge detection

Table 10.2: Binary format for the P and M 12 interfaces

Example of diameter detection:

Measurement value output in binary format								
Data						Byte designator		
D ₅	D ₄	D ₃	D ₂	D ₁	D ₀	P ₁	P ₀	
Middle-Pos. (low byte)						0	0	byte 0
Middle-Pos. (high byte)						0	1	byte 1
Diameter (low byte)						1	0	byte 2
Diameter (high byte)						1	1	byte 3

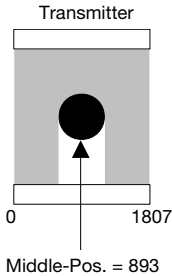


Figure 10.3: Ex. diameter detection (binary format)

The middle of the object is located at CCD pixel 893.

The diameter of the object is 143 pixels.

Measurement value output in binary format								
Data						Byte designator		
D ₅	D ₄	D ₃	D ₂	D ₁	D ₀	P ₁	P ₀	
1	1	1	1	0	1	0	0	byte 0
0	0	1	1	0	1	0	1	byte 1
0	0	1	1	1	1	1	0	byte 2
0	0	0	0	1	0	1	1	byte 3

001101111101
value: 893
(893 x 0.014 mm = 12.5 mm)

000010001111
value: 143
(143 x 0.014 mm = 2.0 mm)

Example of edge detection:

Measurement value output in binary format								
Data						Byte designator		
D ₅	D ₄	D ₃	D ₂	D ₁	D ₀	P ₁	P ₀	
Edge-Pos.			(low byte)			0	0	byte 0
Edge-Pos.			(high byte)			0	1	byte 1

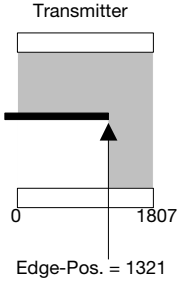


Figure 10.4: Ex. edge detection (binary format)

The edge of the object is located at CCD pixel 1321.

Measurement value output in binary format								
Data						Byte designator		
D ₅	D ₄	D ₃	D ₂	D ₁	D ₀	P ₁	P ₀	
1	0	1	0	0	1	0	0	byte 0
0	1	0	1	0	0	0	1	byte 1
010100101001 value: 1321 (1321 x 0.014mm = 18.5mm)								

11 **Analog measurement value output (interface M12)**

The analog current and voltage values are available only at the M 12 interface. These values vary depending on the type used and on the configuration. The measuring range is changed in output modes 1...5 and in output mode 7 (see chapter 8).

	Output modes 1 ... 5	Output mode 7
Analog current	0.063 mA / 0.1 mm	11.72 μ A / 14 μ m
Analog voltage	0.0316 V / 0.1 mm	5.37 mV / 14 μ m

Table 11.1: Data formats for analog interface M12

12 Typical areas of application

12.1 Diameter detection

Depending on which interface is used, data for up to three objects can be output. Data for more than one object can only be transmitted via the serial interface. The analog value is always based on the edge or diameter information.

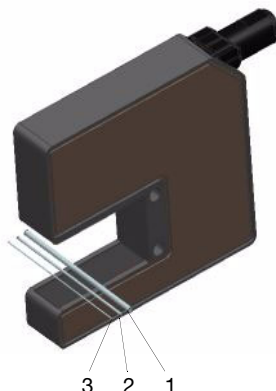


Figure 12.1: Diameter detection application example

12.2 ASCII display via RS 232 (P and M 12 interfaces)

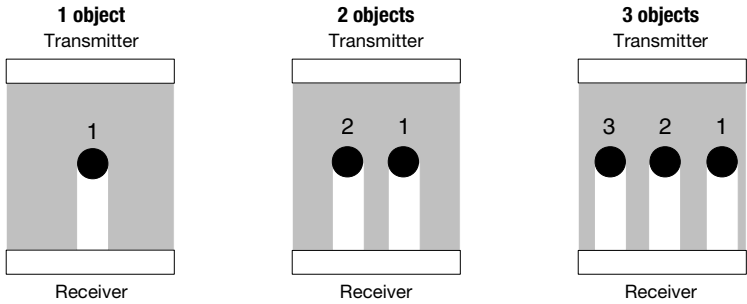
Parameter		ASCII output data via S1 and S2
Q,q	Single-object detection	Middlepos. : xxx Diameter: xxx
W,w	Detection of two objects	Middlepos. : xxx Diameter: xxx Middlepos. : xxx Diameter: xxx
E,e	Detection of three objects	Middlepos. : xxx Diameter: xxx Middlepos. : xxx Diameter: xxx Middlepos. : xxx Diameter: xxx

Table 12.1: ASCII representation, output modes 1 ... 5

Example for xxx:123 (12.3mm)

12.2.1 Binary display via RS 232 (P and M12 interfaces)

Due to the fast output of measurement values, only data for single-object detection can be output in this output mode. The measurement values cannot be displayed on the screen (see chapter 10.2).



13 Edge detection and height verification

With this measurement, the sensor expects only one edge within the measurement field. An error message results if more or fewer edges are detected by the system.

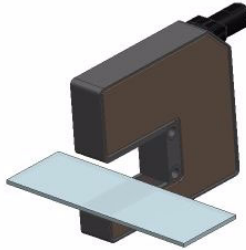
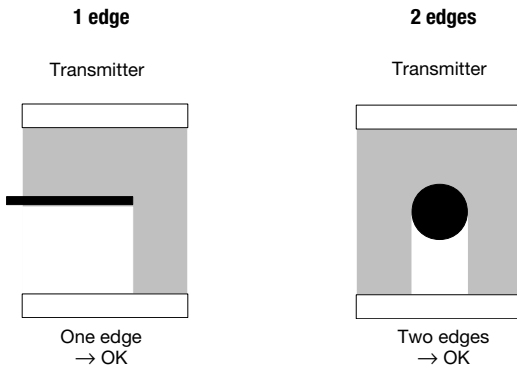


Figure 13.1: Edge detection and height verification



Various configurations are possible with this measurement.

The following only applies to devices with an analog interface:

1. Linear edge measurement over the entire measuring range (s. point 8)
2. Teach-in edge measurement with 5V-output at teaching point

These functions are described in the following.

14 Special configurations

14.1 Teachable single-object- and edge-measurement for devices with analog output

Connection pin 2 of devices with analog output can be configured as a warning output or as a teach input. If pin 2 has been configured as a teach input, edge adjustment is possible here at 5V. In this way, any given point of the measurement field can be assigned the output value 5V. It is no longer necessary to adjust the process software.

14.1.1 Teach-in in the middle of the measurement field

The measurement value is output linearized. As a result, the entire measurement field is available for the measurement.

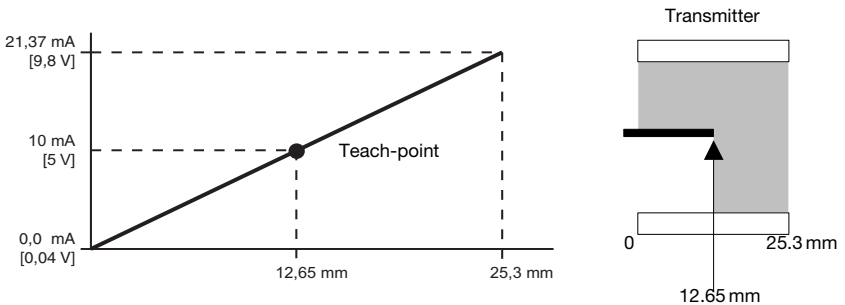


Figure 14.1: Teach-in (edge in the middle of the measurement field)

14.1.2 Teach-in at the end of the measurement field

The measurement value is output linearized. The measurement field range is restricted. A change in measurement value no longer occurs at the beginning of the measurement field.

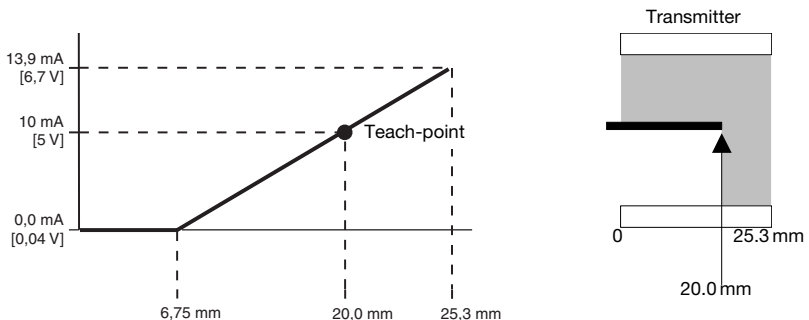


Figure 14.2: Teach-in (edge at the end of the measurement field)

14.1.3 Teach-in at the start of the measurement field

The measurement value is output linearized. The measurement field range is restricted. A change in measurement value no longer occurs at the end of the measurement field.

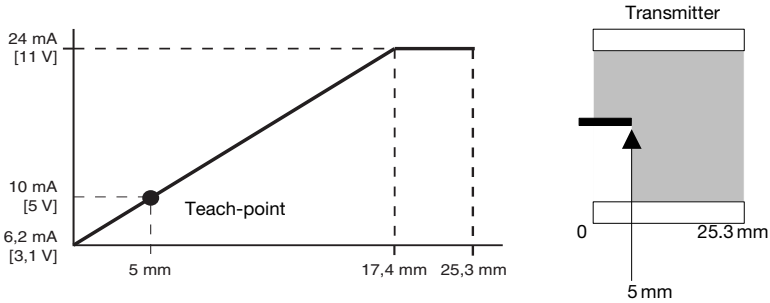
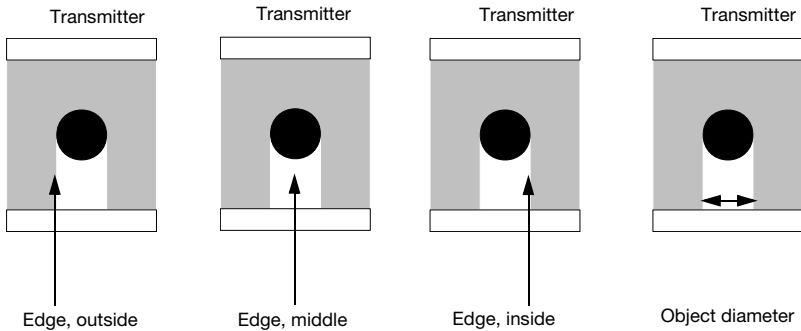


Figure 14.3: Teach-in (edge at start of the measurement field)

14.2 Changeover of the edge assignment for single-object measurement

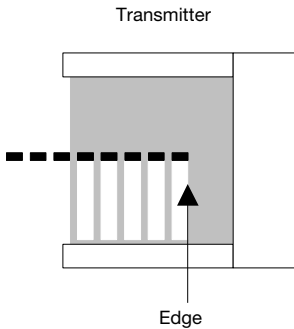
Only one piece of edge information can be output via the analog interface. With single-object measurement, the sensor sees two edges. Using these edges, information such as object diameter and object middle can be calculated. These edge assignments can be configured.



14.3 Edge measurement for non-continuous objects

With this function, net-like objects, e.g. fabric, can be detected.

Here, the first edge of the object is output as the measurement value. All other edges are suppressed. In this configuration the number of edges is not checked. Error messages are not output.



14.4 Level changeover for switching output PIN 2

When PIN 2 is configured as a switching output, various logical functions can be assigned to this switching output. A distinction is made between standard and photoelectric sensor functions/presence monitoring.

Configuration	Function	Switching output pin 2		
		Object partially in measurement field	Object completely in measurement field	Object not in measurement field
<	standard	high	low	high
>	standard inverted	low	high	low
*	dark switching	high	high	low
#	light switching	low	low	high

14.4.1 Standard function

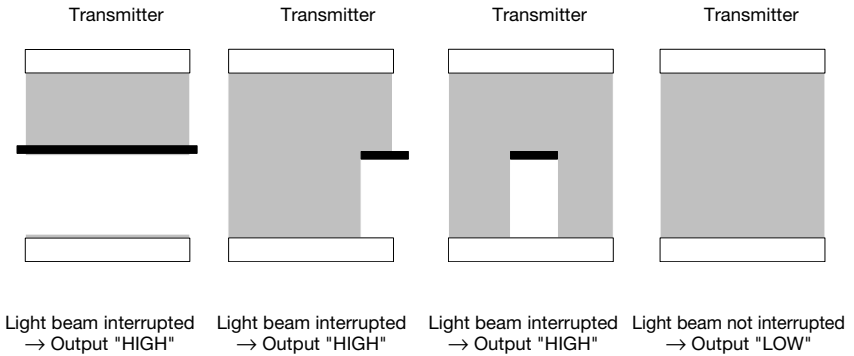
The number of object edges is monitored and output as described in point 9.

14.4.2 Standard function, inverted

The number of object edges is monitored and output inverted as described in point 9.

14.4.3 Photoelectric sensor function, dark switching

When configured for the photoelectric sensor function, the number of edges is not monitored. The entire measuring range is analyzed as a throughbeam photoelectric sensor. The switching output functions on a dark-switching basis.



14.4.4 Photoelectric sensor function, light switching

With photoelectric sensor level, the entire measurement range is analyzed as a throughbeam photoelectric sensor. The switching output functions on a light-switching basis.

