

### 3.2 Device Structure

#### 3.2.1 Scope of Delivery

Beside the BCL, the **device packaging** also includes:

- an information sheet (device information) with electrical connection diagram and quick-start
- an extra set of laser warning signs (self-adhesive) of Class 2 in German/American English and French/American English

Depending on the **number of devices ordered** one **set of technical documentation** in one or several copies, comprised of:

- this operating manual BCL 90 in German or English
- one set of DOS-formatted diskettes (3.5 inch) with the PC software BCL-Config for Windows.

Chapter 5, on page 65 gives an overview of available accessories for the device, electrical connections and mounting as well as connection modules and cables.

#### 3.2.2 Device Models

Several BCL models are available:

Model (red light)	Order number	Scan technology	Reading window	Heater
BCL 90 CAT M 100	500 35 314	Line scanner	frontal	no
BCL 90 CAT OM 100	500 35 315	Line scanner with oscillating mirror	lateral	no
BCL 90 CAT M 100 H	500 35 316	Line scanner	frontal	yes
BCL 90 CAT OM 100 H	500 35 317	Line scanner with oscillating mirror	lateral	yes
BCL 90 CAT N 100	500 35 507	Line scanner	frontal	no
BCL 90 CAT ON 100	500 35 508	Line scanner with oscillating mirror	lateral	no
BCL 90 CAT N 100 H	500 35 509	Line scanner	frontal	yes
BCL 90 CAT ON 100 H	500 35 510	Line scanner with oscillating mirror	lateral	yes
BCL 90 CAT F 100	500 35 318	Line scanner	frontal	no
BCL 90 CAT OF 100	500 35 511	Line scanner with oscillating mirror	lateral	no
BCL 90 CAT F 100 H	500 35 512	Line scanner	frontal	yes
BCL 90 CAT OF 100 H	500 35 513	Line scanner with oscillating mirror	lateral	yes

Table 3.1: Variants of the BCL

## 4 Technical Data

### 4.1 Technical Data

#### 4.1.1 Data Sheet BCL 90 CAT M 100 / BCL 90 CAT N 100 / BCL 90 CAT F 100

Model	BCL 90 CAT M 100 Medium Density	BCL 90 CAT N 100 High Density	BCL 90 CAT F 100 Low Density
Type	<b>Line scanner, without heater</b>		
Reading window	frontal		
Laser diode (wavelength)	red light ( $\lambda = 650 \text{ nm}$ )		
Service life of the laser diode	MTBF 20,000 h		
Laser class of the device	Class 2 (acc. to DIN EN 60825-1), safety disconnection of the laser diode after 10 min <sup>1)</sup>		
Focus control	autofocus, alternatively event-driven focus position switching		
Number of distance configurations	max. 8		
Focus adjustment time	$\leq 20 \text{ ms}$ (typically)		
Focus trigger	switched inputs "SE 2... SE 6"/ data interface/ timer		
Useful opening angle	max. 60° (frontal reading window)		
Scanning/decoding frequency	600 ... 1200 Hz		
Resolution	0.25 ... 1.0 mm	0.17 ... 0.4 mm	0.35 ... 1.2 mm
DOF	see reading field diagram starting from page 34		
Bar code print contrast (PCS)	$\geq 60\%$		
External light tolerance	2000 lx (on bar code)		
Number of bar codes per scan	1 ... 12 (standard decoder), 1 ... 5 (CRT decoder)		
Number of bar codes per scan gate time <sup>2)</sup>	1 ... 50 (auto-discriminating)		
Types of bar code (CRT decoder)	Code 39, Code 128, Code 93, Codabar, EAN, EAN 128, UPC, 2/5 Interleaved		
Bar code length	max. 50 characters (max. 600 characters for all bar codes per scan gate time taken together)		
Print ratio	2:1 ... 3:1		
Number of multiple readings	1 ... 99		
Optical indicators	4 LED function indicators		
Read clocking	switched input "SE 1"/ free-oscillating/ serial interface/ MSP/TCP		
Data interface "host"	RS 232 or RS 422/485, adjustable data output format		
Data transmission rate	300 ... 57 600 bits/ s		
Protocols	Leuze standard, Leuze network multiNet plus and 3964(R)		
Physical configurations	stand alone, network (bus)		
Data interface "service"	RS 232, 9600 baud, 8 data bits, no parity, 1 stop bit, predefined output format		

Table 4.1: Technical specifications BCL 90 CAT **M** 100 / **N** 100 / **F** 100

Model	BCL 90 CAT M 100 Medium Density	BCL 90 CAT N 100 High Density	BCL 90 CAT F 100 Low Density
Function switched inputs	6 ("SE 1 ... SE 6") - with opto-coupler, $U_{\text{emax}} = +30 \text{ V}$ , polarity-proof, can be connected to p-n-p outputs - "SE 1" (reading cycle): max. internal delay time 30 ms, reduced max. 2 ... 6 ms - "SE 2 ... SE 6": focus position switching, IN 3 and IN 4: selectable function int. delay time max. 30 ms		
Function switched outputs	4 ("SWO 1" ... "SWO 4") - p-n-p, short-circuit proof, adjustable pulse duration (statical, resolution 10 ... 990 ms or 100 ... 9900 ms) - function of the result status indication selectable		
Electrical connections	1 x 15-pin D-Sub-HD device plug, 1 x 15-pin D-Sub-HD device socket		
Operating voltage/ power consumption	DC 18 ... 30 V/ typically 9 W, max. 16 W		
Housing	Aluminium die-cast, no silicone used in the exterior materials		
Type of protection/ safety class	IP 65 <sup>3)</sup> (acc. to DIN 40 050)/ Class 3 (acc. to VDE 0106/IEC 1010-1)		
EMC/ vibration/ shock testing	acc. to IEC 801/ acc. to IEC 68-2-6 Test FC/ acc. to IEC 68-2-27 Test EA		
Weight	around 1.5 kg		
Operating ambient/ storage temperature	0 ... +40 °C/ -40 ... +70 °C		
Max. relative air humidity	90%, non-condensing		
<sup>1)</sup> In read operation under the clocking types "switched input sensor" and "serial interface" <sup>2)</sup> Scan gate time: time window of code evaluation generated internally through the reading cycle <sup>3)</sup> Including plug cover or plug cover with parameter memory			

Table 4.1: Technical specifications BCL 90 CAT M 100 / N 100 / F 100 (Cont.)

**4.1.2 Data Sheet BCL 90 CAT OM 100, BCL 90 CAT ON 100, BCL 90 CAT OF 100**

Technical data same as BCL 90 CAT M/N/F 100 except for the following deviations:

<b>Model</b>	<b>BCL 90 CAT OM 100 /BCL 90 CAT ON 100 /BCL 90 CAT OF 100</b>
Type	<b>Line scanner with oscillating mirror</b>
Reading window	lateral
Light exit	at an angle of 105°
Focus trigger	additionally: oscillating mirror reversal points
Useful opening angle	max. 50°
Oscillating mirror functions	stationary, oscillating (variable or predefined amplitude), one-shot <sup>1)</sup>
Oscillation frequency	0.2 ... 4 Hz
Max. deflection angle	max. ± 20° (± 40 CW), adjustable through the software
DOF	see reading field diagram starting from page 40
Deflection widths	see Figure 4.15, on page 46
Operating voltage/ power consumption	DC 18 ... 30 V/ typically 9 W, max. 18 W
Weight	around 2.2 kg
<sup>1)</sup> One-shot: single oscillation per reading cycle (starting position and speed for forward and return phase selectable)	

Table 4.2: Technical specifications BCL 90 CAT OM 100 / ON 100 / OF 100

**4.1.3 Data Sheet BCL 90 CAT M 100H, BCL 90 CAT N 100H, BCL 90 CAT F 100H**

Technical data same as BCL 90 CAT M/N/F 100 except for the following deviations:

<b>Model</b>	<b>BCL 90 CAT M 100 H / BCL 90 CAT N 100 H / BCL 90 CAT F 100 H</b>
Type	<b>Line scanner with heater</b>
Switch-on behaviour/ temperature variation	see “Optional heater” on page 21
Switch-on delay	35 ... 40 min (for DC 24 V and min. ambient temp. of -35°)
Operating voltage	DC 24 V +20% / -0%
Power consumption	typically 75 W, max. 90 W
Required core cross-section	at least 0.75 mm <sup>2</sup> (for operating voltage supply)
Weight	around 1.5 kg
Operating ambient/ storage temperature	-35 ... +35 °C / -20 ... +70 °C

Table 4.3: Technical specifications BCL 90 CAT M 100H / N 100H / F 100H

**4.1.4 Data Sheet BCL 90 CAT OM 100H, BCL 90 CAT ON 100H, BCL 90 CAT OF 100H**

Technical data same as BCL 90 CAT OM/ON/OF 100 except for the following deviations:

<b>Model</b>	<b>BCL 90 CAT OM 100 H / BCL 90 CAT ON 100 H / BCL 90 CAT OF 100 H</b>
Type	<b>Line scanner with oscillating mirror and heater</b>
Switch-on behaviour/ temperature variation	see "Optional heater" on page 21
Switch-on delay	35 ... 40 min (for DC 24 V and min. ambient temp. of -25°)
Operating voltage	DC 24 V +20% / -10%
Power consumption	typically 75 W, max. 100 W
Required core cross-section	at least 0.75 mm <sup>2</sup> (for operating voltage supply)
Weight	around 2.2 kg
Operating ambient/ storage temperature	-35 ... +35 °C / -20 ... +70 °C

Table 4.4: Technical specifications BCL 90 CAT OM 100H / ON 100H / OF 100H

**4.2 Dimensioned Drawings**

**4.2.1 Line Scanner (Standard Device) with/without Heater**

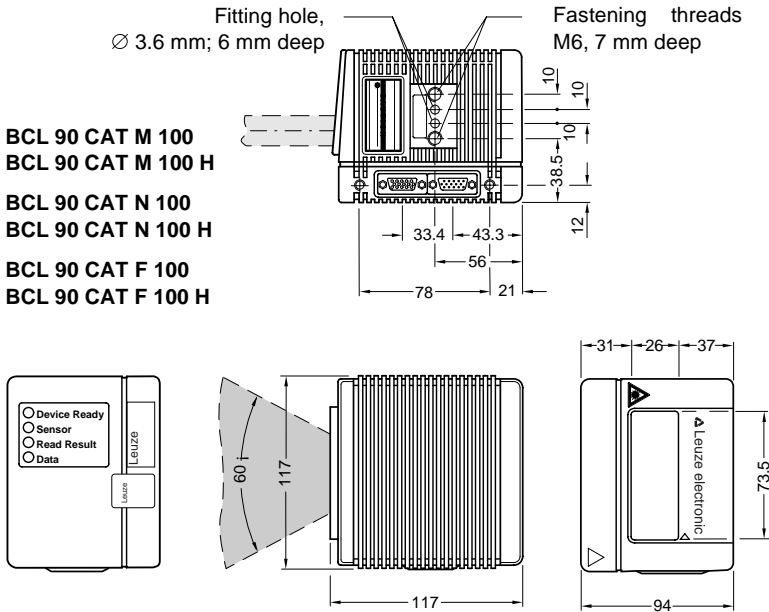


Figure 4.1: Dimensions of the BCL 90 (line scanner), frontal reading window

### 4.3.3 Medium Density: Reading Performance Data of Line Scanner

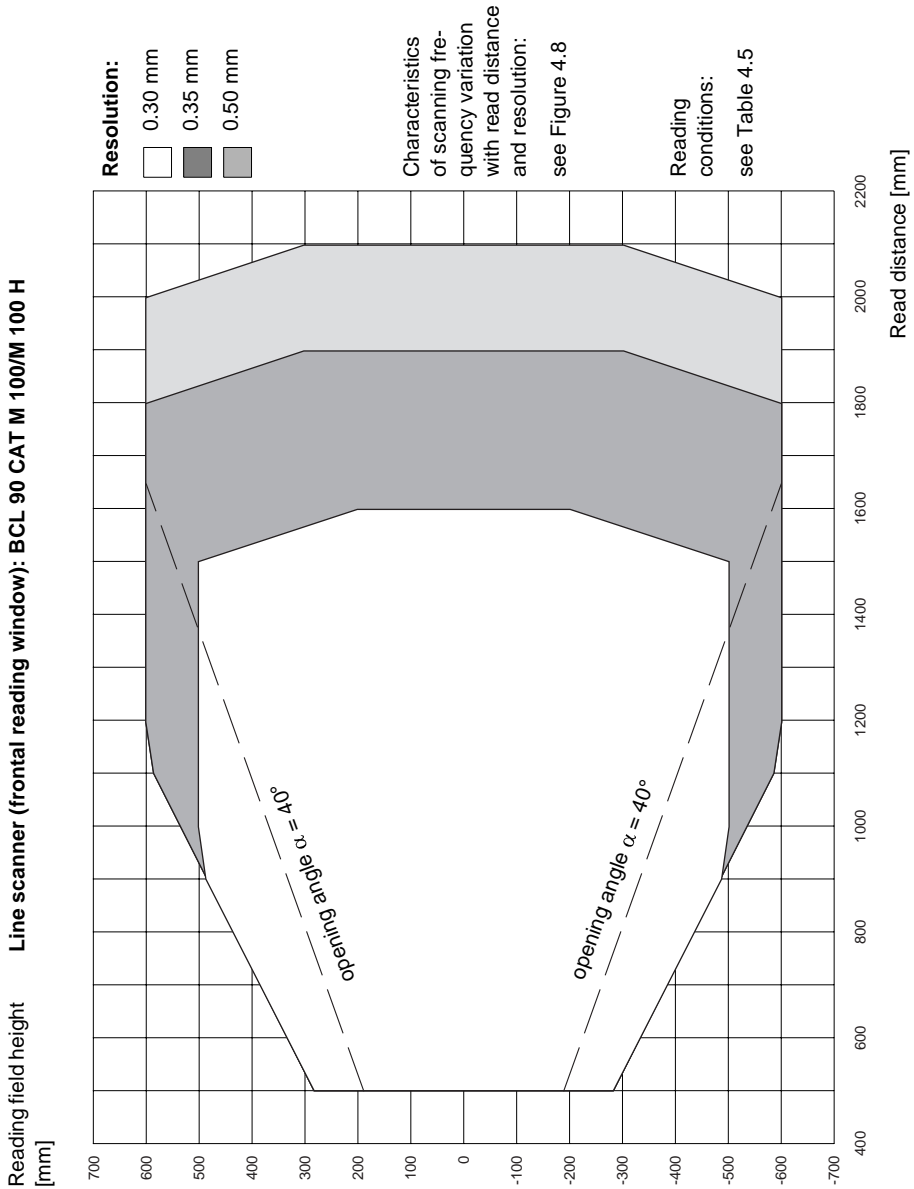


Figure 4.3: BCL 90 CAT M 100/M 100 H (medium density): variation of reading field height with read distance and resolution

**4.3.4 Medium Density: Reading Performance Data of Line Scanner with Oscillating Mirror**

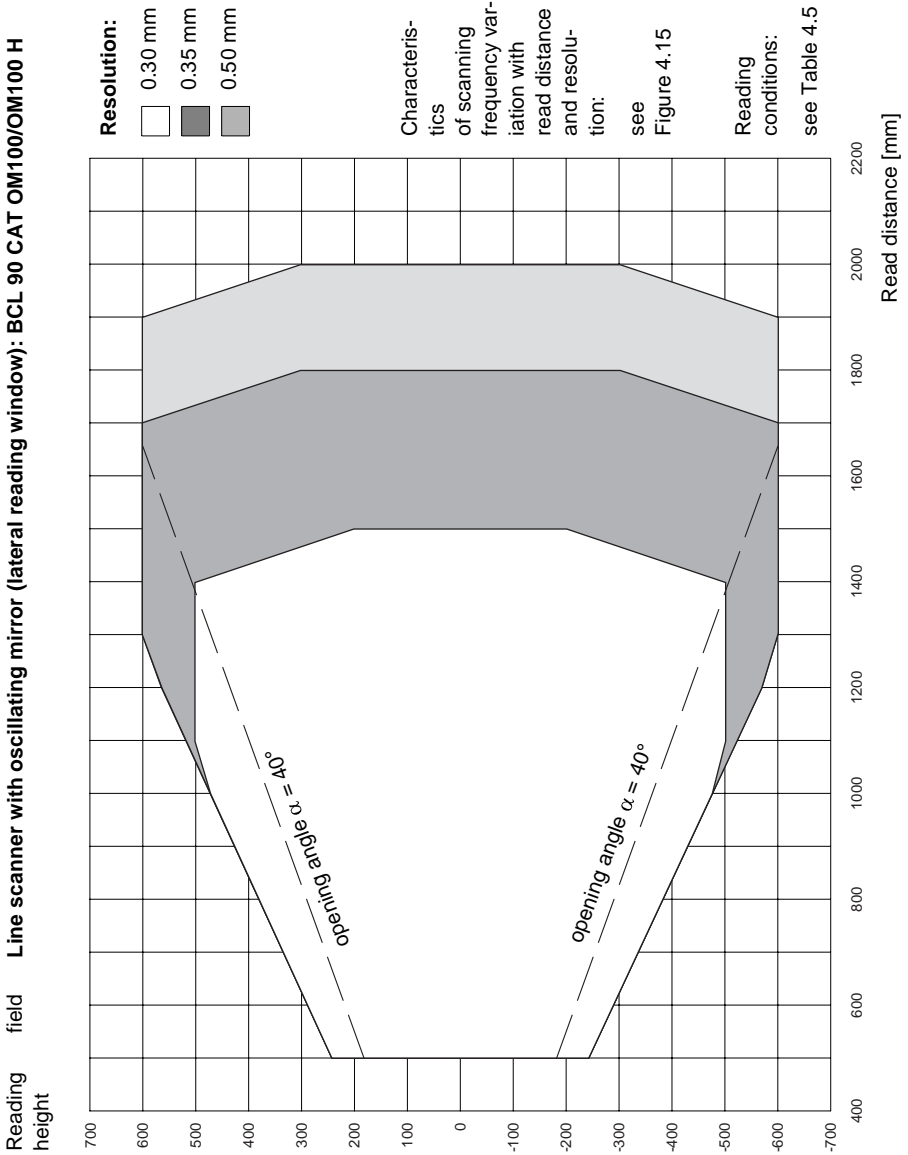


Figure 4.9: BCL 90 CAT OM 100/M 100 H (medium density): variation of reading field height with read distance and resolution

### 4.3.5 High Density: Reading Performance Data of Line Scanner

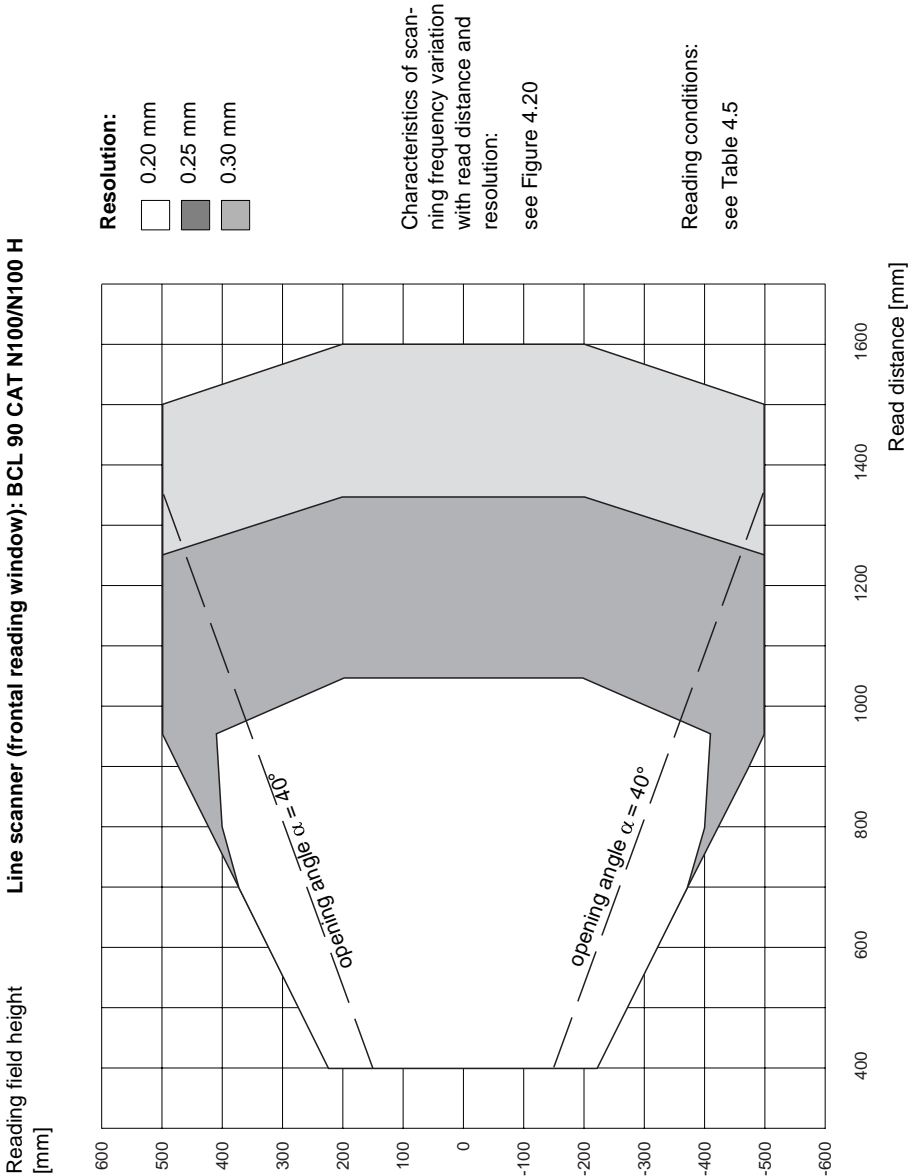


Figure 4.16: BCL 90 CAT N100/N100 H (high density): variation of reading field height with read distance and resolution

4.3.6 High-Density: Reading Performance Data of Line Scanner with Oscillating Mirror

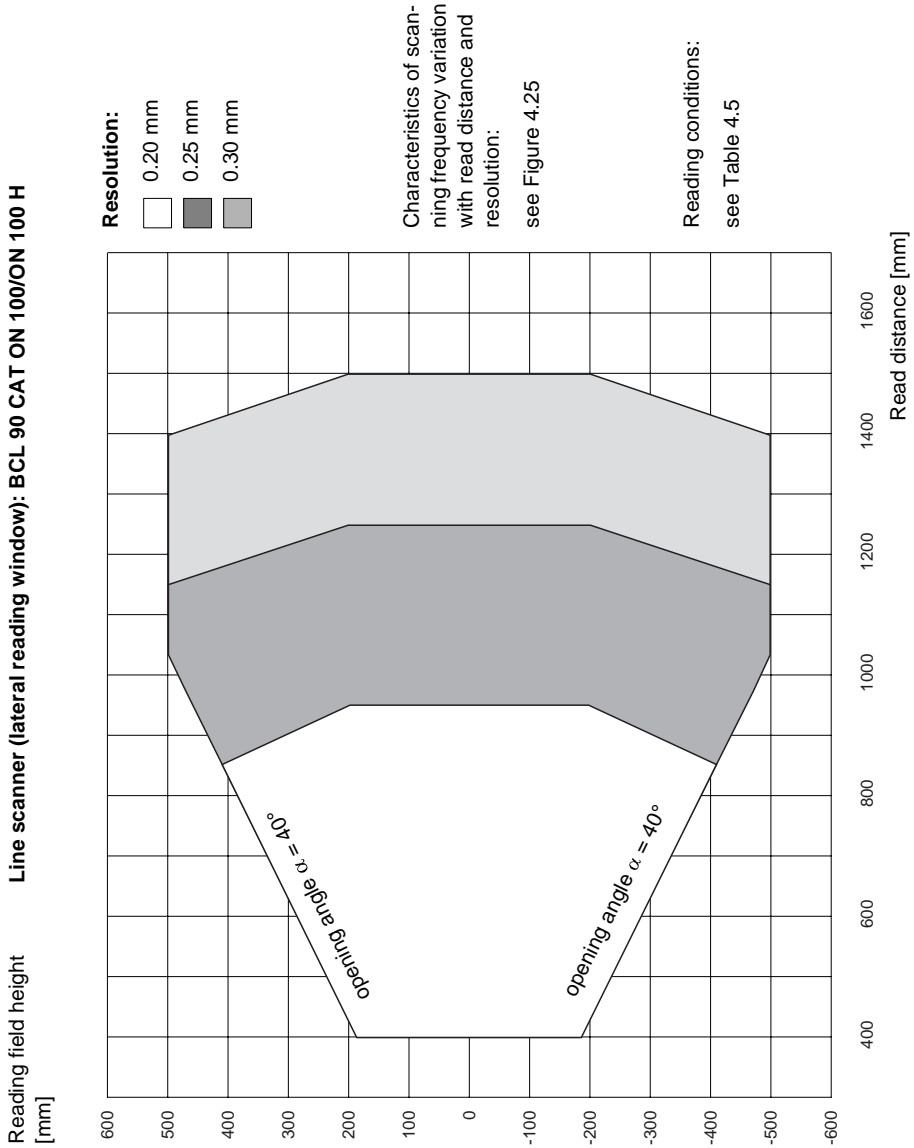


Figure 4.21: BCL 90 CAT ON 100/ON 100 H (high density): variation of reading field height with read distance and resolution

4.3.7 Low Density: Reading Performance Data of Line Scanner

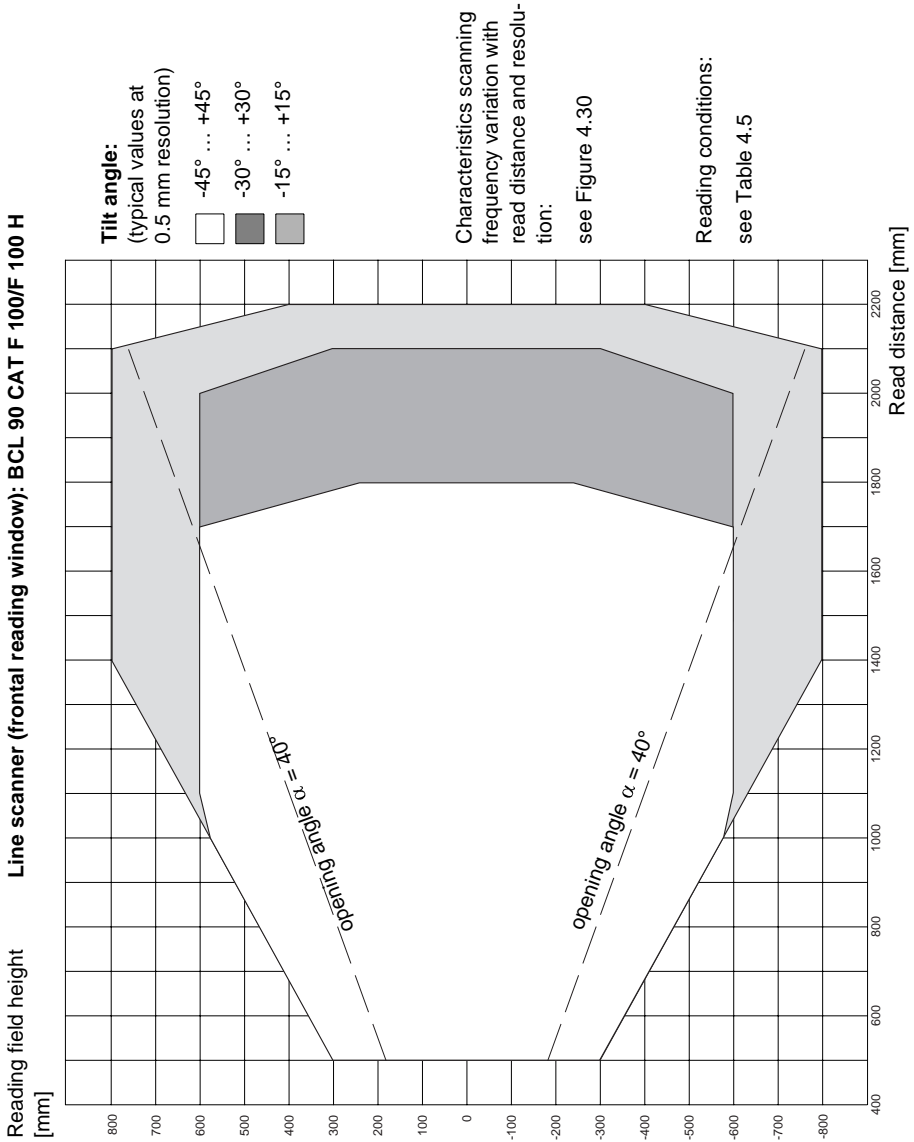


Figure 4.27: BCL 90 CAT F 100/F 100 H (low density): variation of reading field height with read distance and tilt at 0.5 mm resolution

4.3.8 Low Density: Reading Performance Data of Line Scanner with Oscillating Mirror

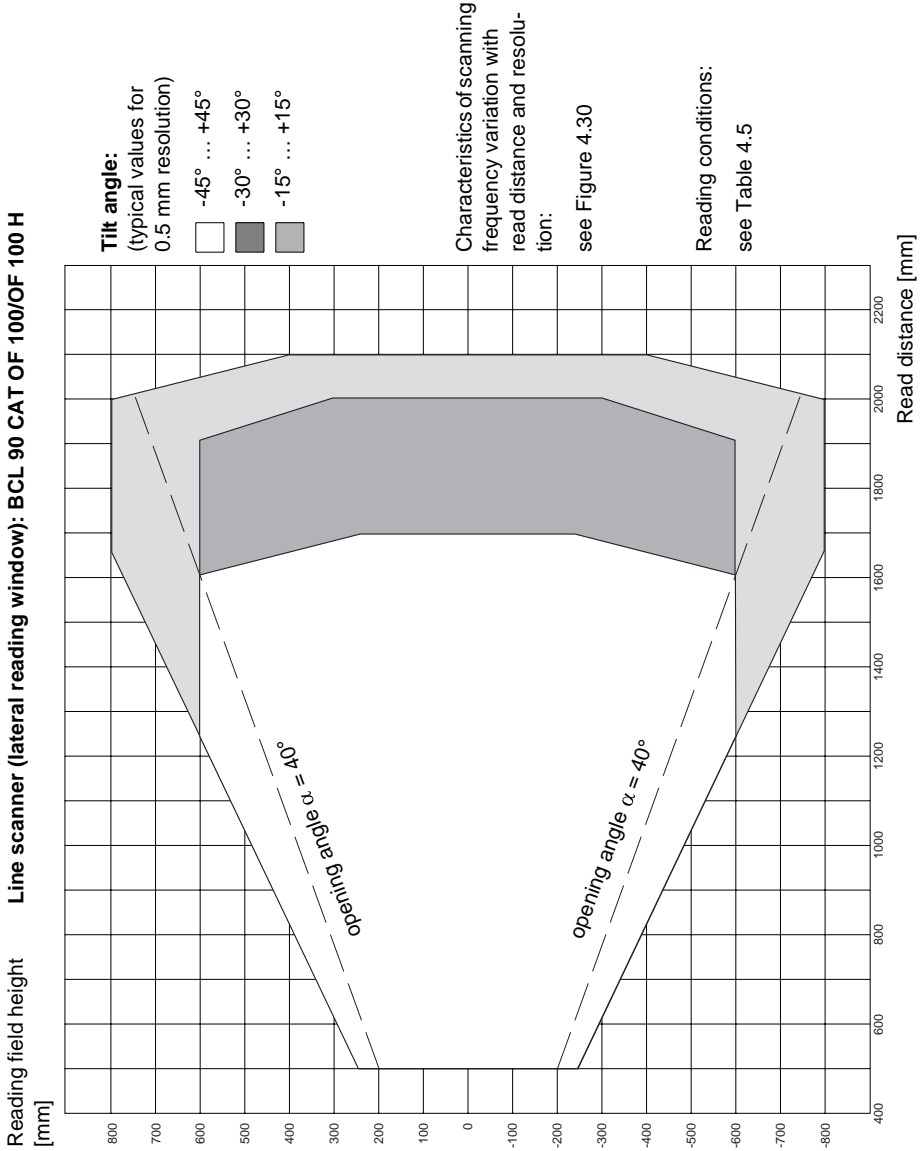


Figure 4.31: BCL 90 CAT OF 100/OF 100 H (low density): variation of reading field height with read distance and tilt at 0.5 mm resolution

## 5 Accessories (Order Codes)

### 5.1 Device and Connection Accessories

#### 5.1.1 External Parameter Memory

The external parameter memory is an optional supplement to the BCL. It is located in a plug cover and consists of a permanent, rewritable memory (EEPROM). After being mounted, the two connections of the BCL are under the plug cover in a common protection class IP 65. Figure 5.1 is a view of the plug cover. Two pre-assembled connection cables that are permanently connected to the plug cover by PG screw glands provide the BCL with unaltered signals.

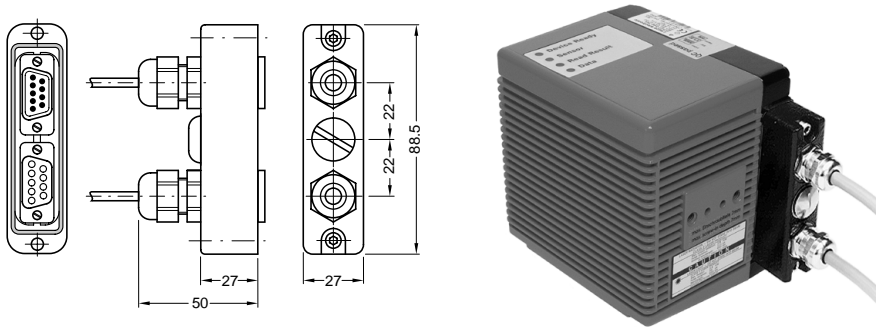


Figure 5.1: View of the external parameter memory, mounted on the BCL

The external parameter memory can only be operated with a BCL **without** heater. Various types are available:

Type / order number	Connection cables with	Length	Connecting
<b>KB 090-3000P</b> / 500 35 322	two 15-pin D-Sub-HD plug connections (Pin assignment 1:1 to the BCL device connections)	3 m	BCL to MA 90
<b>KB 090-3000PO</b> / 500 35 323	two open cable ends	3 m	BCL to external power supply unit, open wiring

Table 5.1: Types of external parameter memories

#### Function

When started, the BCL initialises itself with data stored in its internal parameter set. When a clone of this parameter set is also kept ready at hand in an external memory, devices can be exchanged quickly. The replacement device does not need to be manually configured first before operation, but automatically accesses the external parameter memory by selecting the start option accordingly. It downloads the parameter set stored in the parameter memory into its operating memory (RAM).



#### **Reading cycle generation!**

The Leuze catalogue contains a large selection of light barriers and switches as well as accessories (mounting supports, connection cables).

### 5.1.2 Cables, External Parameter Memories and Plug Covers

#### **BCL without heater**

Temperature range of the connection materials:

Stationary: -30 ... +70°C; moving: 0 ... +70°C

Type / order number	Description	Cores	Length	Connecting
<b>KB 090-3000</b> / 500 35 319	Connecting cable for data interfaces ("host/term") or function interfaces ("I/O"), Ø 8 mm, shielded, with 15-pin D-Sub-HD cable socket and 15-pin D-Sub-HD cable plug. Required quantity: 2 per BCL	15	3 m	BCL 90 to MA 90
<b>KB 090-3000B</b> / 500 35 320	Connection cable for data interfaces ("host/term"), Ø 8 mm, shielded, with 15-pin D-Sub-HD cable socket and open end (stripped). Required quantity: 1 per BCL	15	3 m	BCL 90 to host
<b>KB 090-3000S</b> / 500 35 321	Connection cable for function interfaces and power supply ("I/O"), Ø 8 mm, shielded, with 15-pin D-Sub-HD cable plug and open end (stripped). Required quantity: 1 per BCL	15	3 m	BCL 90 to sensors, PLC and external power supply unit
<b>KB 090-3000P</b> / 500 35 322	Plug cover with parameter memory (EEPROM), protection class IP 65, with two connection cables, Ø 8 mm each, shielded, with 15-pin D-Sub-HD cable socket and 15-pin D-Sub-HD cable plug Required quantity: 1 per BCL	each 15 x 0.14 mm <sup>2</sup>	3 m	BCL 90 to MA 90
<b>KB 090-3000PO</b> / 500 35 323	Plug cover with parameter memory (EEPROM), protection class IP 65, with two connection cables, Ø 8 mm each, shielded, two open ends (stripped). Required quantity: 1 per BCL	each 15 x 0.14 mm <sup>2</sup>	3 m	BCL 90 to host, sensors, PLC and external power supply unit

Table 5.2: Available accessories: cables and plug covers for the BCL without heater



#### **Notice!**

*Other cable lengths/cables for BCL without heater upon request.*

**b) BCL with heater**

Temperature range of the connection materials:

Stationary: -50 ... +70 °C; moving: -40 ... +70 °C

Type / order number	Description	Cores	Length	Connecting
<b>KB 090-3000H /</b> 500 35 324	2 x plug covers, protection class IP 65, with two connecting cables, Ø 6.7 mm each, shielded. Required quantity: 1 per BCL	each 13 x 0.14 mm <sup>2</sup> + 2 x 0.75 mm <sup>2</sup>	3 m	BCL 90 to MA 90
<b>KB 090-3000HO/</b> 500 35 325	Plug cover, protection class IP 65, with two connection cables, Ø 6.7 mm each, shielded, two open ends (stripped). Required quantity: 1 per BCL	1 x 18 x 0.14 mm <sup>2</sup> 1 x 2 x 0.75 mm <sup>2</sup>	3 m	BCL 90 to host, sensors, PLC and external power supply unit

Table 5.3: Available accessories: cables and plug covers for the BCL with heater



**Notice!**

*Other cable lengths/cables for BCL with heater upon request.*

**Leuze multiNet plus master**

Order number	Type	Description
on request	MA 30 / MA 31	Network controller

Table 5.4: Available accessory component: network controller

**5.2 Mounting Accessories**

Type / order number	Description	Fig.
<b>BT 90 S /</b> 500 35 514	Quick-action clamping device, with complete fastening materials	Figure 5.4
<b>BT 90 W /</b> 500 35 515	Bracket support, single, with two screws M 6 x 10 mm, self-locking	Figure 5.2
<b>BT 90 G /</b> 500 35 516	Joint bracket (double bracket support 2 013 824), with 2 screws M 6 x 10 mm, self-locking	Figure 5.3

Table 5.5: Available accessories: mounting accessories