BCL 8
Barcode Reader with Integrated Decoder

LASERSTRAHLUNG
NICHT IN DEN STRAHL BLICKEN
Max. Leistung: 1,3 mW
Impulsdauer: 420 µs
Wellenlänge: 650 nm
LASERKLASSE 2
EN 60825-1:2001 -11

TECHNICAL DESCRIPTION

Leuze electronic

Sales and Service

Germany	Sales Region North	Sales Region South	Sales Region East
	Phone 07021/573-306	Phone 07021/573-307	Phone 035027/629-106
	Fax 07021/9850950	Fax 07021/9850911	Fax 035027/629-107
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	40000-65999		39000-39999
	97000-97999		98000-99999

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07/2008

1　General information

1.1　Explanation of symbols

The symbols used in this technical description are explained below.

Attention!

This symbol appears before text passages which must absolutely be observed. Failure to heed this information may lead to injuries to personnel or damage to the equipment.

Attention Laser!

This symbol warns of possible danger through hazardous laser radiation.

Notice!

This symbol indicates text passages containing important information.

1.2　Declaration of conformity

The BCL 8 barcode reader and the optional MA 8.1 connector unit have been developed and produced in accordance with the applicable European standards and directives.

Notice!

The corresponding declaration of conformity can be requested from the manufacturer.

The manufacturer of the product, Leuze electronic GmbH & Co. KG in D-73277 Owen/Teck, possesses a certified quality assurance system in accordance with ISO 9001.

2   Safety notices

2.1   Safety standards

The BCL 8 barcode reader and the optional MA 8.1 connector unit have been developed, produced and tested in accordance with the applicable safety standards. They correspond to the state of the art.

2.2   Approved purpose

⚠️ ***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.

The BCL 8 barcode reader is designed as a stationary scanner with integrated decoder for all common barcodes used for automatic object detection.

The optional MA 8.1 connector unit is intended for the easy connection of a barcode reader of type BCL 8.

In particular, unauthorised uses include:

- rooms with explosive atmospheres
- operation for medical purposes

Areas of application

The BCL 8 barcode reader with optional MA 8.1 connector unit is designed especially for the following fields of application:

- labelling and packaging machines
- automatic analysers
- space-critical barcode reading tasks
- in material flow
- pharmaceutical industry
- in robot technology and automation systems

2.3   Working safely

Attention Laser Radiation!

If you look into the beam path over a longer time period, the retina of your eye may be damaged! Never look directly into the beam path! Do not point the laser beam at persons! When mounting and aligning, avoid reflections of the laser beam off reflective surfaces!

Adhere to the applicable legal and local regulations regarding protection from laser beams acc. to IEC 60825 in its latest version.

The scanner window is the only aperture through which light may be observed on this product. The device must not be tampered with and must not be changed in any way! There are no user-serviceable parts inside the device.

A failure of the scanner motor while the laser diode continues to emit a laser beam may cause the emission level limit to be exceeded. The device has safeguards to prevent this occurrence. If, however, a stationary beam is emitted, the failing barcode reader should be disconnected from its power source immediately.

The BCL 8 uses a laser diode with low power in the visible red light range with an emitted wavelength of approx. 650nm. The output power of the laser beam at the reading window is at most 1.3mW acc. to EN 60825-1.The average laser power is less than 1mW in accordance with laser class 2 acc. to EN 60825-1 and U.S. 21 CFR 1050.10 with Laser Notice No. 50.

CAUTION: Use of controls or adjustments or performance of procedures other than specified herein may result in hazardous light exposure! The use of optical instruments with the product will increase eye hazard!

Notice!
It is important that you attach the sticky labels supplied to the device (notice signs and laser emission symbol)! If the signs would be covered due to the installation situation of the BCL 8, attach them close to the BCL 8 in such a way that reading the notices does not necessitate looking into the laser beam!
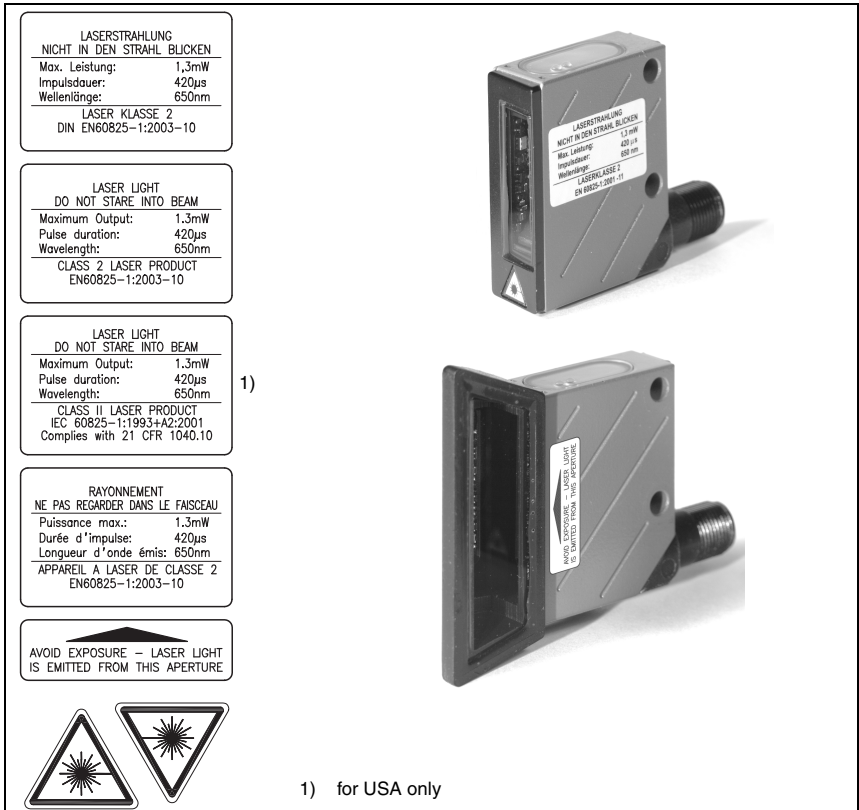
Figure 2.1:   Example for the attachment of the sticky labels with warning notices

Attention!

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

Safety regulations

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

Qualified personnel

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.

3   Description

Device construction of the BCL 8

BCL 8 S M 102
BCL 8 S N 102

BCL 8 S M 100
BCL 8 S N 100

Through holes
∅ 4.4 for
fastening

Through holes
∅ 4.4 for
fastening

M12 connectors, turnable

M12 connectors, turnable

Reading window with
beam exit at the front

Reading window with
lateral beam exit

Two M4 mounting threads at the rear and bottom side of the device
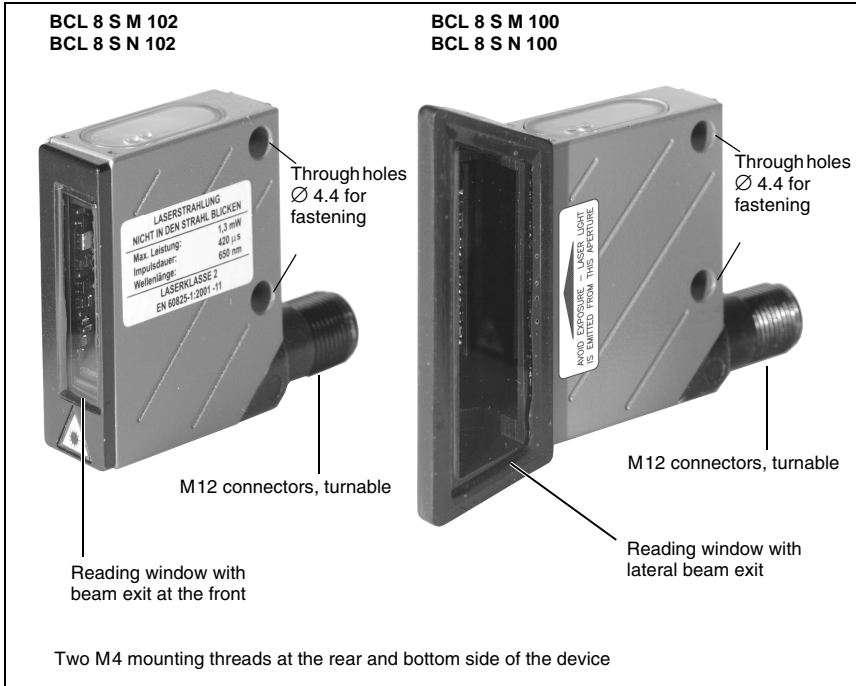
Figure 3.1:   Device construction of the BCL 8

3.1   The BCL 8 barcode reader

The BCL 8 barcode reader is a laser scanner with integrated decoder for all commonly used barcodes, e.g. 2/5 Interleaved, Code 39, Code 128, EAN etc., with an extremely small housing.

The many possible configurations of the device allow it to be adapted to a multitude of reading tasks. Due to the small dimensions of the unit and its wide reading field, the BCL 8 may also be used in highly constrained spaces.

Information on technical data and characteristics can be found in chapter 4.

3.2 Stand alone operation

The BCL 8 barcode reader is operated as a "stand-alone" device. It is equipped with a five-core cable with open ends or a 5-pin M12 connector for the electrical connection of the supply voltage, the interface and the switching input.

With MA 8.1 connector unit

The MA 8.1 connector unit simplifies the electrical installation of the barcode reader in stand-alone operation with an **RS 232 interface**.

For details on the connector units, see chapter 5.

With MA 8-01 connector unit

The MA 8-01 connector unit simplifies the electrical installation of the barcode reader in stand-alone operation with an **RS 485 interface**.

For details on the connector units, see chapter 5.

3.3 Daisy chain network

A daisy chain is a network based on the RS 232 interface. All devices, which consist of a transmitter and a receiver, are connected to one another to form a ring. The transmitter of one device is directly connected to the receiver of the next device until all devices are connected together to form a ring. One device performs the task of the host system.

Ideally, all BCL 8 devices are to be connected to one another with MA 8.1 connector units so that:

- the voltage supply of the BCL 8/MA 8.1 is ensured.
- TxD to RxD of the RS 232 is established from one BCL 8 to the next (host).
- the switching outputs and inputs are connected (optional).

A maximum of seven BCL 8 devices may be operated in the daisy chain together with one host. Further information is available from your Leuze sales office.

4   Specifications

4.1   General specifications BCL 8

Optical data

Light source	laser diode 650 nm
Scanning rate	M-optics: 600 scans/s
	N-optics: 500 scans/s
Resolution	M-optics: m = 0.150 … 0.500 mm / 6 … 20 mil
	N-optics: m = 0.127 … 0.400 mm / 5 … 16 mil
Beam deflection	by means of rotating polygon wheel
Beam exit	at front, alternatively on the side with deflection mirror (105°)
Read distance	see reading fields
Reading field opening	see reading fields
Laser safety class	class 2 acc. to EN 60825-1 and U.S. 21 CFR 1040.10 with Laser Notice No. 50
Code types	2/5 Interleaved, Code 39, Code 128, EAN 128, EAN/UPC, EAN Addendum, Codabar, Pharma Code, Code 93
Software features	selectable output format, autoConfig, autoReflAct, reference code comparison, multiple read, real time decoding, adjustment mode, control of switching input or switching output, etc.

Electrical data

Interface type	RS 232, freely configurable
Baud rate	4800 … 57600 Bd
Data formats	data bits: 7, 8
	Parity: None, Even, Odd
	Stop bit: 1, 2
Protocols	framing protocol with/without handshake software handshake X ON / X OFF
Service interface	RS 232 with fixed data format, 9600 Bd, 8 data bits, no parity, 1 stop bit <STX> <data> <CR><LF>
Ports	1 switching input 5 VDC
	or
	1 switching output 5 … 30V, 20 mA
LEDs	1 device status
	1 read status
Operating voltage	4.75 … 5.5 VDC, Safety Class III - PELV [1] (Protective Extra Low Voltage)
Current consumption	max. 250 mA (2W power supply unit recommended)

Table 4.1:   Technical data

Mechanical data

Protection class	IP 67
Connection type	M12 connector, 5-pin, turnable or fixed cable, 2m long, 5 x 0.25mm^2
Weight	70g
Dimensions (WxHxD)	beam exit at front: 48 x 40.3 x 15mm beam exit on the side: 48 x 58 x 17.4mm
Housing	metal (diecast zinc)

Environmental data

Ambient temp. (operation/storage)	0°C … +40°C/-20°C … +60°C
Air humidity	max. 90% rel. humidity, non-condensing
Vibration	IEC 60068-2-6, test FC
Shock	IEC 60068-2-27, test Ea
Electromagnetic compatibility	EN 55022, IEC 61000-4-2, -3, -4 and -6,
Conformity	CE, FCC Class B, UL

Table 4.1:   Technical data

    1)   For UL applications: for use in class 2 circuits according to NEC only

4.2   LED indicators

Two, 3-colour LEDs on the top of the housing indicate the device and read status:

LED	Colour	Meaning
Status LED	Green, flashing	Initialisation phase
	Green continuous	Ready to operate
	Red flashing (200ms)	Warning
	Red continuous	Error, no function
	Orange flashing (200ms)	Service operation
Decode LED	Green (200ms on)	Reading successful
	Red (200ms off)	No reading result
	Orange continuous	Reading gate active

Table 4.2:   LED indicators

4.3   Dimensioned and Connection Drawings

BCL 8 S M …0, BCL 8 S N …0 with lateral beam exit

A   Turning connector, 90°
B   Indicator LEDs (B1: status LED, B2: decode LED)
C   Laser beam
D   Optical axis
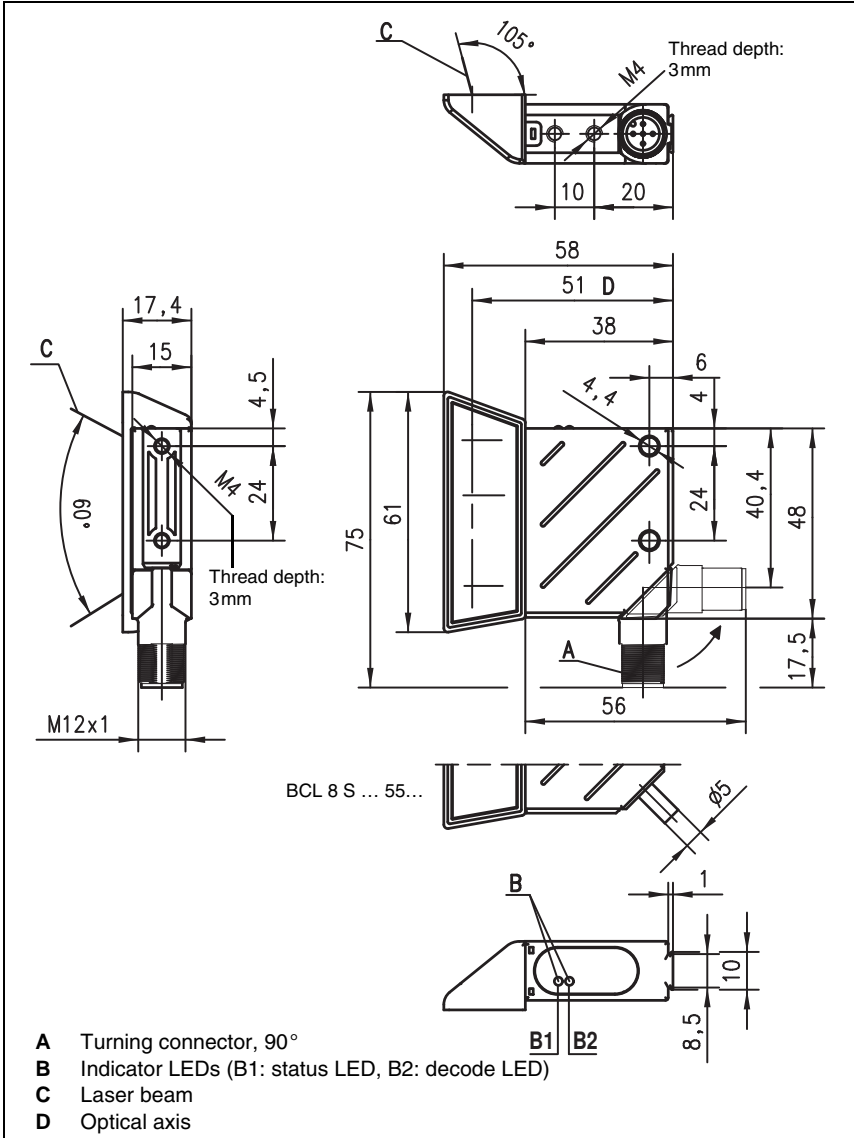
Figure 4.1:   Dimensioned drawing BCL 8 S M …0, BCL 8 S N …0 with lateral beam exit

BCL 8 S M …2, BCL 8 S N …2 with front beam exit

A	Turning connector, 90°
B	Indicator LEDs (B1: status LED, B2: decode LED)
C	Laser beam
D	Optical axis
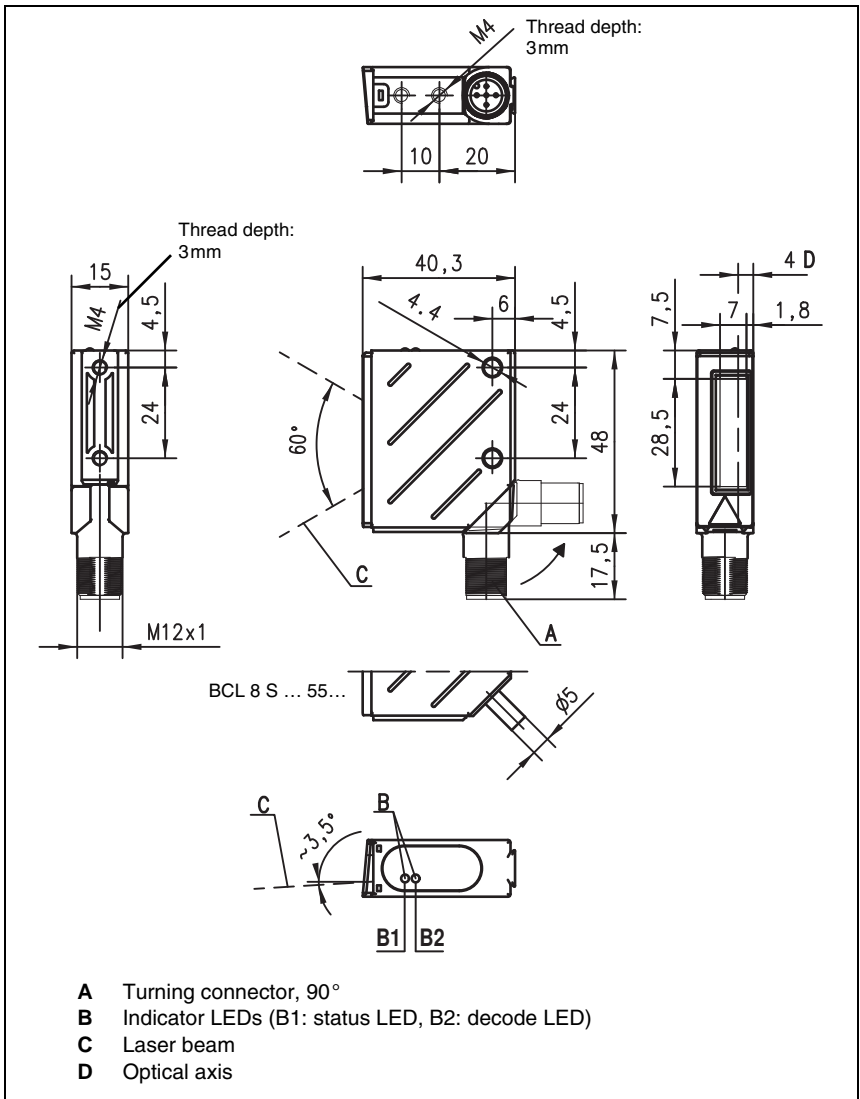
Figure 4.2:   Dimensioned drawing BCL 8 S M …2, BCL 8 S N …2 with front beam exit

4.4 Optical data

○ *Notice!*

Please note that the size of the barcode module influences the maximum read distance and the width of the reading field. Therefore, when selecting a mounting location and/or the barcode label, take into account the different reading characteristics of the scanner with various barcode modules.

For different reading task and connection requirements, the BCL 8 is available in various models (see chapter 4.4.1 "Type overview").

4.4.1 Type overview

BCL 8 with M optics

Type	Range	Module/ resolution [mm]	Connection	Scanner type/ beam exit	Part No.
BCL 8 S M 100	up to 160mm	0.15 … 0.5	M12 connector	Single Line/ lateral	500 40229
BCL 8 S M 102				Single Line/ front	500 38949
BCL 8 S M 550			fixed cable (2m)	Single Line/ lateral	500 40230
BCL 8 S M 552				Single Line/ front	500 38948

Table 4.3: Type overview - M-optics

BCL 8 with N optics

Type	Range	Module/ resolution [mm]	Connection	Scanner type/ beam exit	Part No.
BCL 8 S N 100	up to 120mm	0.125 … 0.4	M12 connector	Single Line/ lateral	501 05417
BCL 8 S N 102				Single Line/ front	501 05418
BCL 8 S N 550			fixed cable (2m)	Single Line/ lateral	501 05419
BCL 8 S N 552				Single Line/ front	501 05420

Table 4.4: Type overview - N-optics

4.4.2   Reading fields

○ *Notice!*

Please note that the actual reading fields are also influenced by factors such as labelling material, printing quality, scanning angle, printing contrast etc., and may thus deviate from the reading fields specified here. The origin of the read distance always refers to the front edge of the housing of the beam exit.

Reading field of BCL 8 with M-optics
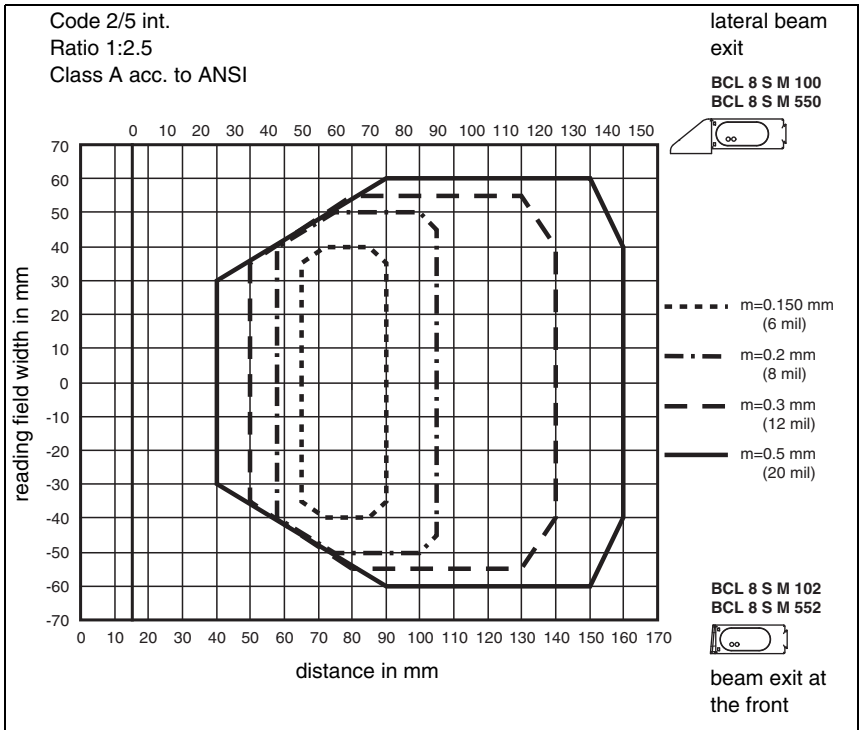
Figure 4.3:   Reading field of BCL 8 S M … with M-optics (medium density)

Reading field of BCL 8 with N-optics

Code 2/5 int.
Ratio 1:2.5
Class A acc. to ANSI

lateral beam exit

BCL 8 SN 100
BCL 8 SN 550

m=0.127 mm (5 mil)
m=0.15 mm (6 mil)
m=0.2 mm (8 mil)
m=0.25 mm (10 mil)

BCL 8 SN 102
BCL 8 SN 552

beam exit at the front

reading field width in mm

distance in mm
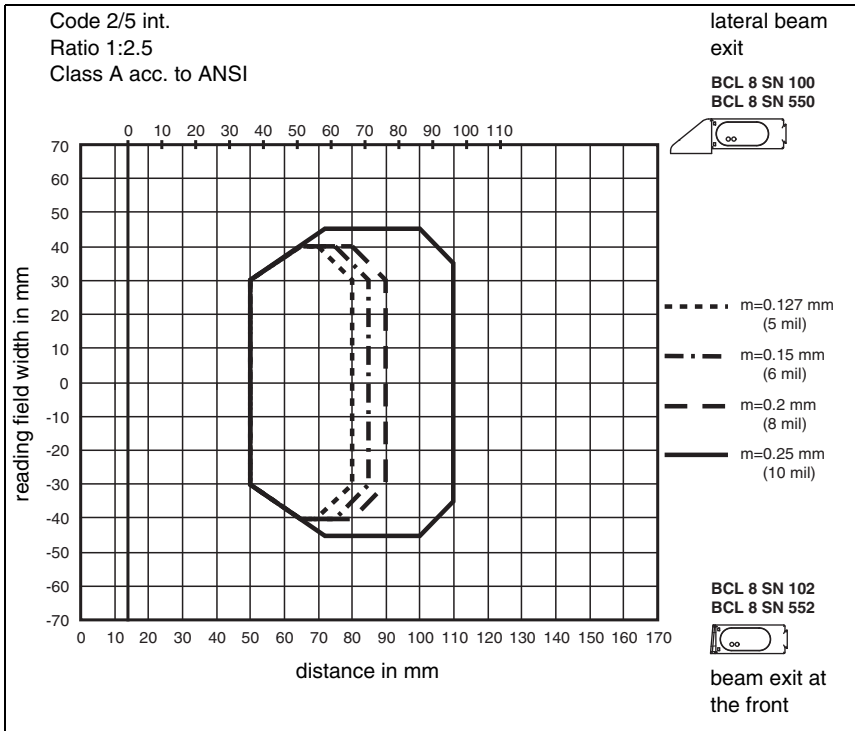
Figure 4.4: Reading field of BCL 8 S N … with N-optics (high density)

5 Accessories / order codes

5.1 Accessories overview

○
⊓ *Notice!*
Products from Leuze electronic GmbH + Co. KG can be ordered from any of the sales and service offices listed on the back page of this operating manual.

Designation	Part No.	Short description
MA 8.1	501 01699	MA 8.1 connector unit for BCL 8, **RS 232** point-to-point connection, 1 switching input **and** 1 switching output, 24 V DC
MA 8-01	501 04790	MA 8-01 connector unit for BCL 8, **RS 485** point-to-point connection, 1 switching input **and** 1 switching output, 24 V DC
BT 8-0	500 36196	Mounting device with dovetail
BT 8-D10	500 35017	Mounting device for rods ∅ 10 mm or mounting plate
BT 8-D12	500 35018	Mounting device for rods ∅ 12 mm or mounting plate
BT 8-D14	500 35019	Mounting device for rods ∅ 14 mm or mounting plate
UMS 8-D10	500 35020	Mounting system with dovetail for rods ∅ 10 mm
UMS 8-D12	500 35021	Mounting system with dovetail for rods ∅ 12 mm
UMS 8-D14	500 35022	Mounting system with dovetail for rods ∅ 14 mm
UMS 8.1-D10	500 35023	Turnable mounting system, with dovetail, for rods ∅ 10 mm
UMS 8.1-D12	500 35024	Turnable mounting system, with dovetail, for rods ∅ 12 mm
UMS 8.1-D14	500 35025	Turnable mounting system, with dovetail, for rods ∅ 14 mm
UMS 8.2-D10	500 35026	Turnable and inclinable mounting system, with dovetail, for rods ∅ 10 mm
UMS 8.2-D12	500 35027	Turnable and inclinable mounting system, with dovetail, for rods ∅ 12 mm
UMS 8.2-D14	500 35028	Turnable and inclinable mounting system, with dovetail, for rods ∅ 14 mm
BCLConfig	Download at www.leuze.de	Configuration software

Table 5.1: Accessories / order codes

5.2 Connector unit MA 8.1

The MA 8.1 connector unit is used to simplify the electrical installation of the BCL 8. If offers the following advantages over the installation of the BCL 8 as a stand-alone device:

- M12 socket for switching input and switching output
- M12 connector for RS 232 interface and voltage supply 24 V DC
- M12 socket for connection of the BCL 8

A M12 socket, 5-pin
B M12 plug, 5-pin
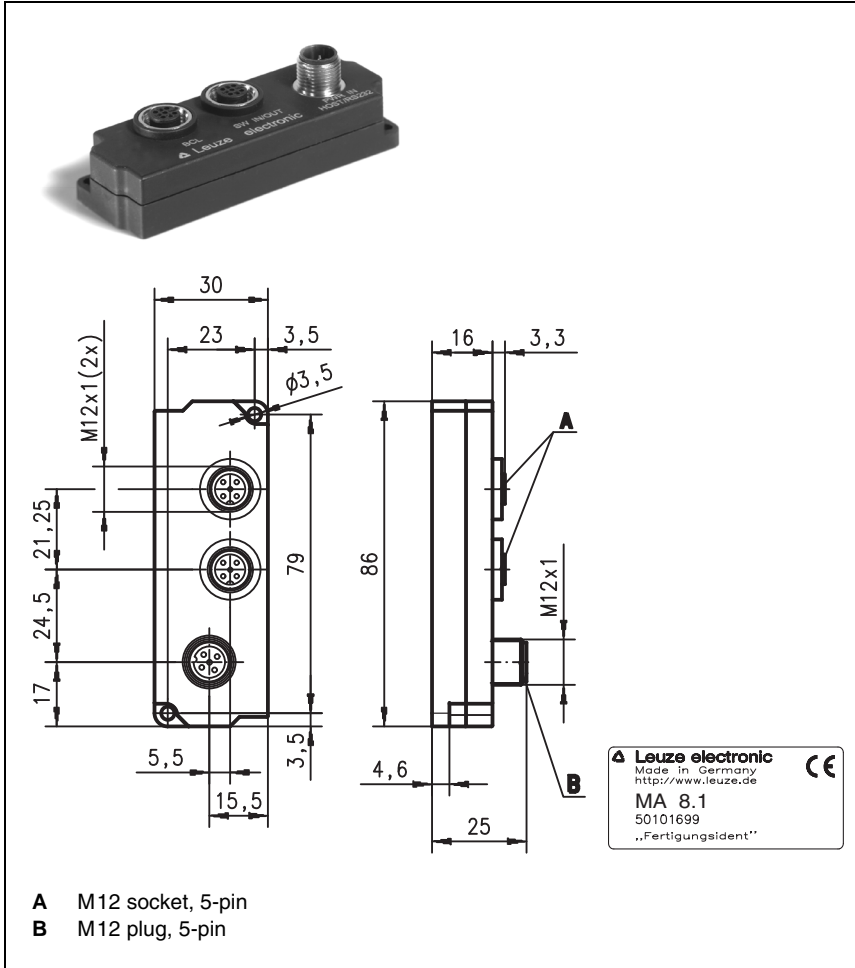
Figure 5.1: Photo and dimensioned drawing of the MA 8.1 connector unit

5.2.1   Electrical connection MA 8.1
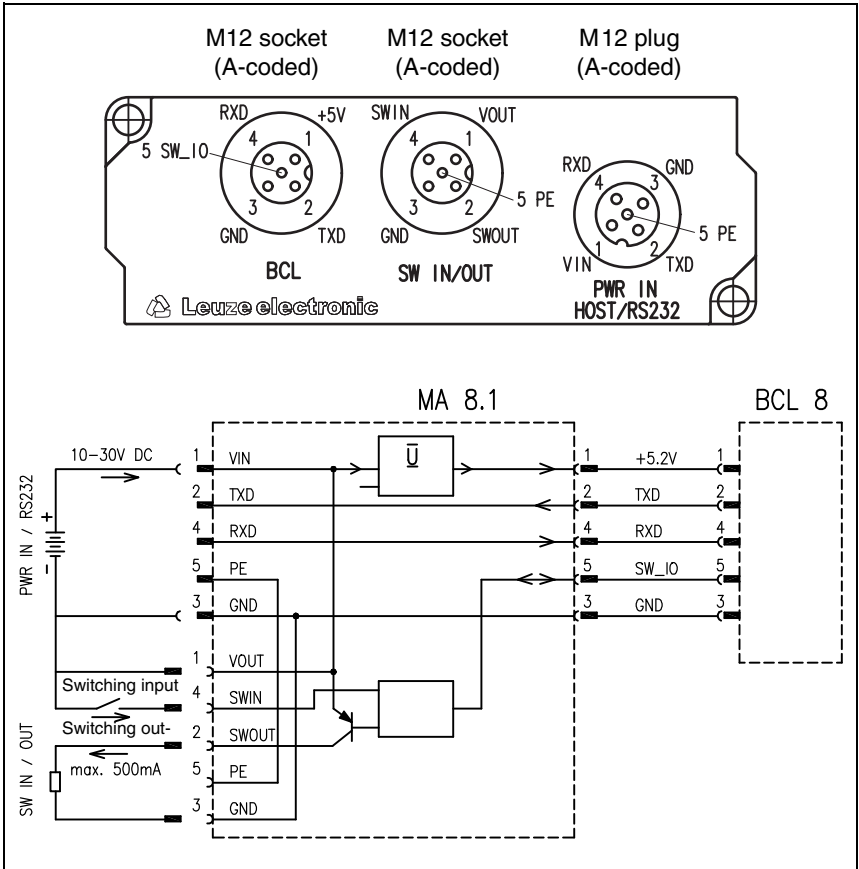
Figure 5.2:   Electrical connection MA 8.1

5.2.2 MA 8.1 - PWR IN HOST/RS 232 - voltage supply and RS 232
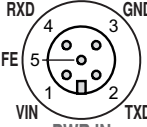
PWR IN HOST/RS 232 (5-pin plug, A-coded)			
RXD GND FE VIN TXD **PWR IN HOST/RS232** **M12 plug (A-coded)**	**Pin**	**Name**	**Remark**
	1	**VIN**	Positive supply voltage: +10 … +30 VDC
	2	**TXD**	RS 232 transmit data from the BCL 8 to the host
	3	**GND**	Supply voltage 0 VDC
	4	**RXD**	RS 232 received data from the host to the BCL 8
	5	**FE**	Functional earth
	Thread	**FE**	Functional earth (housing)

Figure 5.2: MA 8.1 - Pin assignment PWR IN HOST/RS 232

⚠ **Attention!**
Protection class IP 67 is achieved only if the connectors and caps are screwed into place!

5.2.3 MA 8.1 - SW IN/OUT – switching input and switching output
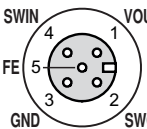
SW IN/OUT(5-pin socket, A-coded)			
SWIN VOUT FE GND SWOUT **SW IN/OUT** **M12 socket (A-coded)**	**Pin**	**Name**	**Remark**
	1	**VOUT**	Voltage supply for sensors (VOUT identical to VIN at PWR IN)
	2	**SWOUT**	Switching output
	3	**GND**	GND for sensors
	4	**SWIN**	Switching input
	5	**FE**	Functional earth
	Thread	**FE**	Functional earth (housing)

Figure 5.3: MA 8.1 - Pin assignment SW IN/OUT

⚠ **Attention!**
Protection class IP 67 is achieved only if the connectors and caps are screwed into place!

○ **Notice!**
*The switching input/switching output are programmed via the **BCLconfig** configuration soft-ware. For more information see chapter 10.6 and chapter 10.8, from page 50 onwards.*

Attention!

If you use a sensor with a standard M12 connector, then please note the following:

*Use **only sensors** on which the **switching output does not lie on pin 2** or **sensor cables on which pin 2 is not assigned**. Otherwise, the switching output is not protected against feedback on the switching input. If the inverted sensor output lies on pin 2, erroneous behaviour of the switching output will result.*

Connecting the switching input / switching output

The MA 8.1 is provided with a switching input and a switching output. The connection of switching input / switching output is carried out according to figure 5.4.
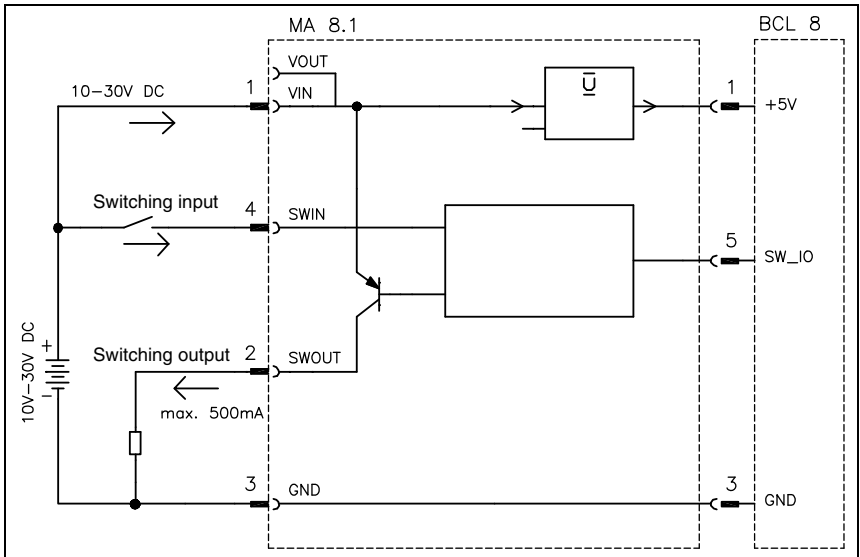
Figure 5.4: Connection of the switching input/output of the MA 8.1

5.2.4   MA 8.1 - BCL - connecting the BCL 8 to the MA 8.1
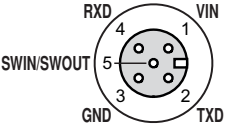
BPS (5-pin socket, A-coded)			
	Pin	**Name**	**Remark**
	1	VIN	Supply voltage for BCL 8 +4.9 … +5.4 V DC
	2	TXD	Transmission line RS 232
	3	GND	Supply voltage 0 V DC
	4	RXD	Receiving line RS 232
	5	SWIN/ SWOUT	Programmable switching input/output of the BCL 8
	Thread	FE	Functional earth (housing)

Figure 5.5: MA 8.1 - Pin assignment BCL

⚠ ***Attention!***
Protection class IP 67 is achieved only if the connectors and caps are screwed into place!

The BCL 8 is connected to the MA 8.1 via the connection cable KB 008-1000/2000/3000 (AA/AR). The voltage supply is connected via the **PWR IN HOST/RS 232** socket.

⚠ ***Attention!***
It is absolutely necessary to connect functional earth, since all electrical interference (EM pick-up) is discharged via the functional earth connection.

5.3   Connector unit MA 8-01

The modular connector unit is an optional accessory when connecting a BCL 8 to an RS 485 interface. The RS 485 interface, the switching input and the switching output are all connected to the MA 8-01. It also supplies voltage to the BCL 8. The MA 8-01 connector unit offers the following advantages over the installation of the BCL 8 as a stand-alone device:

- M12 socket for switching input and switching output
- M12 connector for RS 485 interface and voltage supply 24 V DC
- M12 socket for connection of the BCL 8

All dimensions in mm

PWR IN HOST/RS 485	= Voltage supply/RS 485 host interface
SW IN/OUT	= Switching input/output
BPS	= Connection to BCL 8/BPS 8

○
ⅼ **Notice!**
   The SW IN/OUT connection is sealed with a thread plug upon delivery.
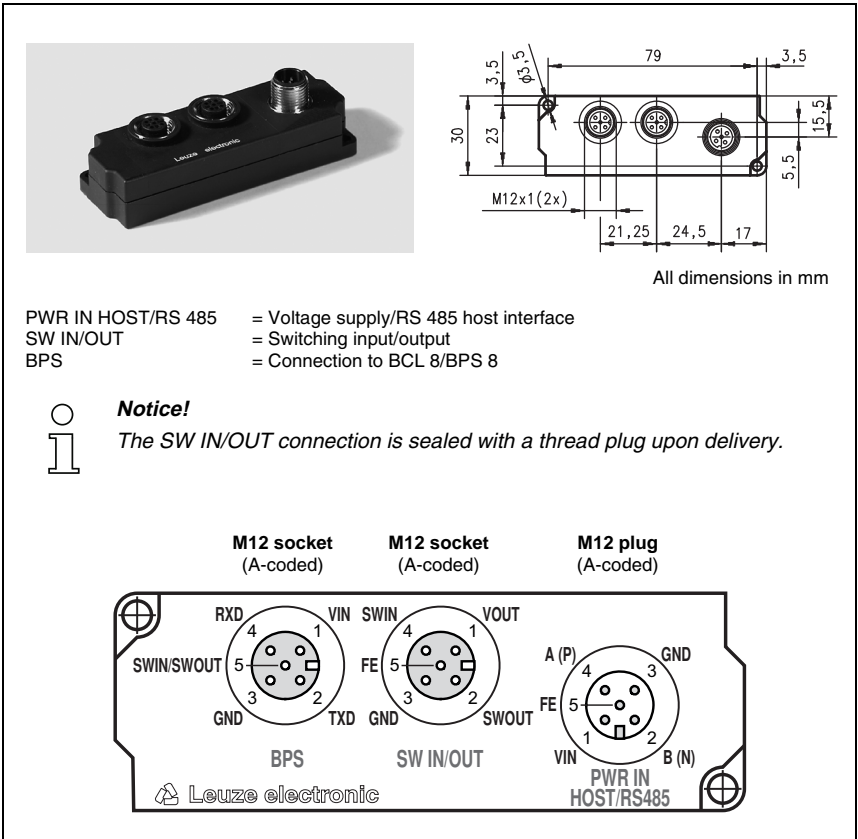
Figure 5.6: Pin assignment MA 8-01

⚠ **Attention!**
   Protection class IP 67 is achieved only if the connectors and caps are screwed into place!

Electrical connection MA 8-01

Electrical data

Interface type	RS 485
Service interface	**without MA 8-01 connected**:
	RS 232 with default data format,
	9600 Bd, 8 data bits, no parity, 1 stop bit
	with MA 8-01 connected:
	RS 485 replaces RS 232
Switching input / switch-	1 switching input, 1 switching output, each is programmable
ing output	Switching input: 10 … 30 VDC
	Switching output: I_{max} = 500 mA
	output voltage = operating voltage
Operating voltage	10 … 30 VDC
Power consumption	max. 0.5 W

5.3.1 MA 8-01 - PWR IN HOST/RS 485 - voltage supply and RS 485
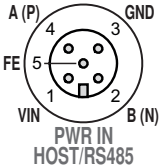
PWR IN HOST/RS 485 (5-pin plug, A-coded)			
	Pin	**Name**	**Remark**
A (P) ⌒ GND	**1**	**VIN**	Positive supply voltage: +10 … +30 VDC
4 3	**2**	**B (N)**	RS 485 receive/transmit data B-line (N)
FE 5	**3**	**GND**	Supply voltage 0 VDC
1 2	**4**	**A (P)**	RS 485 receive/transmit data A-line (P)
VIN B (N) **PWR IN HOST/RS485**	**5**	**FE**	Functional earth
M12 plug (A-coded)	**Thread**	**FE**	Functional earth (housing)

Figure 5.7: MA 8-01 - Pin assignment PWR IN HOST/RS 485

⚠ **Attention!**

Protection class IP 67 is achieved only if the connectors and caps are screwed into place!

5.3.2   MA 8-01 - SW IN/OUT - switching input and switching output
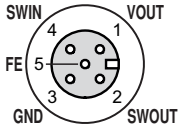
SW IN/OUT(5-pin socket, A-coded)			
	Pin	**Name**	**Remark**
SWIN VOUT FE 5 4 1 3 2 GND SWOUT **SW IN/OUT** **M12 socket (A-coded)**	**1**	**VOUT**	Voltage supply for sensors (VOUT identical to VIN at PWR IN)
	2	**SWOUT**	Switching output
	3	**GND**	GND for the sensors
	4	**SWIN**	Switching input
	5	**FE**	Functional earth
	Thread	**FE**	Functional earth (housing)

Figure 5.8: MA 8-01 - Pin assignment SW IN/OUT

⚠ **Attention!**

Protection class IP 67 is achieved only if the connectors and caps are screwed into place!

◯ **Notice!**

*The switching input/switching output are programmed via the parameters in the **BCLconfig** configuration software. For more information see chapter 10.6 and chapter 10.8, from page 50 onwards.*

⚠ **Attention!**

If you use a sensor with a standard M12 connector, then please note the following:

*Use **only sensors** on which the **switching output does not lie on pin 2** or **sensor cables on which pin 2 is not assigned**. Otherwise, the switching output is not protected against feedback on the switching input. If the inverted sensor output lies on pin 2, erroneous behaviour of the switching output will result.*
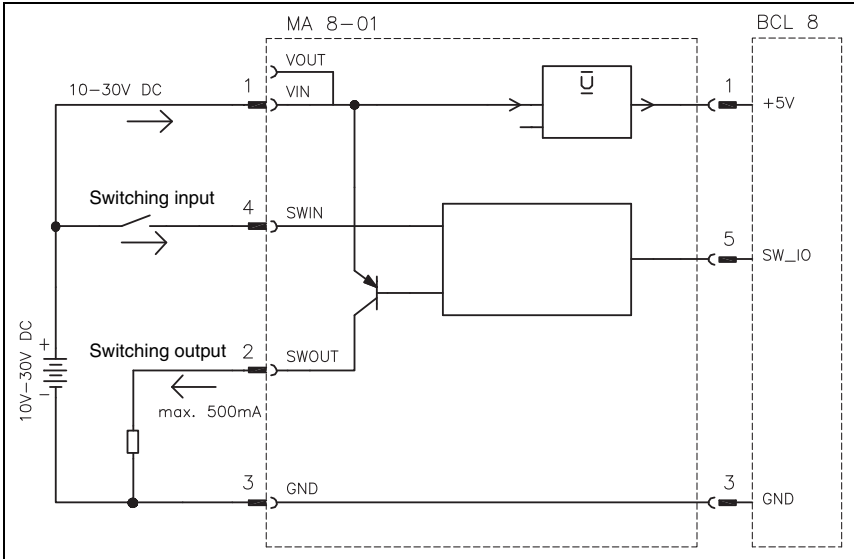
Figure 5.1:   Electrical connection MA 8-01

5.3.3   MA 8-01 - BCL - connecting the BCL 8 to the MA 8-01

BCL (5-pin socket, A-coded)			
	Pin	**Name**	**Remark**
	1	VIN	Supply voltage for BCL 8 approx. +5.2 V DC
	2	TXD	Transmission line RS 232
	3	GND	Supply voltage 0 V DC
	4	RXD	Receiving line RS 232
	5	SWIN/ SWOUT	Programmable switching input/output of the BCL 8
	Thread	FE	Functional earth (housing)

Figure 5.9: MA 8-01 - Pin assignment BCL

⚠ ***Attention!***

Protection class IP 67 is achieved only if the connectors and caps are screwed into place!

The BCL 8 is connected to the MA 8-01 via the connection cable KB 008-1000/2000/3000 (AA/AR). The voltage supply is connected via the **PWR IN HOST/RS 485** socket.

> ⚠ **Attention!**
> *It is absolutely necessary to connect functional earth, since all electrical interference (EM pick-up) is discharged via the functional earth connection.*

5.3.4   Termination of the RS 485 interface

A permanently installed termination network is present in the MA 8-01. The network terminates the outgoing RS 485 data interface, as shown in figure 5.1, and cannot be switched off.
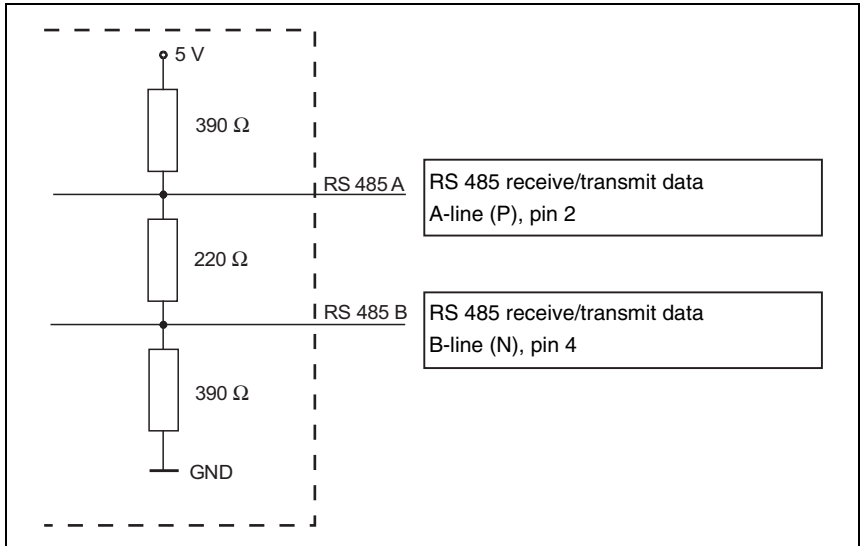
Figure 5.1:   Termination of the RS 485 interface in the MA 8-01

5.4   Mounting accessories

A variety of mounting devices are available for mounting the BCL 8. These are designed for rod or screw mounting (see also the Leuze Catalog, Series 8 Accessories).

Mounting devices

BT 8-0 (Part No. 500 36196)   BT 8-D10 (∅10mm, Part No. 500 35017)
                                               BT 8-D12 (∅12mm, Part No. 500 35018)
                                               BT 8-D14 (∅14mm, Part No. 500 35019)

UMS 8-D10 (∅10mm, Part No. 500 35020)   UMS 8.1-D10 (∅10mm, Part No. 500 35023)
UMS 8-D12 (∅12mm, Part No. 500 35021)   UMS 8.1-D12 (∅12mm, Part No. 500 35024)
UMS 8-D14 (∅14mm, Part No. 500 35022)   UMS 8.1-D14 (∅14mm, Part No. 500 35025)

UMS 8.2-D10 (∅10mm, Part No. 500 35026)
UMS 8.2-D12 (∅12mm, Part No. 500 35027)
UMS 8.2-D14 (∅14mm, Part No. 500 35028)

Figure 5.2:   Mounting devices for the BCL 8

6   Installation

6.1   Storage, transportation

⚠️ **Attention!**
When transporting or storing, package the device so that it is protected against collision and humidity. Optimum protection is achieved when using the original packaging. Heed the required environmental conditions specified in the technical data.

Unpacking

↳ *Check the packaging for any damage. If damage is found, notify the post office or shipping agent as well as the supplier.*

↳ *Check the delivery contents using your order and the delivery papers:*

- Delivered quantity
- Device type and model as indicated on the nameplate
- Laser warning signs
- Brief manual

The name plates provide information as to what BCL type your device is. For specific information, please refer to chapter 4.4.1.

BCL 8 name plate

BCL 8 type designation

△ Leuze electronic CE
Made in Germany
P.O.—Box 1111
73277 Owen/Teck
BCL 8 SM 552   c(UL)us
                LISTED
                I.T.E.
                85PA
Serial Number:
Manufactured:
Power supply: 4.75—5.5V DC /250mA
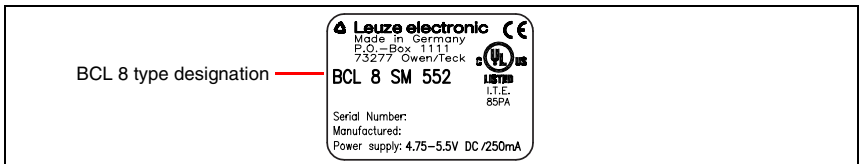
Figure 6.1:   BCL 8 device name plate

↳ *Save the original packaging for later storage or shipping.*

If you have any questions concerning your shipment, please contact your supplier or your local Leuze electronic sales office.

↳ *Observe the applicable local regulations when disposing of the packaging materials.*

Cleaning

↳ *Clean the glass window of the BCL 8 with a soft cloth before mounting. Remove all packaging remains, e.g. carton fibres or Styrofoam balls.*

⚠️ **Attention!**
Do not use aggressive cleaning agents such as thinner or acetone for cleaning the device.

6.2 Mounting

⚠️ *Attention Laser Radiation!*

Follow the safety notices in chapter 2.3 on page 6!

Accessories

A variety of mounting systems are available which you can order separately from Leuze electronic. Please select the part number from the separate data sheet (available on the Internet under www.leuze.de).

Mounting the BCL 8

There are three basic mounting arrangements for the BCL 8:

- using the dovetail strips and the corresponding mounting accessories
- using the mounting threads on the back- and underside of the devices (chapter 4.3)
- using the two $\varnothing$ 4.4 mm through holes (chapter 4.3)

BCL 8 mounting example

Rod mounting with UMS 8.1-D… mounting system

Figure 6.2:   BCL 8 mounting example

Mounting the MA 8.1 connector unit

You can mount the MA 8.1 connector unit according to your needs by using the two bore holes. Subsequently, connect the BCL 8 with the connector unit via the respective cable (see separate data sheet for MA 8.1).

6.2.1   Device arrangement

Selecting a mounting location

In order to select the right mounting location, several factors must be considered:

- size, orientation, and position tolerance of the barcodes on the objects to be scanned.
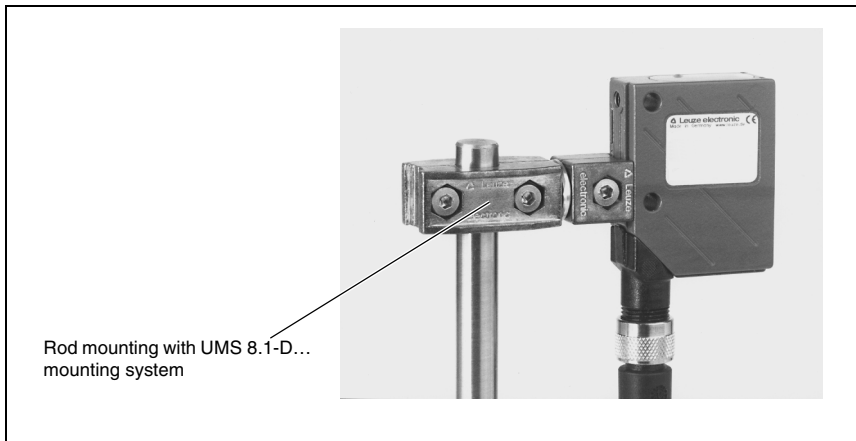- the reading field of the BCL 8 in relation to the barcode module width.
- the resulting minimum and maximum read distance from the respective reading field (For specific information, please refer to chapter 4.4).
- alignment of the barcode reader for avoiding reflections.
- distance between BCL 8 and host system with respect to the interface.

Notice!

The best reading results are obtained when

- the read distance lies in the middle area of the reading field.
- there is no direct sunlight and extraneous light is avoided.
- the barcode labels are of good print quality and have good contrast ratios.
- you do not use high-gloss labels.
- the barcode is moved past the reading window with a rotational angle > approx. 15°.
- the laser beam is narrowed down for its respective reading task in order to avoid reflections on shiny components.

Notice!

With front beam exit, the beam exit on the BCL 8 is nearly vertical to the reading window; with lateral beam exit, the beam exit is at 15° from vertical. The barcode label must be rotated by > 10° to avoid a total reflection of the laser beam in the case of glossy labels.
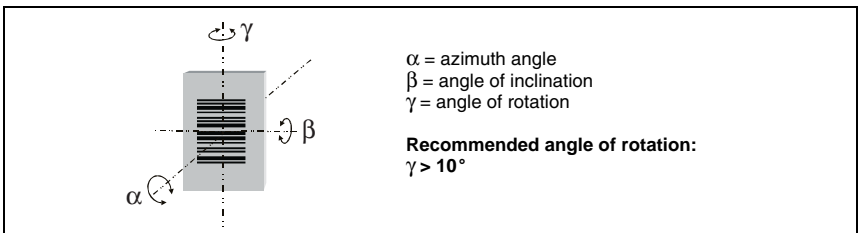
Figure 6.3:   Definition of the BCL 8 reading angles

Mounting location

↳ *When selecting a mounting location, pay attention to*

- maintaining the required environmental conditions (temperature, humidity)
- possible soiling of the reading window due to liquids, abrasion by boxes, or packaging material residues.
- lowest possible chance of damage to the scanner by mechanical collision or jammed parts.
- possible extraneous light influence (no direct sunlight).

6.3 Connection

⚠️ ***Attention!***
The BCL 8 barcode reader is completely sealed and cannot be opened.
Do not try to open the device under any circumstances, as this voids both protection class IP 67 and the warranty.

Before connecting the device, be sure that the supply voltage agrees with the value printed on the name plate.

Connection of the device and maintenance work while under voltage must only be carried out by a qualified electrician.

The power supply unit for the generation of the supply voltage for the BCL 8 and the corresponding connector units must have a secure electrical insulation according to IEC 60742 (PELV). For UL applications: only for use in class 2 circuits according to NEC.

Take care to connect the protective conductor correctly to the housing screen. Error-free operation is only guaranteed when the protective conductor is properly connected.

If faults cannot be corrected, the device should be removed from operation and protected against possible use.

6.3.1 Connecting the BCL 8

BCL 8 pin assignment
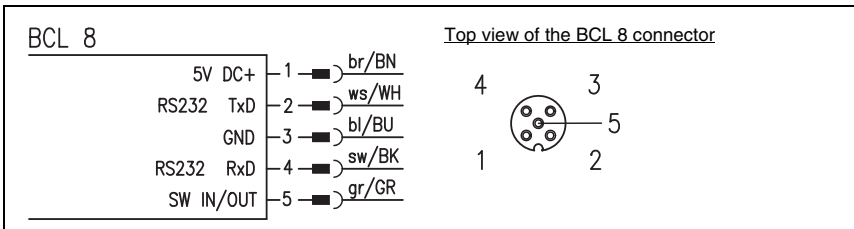
Figure 6.4:   BCL 8 pin assignment

Wiring description

Pin 1	+5V DC	Operating voltage 5 V DC
Pin 2	RS 232 TxD	TxD signal line of the RS 232 interface
Pin 3	GND	Operating voltage 0 V DC / reference ground
Pin 4	RS 232 RxD	RxD signal line of the RS 232 interface
Pin 5	SW IN/OUT	Switching input **or** switching output

Table 6.1:   Wiring description BCL 8

6.3.2   Connecting the switching input/output

The BCL 8 is provided with a switching input **or** a switching output. You can configure the respective function (input or output) according to your requirements using the supplied BCLConfig software.

Switching input (default)

By means of the SW IN/OUT combined switching input/output connection, you can trigger a read process **in the standard setting** (low = active) with the connection SW IN/OUT (pin 5) and GND (pin 3). The 2.2 kΩ "pull-up" resistor must be connected externally (**connection version 1**, figure 6.5).
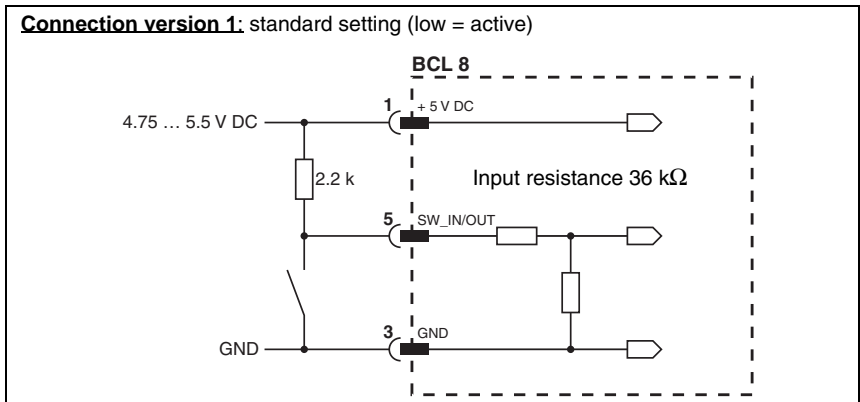
Figure 6.5:   Switching input for BCL 8 connection version 1 (standard setting)

With the **"inverted" setting** (high = active), you can trigger a read process by applying a voltage of +5 V DC (pin 1) at SW IN/OUT (pin 5) (**connection version 2**, figure 6.6).
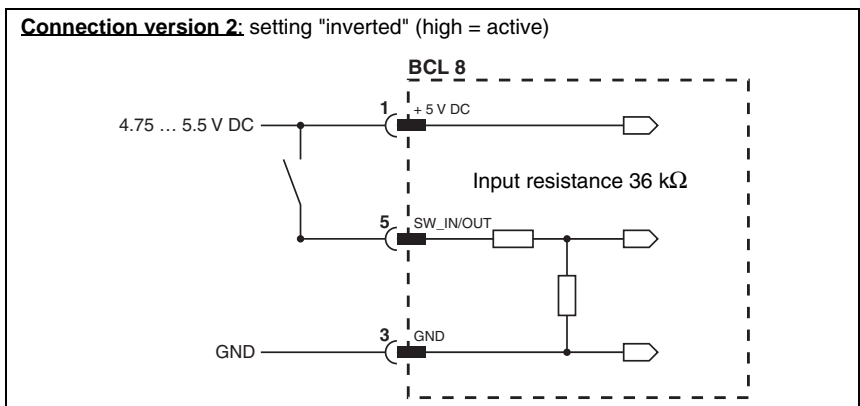
Figure 6.6:   Switching input for BCL 8 connection version 2 (setting "inverted")

Switching output

The switching output connection between SW IN/OUT (pin 5) and GND (pin 3) can be activated in the scanner setup.

In the basic setting, the SW IN/OUT switching output is switched to GND (pin 3) if a code is recognised.
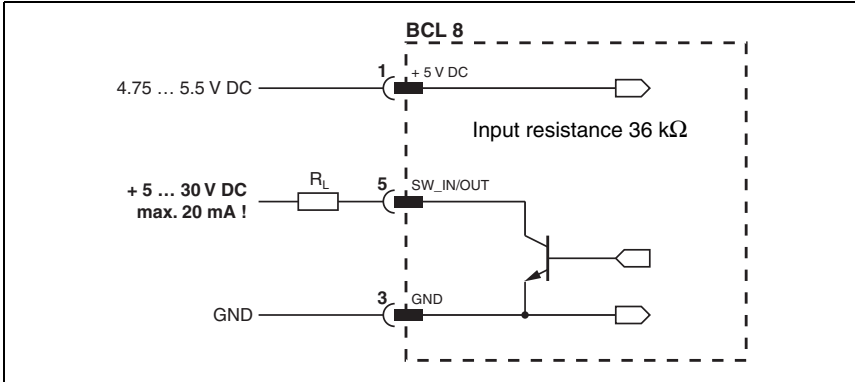
Figure 6.7:   Switching output BCL 8

⚠ **Attention!**
Do not load the respective switching output of the BCL 8 with more than 20 mA at +5 … 30 V DC!

○ **Notice!**
You can configure the switching input/output according to your needs using the supplied BCLConfig program.

6.3.3 Line lengths

The following maximum line lengths to be used must be observed:

Connection	Interface	Max. line length	Shielding
BCL 8 direct	RS 232	< 3 m	necessary
BCL 8 – MA 8.1	RS 232	< 3 m	necessary
BCL 8 – MA 8-01	RS 232	< 3 m	necessary
MA 8.1 – host	RS 232	< 10 m	necessary
MA 8-01 – host	RS 485	< 25 m	necessary
Switching input/output		< 10 m	not necessary

Table 6.2: Line lengths

Notice!

*The **RS 232 connection** between BCL 8 and host must not **exceed a total of** 10 m.*

6.4 Disassembling, packing, disposing

Repacking

For later re-use, the device is to be packed so that it is protected against shocks and dampness. Optimal protection is achieved when using the original packaging.

Notice!

Electrical scrap is a special waste product! Observe the locally applicable regulations regarding disposal of the product.

7 Commissioning

Attention Laser Radiation!

Follow the safety notices in chapter 2.3 on page 6!

7.1 Measures to be performed prior to the initial commissioning

↳ *Before commissioning, familiarise yourself with the operation and configuration of the device(s)!*

↳ *Before connecting the supply voltage, recheck all connections and ensure that they have been properly made.*

7.2 Function Test

"Power On" test

After connecting the operating voltage, the BCL 8 performs an automatic "Power On" function test. Afterward, the green status LED on the top side of the BCL 8 lights up. Only then are any saved customer-specific settings active.

Interface

Proper function of the interface can be tested easiest in service operation using the service interface with the "BCLConfig" programming software and a notebook computer.

"Online commands"

Using the "Online" commands, important device functions can be checked, e.g. proper functioning of the laser.

Problems

Should problems occur during device commissioning, refer first to chapter 8.2. Should a problem persist after checking all electrical connections and settings on the devices and host, please contact a Leuze service office near you (see the back page of this operating manual).

7.3   Setting the parameters

You have now commissioned the BCL 8. Usually, you will have to configure it before you can use it. Using the parameter options made available by the BCL 8, you may configure the barcode reader to suit your individual area of application. For instructions regarding the various setting options, refer to chapter 9 or to the online help of the BCLConfig program.

To operate the BCL 8, it is normally sufficient to set code type and code length in accordance with the barcodes that are to be read. However, depending on the application, you will additionally activate the autoReflAct function and configure the switching inputs and outputs according to your requirements.

The setting of code type and code length is usually accomplished by using the BCLConfig program, see "Installing the BCLConfig software" on page 41.

To understand what is happening during the parameter setting, the following chapter 7.3.1 briefly explains the various parameter sets.

The setting of the parameters then takes place in the "service" operating mode, which is described in chapter 7.3.2.

7.3.1   Parameter sets

Factory default parameter set

This parameter set contains the default settings made ex works for all BCL 8 parameters. It is permanently stored in the ROM of the BCL 8. The parameter set with the factory settings is loaded into the memory of the BCL 8,

- the first time the device is commissioned after delivery
- following the command "Factory Default" in the configuration program
  (online command 'PC20')
- if the checksums of the current parameter set are invalid.

Current parameter set

In this parameter set, the current settings for all device parameters are stored. When the BCL 8 is in operation, the parameter set is stored in the EEPROM of the BCL 8. The current set can be stored:

- by copying a valid parameter set from the host computer to the BCL 8
- by an off-line setup using the BCLConfig configuration software and then subsequently copying to the BCL 8

The current parameter set is loaded into the memory of the BCL 8:

- each time the supply voltage is connected
- following a software reset (online command 'H')

The current parameter set is overwritten by the parameter set with the factory settings:

- by a parameter reset, see page 63

7.3.2   Service operating mode

Setting the required parameters is carried out easiest in the 'Service' operating mode. The operating mode Service provides the following defined operating parameters on the RS 232 interface, no matter how the BCL 8 is configured for standard operation:

- transfer rate 9600 baud
- no parity
- 8 data bits
- 1 stop bit
- prefix: STX
- postfix: CR, LF

Activating the service interface

The service interface can be activated by holding a defined barcode label ("Service", see figure 7.1) in front of the reading window during power-up (initialisation phase).

Figure 7.1:   Barcode label "Service"

While the laser switches on for approx. 1s after power-up, the "Service" label is to be held up in front of the barcode reader at a suitable read distance. When the device is in service mode, the status LED flashes orange.

Connection

You can connect a PC or a terminal to the BCL 8 via the serial interface and configure the BCL 8 through this connection. The connection is made using an RS 232 connection cable that establishes the RxD, TxD and GND connections between PC and BCL 8.

If the BCL 8 is connected to a connector unit, you can establish the connection in the same way in front of the connector unit. For the respective pin assignments, please refer to the data sheet of the connector unit.
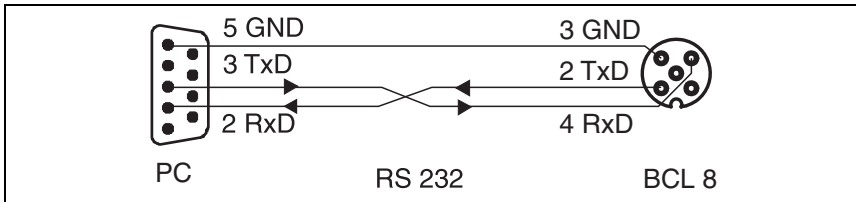
Figure 7.2:   Connecting the RS 232 interface to a PC or terminal

8   Operation

> ⚠ ***Attention Laser Radiation!***
>
> ***Follow the safety notices in chapter 2.3 on page 6!***

> 🛈 ***Notice!***
> - *Please observe the notices for device arrangement in section 6.2.1.*
> - *If possible, always trigger the laser scanner with the aid of commands, an external signal transmitter (photoelectric sensor) or the integrated AutoReflAct function. Only then can you be certain whether a code has been read. If read, the code contents are transmitted; if not, the NoRead character is transmitted at the end of the reading gate).*
> - *In the event of sporadic readings with longer pauses, the BCL barcode reader can also be switched to an energy-saving standby mode with the online command "SOS". In stand-by mode, the motor as well as the laser are switched off. On return to normal operation, longer boot times will be experienced in this case, however. The online command "SOF" switches standby mode back off and starts the motor.*

8.1   Display elements

On the BCL 8, you will find two LEDs that show the operational readiness and the reading state of the barcode reader (see table 4.2 on page 11).

8.2 Error handling

Error, warning and status messages of the BCL 8 are transmitted via the RS 232 interface.

Types of errors

Errors are divided up into the following types:

- Warnings
- Serious errors

Warnings

Warnings indicate temporary operating faults which do not affect the proper functioning of the device.

Serious errors

Serious errors impair the proper functioning of the device. The device must be reinitialised.

Troubleshooting

Isolated warnings can be ignored, since the BCL 8 will continue to function properly.

Following a serious error, you should re-initialise the BCL 8. It will then usually again function properly. If a hardware problem is present, the BCL 8 will not reinitialise.

Warnings and errors which occur frequently can be corrected easiest using the BCLConfig software.

If you cannot correct faults and errors with the software, please contact a Leuze electronic sales office or service facility. For addresses, please refer to the back page of this operating manual.

Notice!

Please also observe the notices for diagnostics and troubleshooting in chapter 12.3.

9   Communicating with the device

Device parameters can be set using the automatic configuration "autoConfig", with commands via the serial interface or using the easy-to-use BCLConfig control software.

9.1   Installing the BCLConfig software

↳ *Insert the installation CD into your drive*
  (also available on the Internet under www.leuze.de).

↳ *Call up the installation file (e.g. Setup.exe).*

↳ *Select the installation language.*

The following window appears:

Installation window
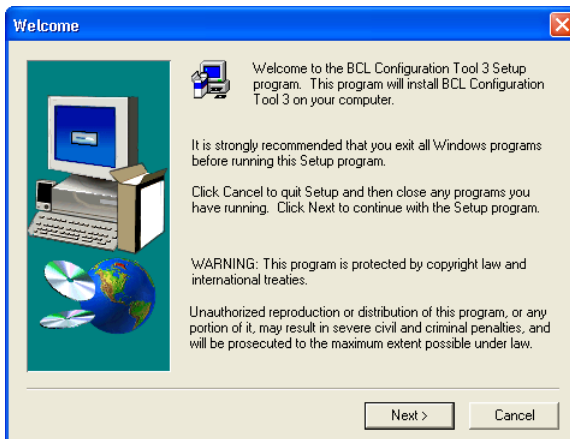
Figure 9.1:   Installation window

↳ *Confirm the following licence agreement and select the installation path in the following window.*

Installation directory
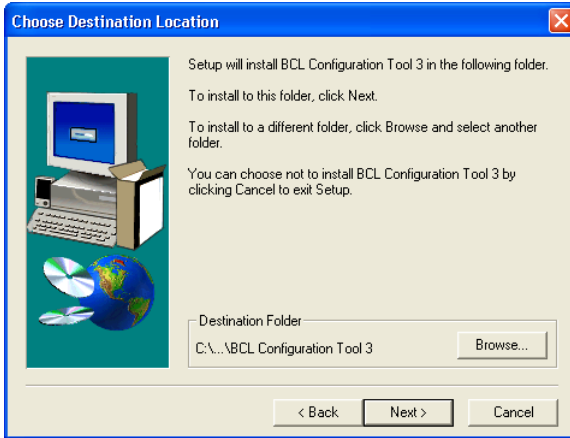
Figure 9.2:   Installation directory

↳ *Confirm your entry with Next, then follow the installation routine.*

For further details please refer to online help of the "BCLConfig" software.

↳ *After the successful installation, double-click on the file "BCLconfig.exe" to activate the configuration program.*

From the list on the left, select **BCL 8**. The following window for graphical configuration is displayed:
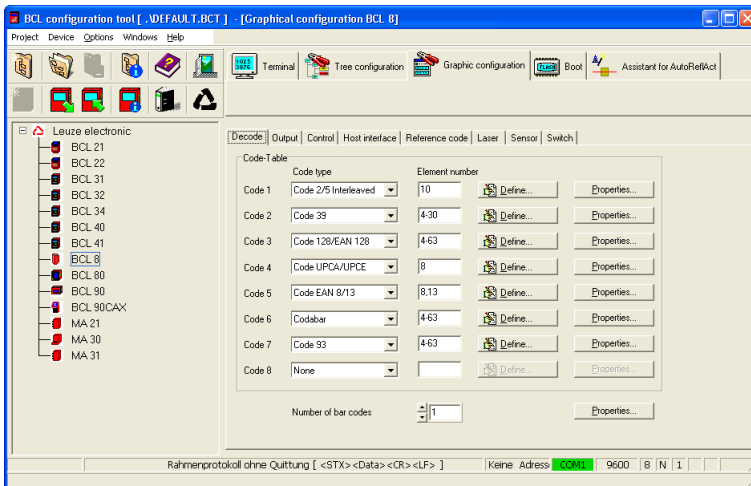
Figure 9.3:   BCL 8 configuration software

10   Important parameters

10.1   Decode tab
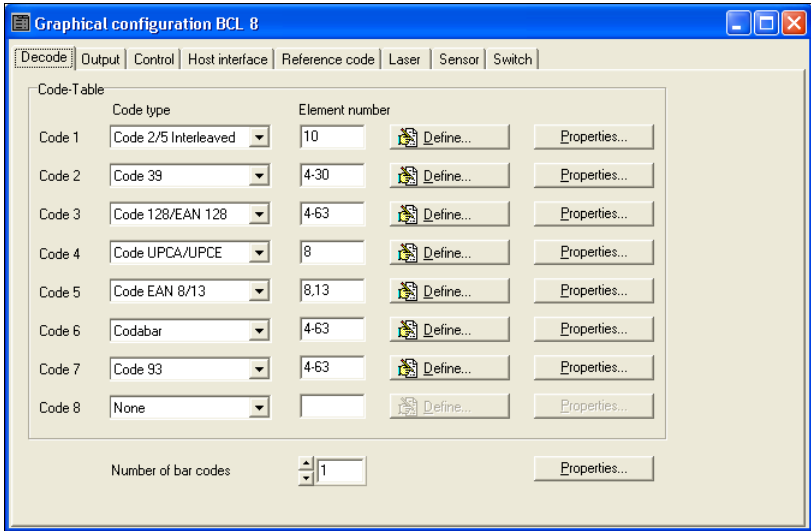
Figure 10.1:   Decode tab

Code table	Here, the codes which are to be decoded are set. We recommend enabling only the code types which are to actually be read with the corresponding element numbers. Codes which are not enabled are not decoded!

Element number	In the field Element number, up to 3 element entries may be entered. An area is represented by a dashed line: e.g. 4-40 digits. With 2 or 3 different element entries by a comma: e.g: 8,13 digits The combination is also possible, but the range must be specified first: e.g.: 4-10,20 digits

Notice!

If the code EAN128 is to be read, 3 additional characters are to be set for the code identifier.

Properties	Behind the "Properties" button, to the right of the respective code, the code-specific settings, such as the check digit, can be selected.

Number of barcodes	Here, the number of the barcodes to be decoded within a read cycle (one reading gate) is set.

10.1.1   Properties window – Decode tab
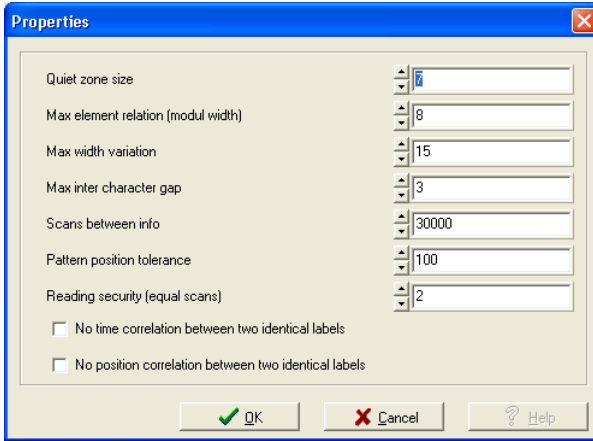
Figure 10.2:   Standard settings for the Properties window – Decode tab

Quiet zone size	Quiet zone: the area to the left and right of the barcode Module: width of the narrowest line in the barcode According to the code specifications, each barcode must have a quiet zone which is 10 times as wide as the module of the barcode. **Ex:** for a code having a module of 0.5 mm, 5 mm blank space must be present at both the left and right of the code. By default, the scanner checks a quiet zone which is 7 times greater than the module. This means 7x or greater is acceptable for the scanner.
Reading security (equal scans)	Specifies how often a code must be decoded before the result is valid and output. This value should only be increased for test purposes or for codes with low security.
No time correlation between two identical scans	If this parameter is set, a gap between two identical labels is ignored and they are treated as a single label.
No position correlation between two identical scans	If this parameter is set, then the position of a barcode label in the reading beam is not taken into account. Identical labels are treated as a single label

○
ⵌⵌ *Notice!*
In general, the remaining parameters must not be changed. In the worst case, this could corrupt the reading result!

10.2   Output tab
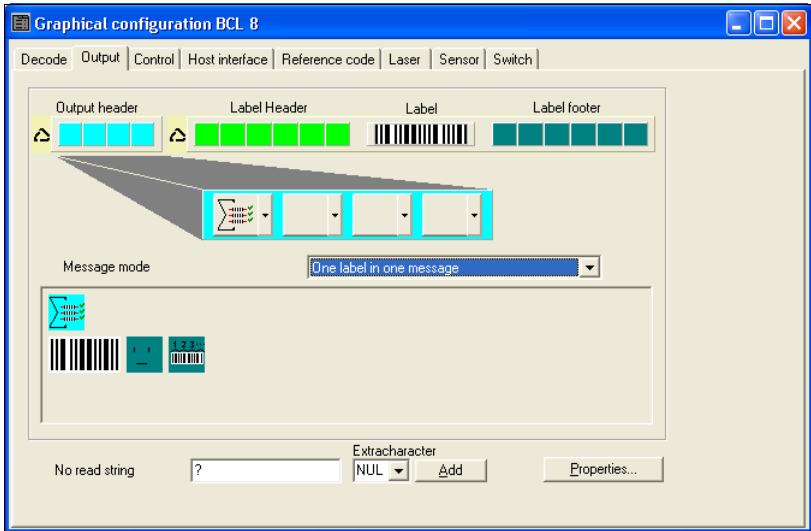
Figure 10.3:   Output tab

Output header	Select from the options listed below. The output header is sent in a separate message before the read result.
Label header	The Label header is set directly before the code data.
Label footer	The label footer is appended directly to the code data.
Message mode	Selects whether the barcodes read are sent in concatenation or separately as individual strings.

○
⊥ *Notice!*
The structure of this message string is depicted symbolically in the preview window.

No read string	This character is set for each unrecognised barcode. Multiple characters (=string) may be entered here. Up to 20 characters are possible.
Properties	Set the desired formatting modes and formatting characters as necessary.

10.3   Control tab
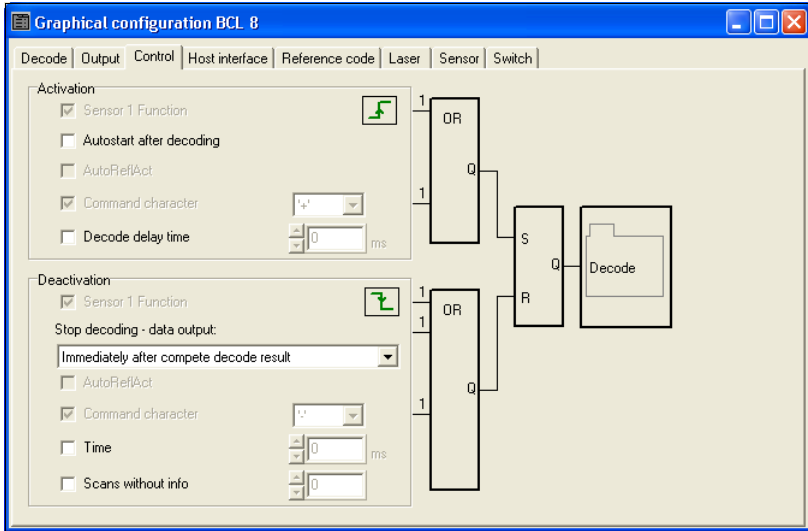
Figure 10.4:   Control tab

Activation

Sensor 1 function See menu "switching input"

Autostart after decoding In this mode, the scanner reads via an internal trigger signal with maximum performance. Attention: Up to 100 codes per second may be transmitted.

Command character The standard online character for the trigger start is the ´+´ character. This character can be changed only via the tree structure.

Decode delay time This point is usually used only for test purposes. After the time set here has passed, the scanner automatically reactivates itself following a reading gate end (e.g. in combination with "Autostart after decoding").

Deactivation

Sensor 1 function See menu "switching input"

Immediately after complete decode result If this item is activated, the read result is output immediately after the barcode is decoded.
If the item is deactivated, the read result is sent only after the trigger signal is returned (=end of reading gate).

Command character The standard online character for the trigger end is the ´-´ character. This character can be changed only via the tree structure.

Time If the scanner is activated, the reading gate is automatically closed by the scanner after this preset time has elapsed (e.g. for test purposes).

Scans without info Following a successful read, the scanner waits for this number of scans (sequential scans with no read result) before it automatically deactivates itself.

10.4 Host interface tab
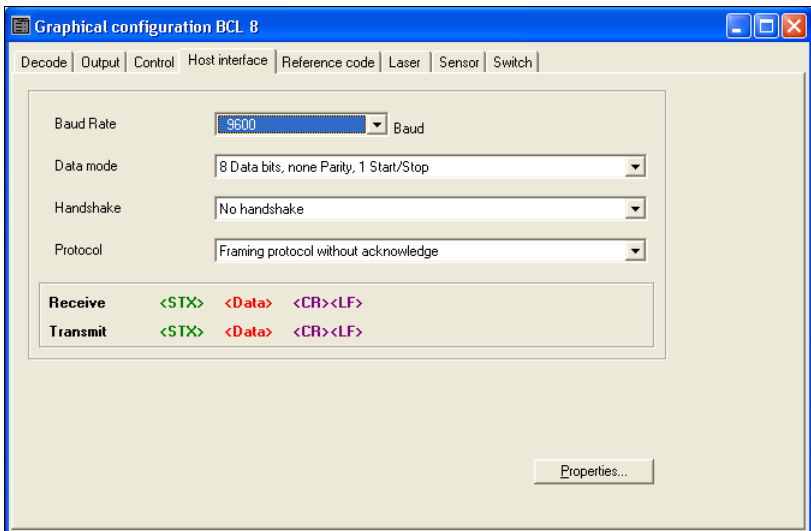
Figure 10.5: Host interface tab

Select the desired baud rate, the stop bits, the data bits, the parity and various transmission modes here. These parameters are not active until following the automatic "Power-On" test after the BCL 8 is switched on.

10.4.1   Properties window – Host interface tab
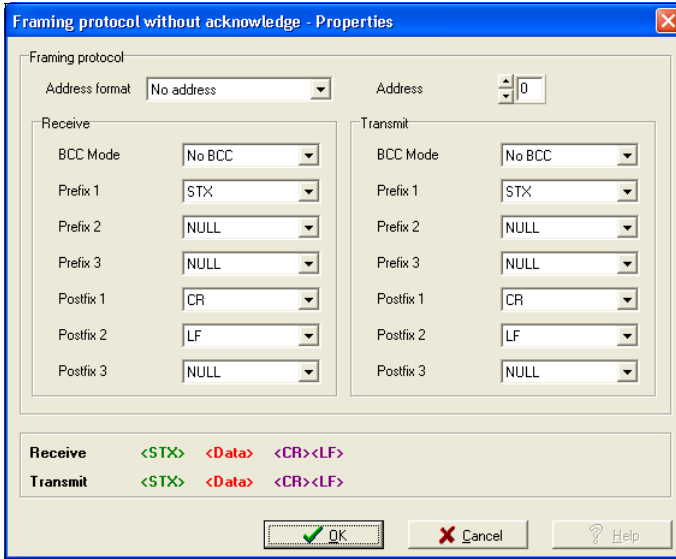
Figure 10.6:   Standard settings for the Properties window – Host interface tab

Here, you can change the addresses settings and the protocol for sending and receiving.

To be able to continue to communicate with a BCL 8 following a parameter transfer, it may be necessary to make appropriate adjustments to the communication properties of the device in the **BCL Configuration Tool**.

10.5 Reference code tab
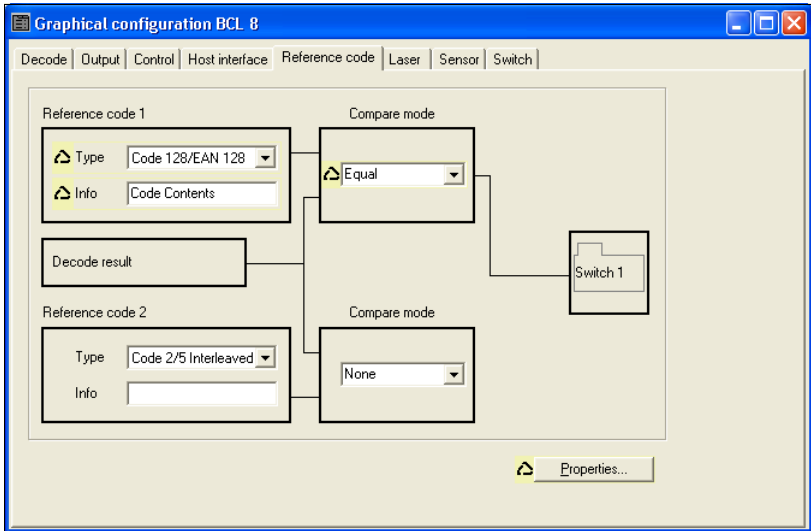
Figure 10.7: Reference code tab

A reference code is barcode information which is stored in the memory of the scanner.

This reference code can be compared with the current decoded barcode in various modes and, thus, the switching output be set appropriately. To do this, the switching output must still be set to "By comparison of reference code X" in the "Switch" menu.

One way to store the reference code is to enter it manually in this menu. You can find further options of the reference code teach-in in the chapter on online commands.

Type   Select the code type.

Info   Contents of the reference code

Compare mode   Select here how the internally stored reference code is to be compared with the decoded result.
-> For additional comparison possibilities, please select the "Properties" menu

10.6 Sensor tab
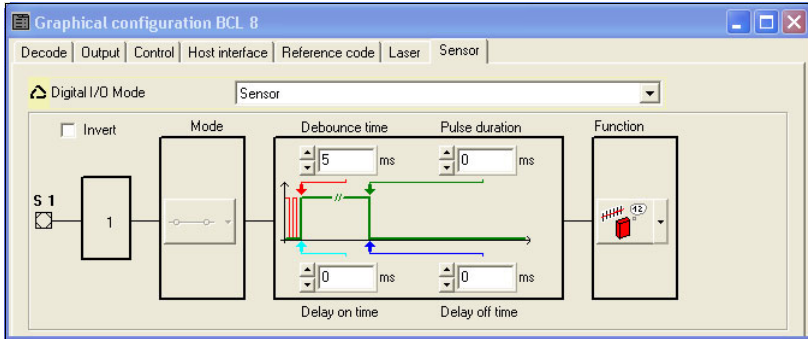
Figure 10.8: Sensor tab

Invert   Here, the input level can be inverted.

Enable   Switching input enabled or disabled.

Debounce time   This time period must lapse until the trigger signal is regarded as valid.

Delay on time   The trigger signal is passed on delayed by the specified time period.

Pulse duration If the value is higher than "0": duration of the activation, regardless of how long the trigger signal has been present.

Delay off time After the end of the trigger signal, the pulse is extended internally by this time period.

○
∬ *Notice!*
If the switch-off delay is activated, the parameter "pulse duration" should be "0".

Function   Event that is started when the switching input is activated.

⚠ *Attention!*
Depending on wiring, either a switching input or a switching output is available on the BCL 8.

10.7 Laser tab
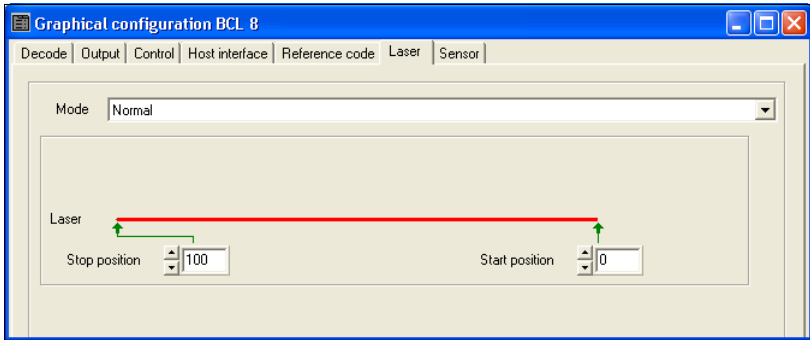
Figure 10.9: Laser tab

Start position and stop position   Here, you can narrow down the reading field width of the laser beam.

Mode

- **Normal** – mode (1) with optional laser beam narrowing

  This is the standard mode without the reflector polling function

- **Reflector polling with auto activation reading gate** – mode (2)

  In this mode, the decoding of the label is automatically started after the scanning beam to the reflector has been interrupted. Following successful decoding or renewed detection of the reflector, the reading gate is automatically closed. If the reflector is covered, the reading gate is automatically opened for decoding.

- **Reflector polling without auto activation reading gate, send an 'AR' command** – mode (3)

  In this mode, the decoding does not start automatically. Starting must be activated via a control or via a switching input. This mode is of interest if a programmable logic controller (PLC) wants to know whether or not the scanning beam to the reflector is currently interrupted. If this is the case, the PLC can start the decoding by sending the + command. The BCL sends an 'AR=1' command (freely configurable) if a reflector was detected or it sends an 'AR=0' command (freely configurable) if no reflector is present.

- **Reflector polling without auto activation reading gate, set the switch** – mode (4)

  Same as mode (3), except that the detection of whether or not a reflector is present is passed on via the switching output. As in mode 3, decoding is not activated automatically; this is the task of the control.

- **Reflector polling without auto activation reading gate, send an 'AR' command and set the switch** – mode (5)

  Combination of mode (3) and mode (4). In this mode, the BCL sends a message to the control and simultaneously activates the switching output.

Reflector polling

Reflector polling (**autoReflAct**) is an operating mode in which no external sensor is required for triggering. Activation and deactivation of the scanner occur by means of the supplied reflector which must be mounted in the scanning area of the BCL 8.

For simple alignment in **autoReflAct** mode, please select the **AutoReflAct** Wizard.

Once called up, the wizard attempts to establish a connection to the connected BCL 8. If this is successfully, please select one of the four reflector polling modes under "Mode" from the menu which then appears. A screen similar to the following appears:
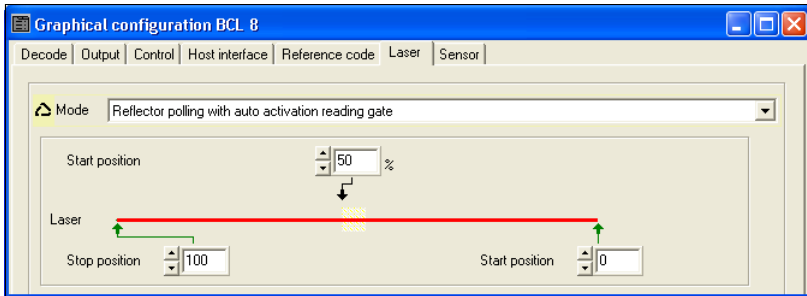
Figure 10.10: AutoReflAct Wizard

Upon activation of the "Search" button, the BCL 8 scans its reading field and attempts to find a reflector. To do this, the reflector must be positioned in the reading field of the scanner.

After a reflector has been detected, it passes on the start position of the reflector in its reading field.

By clicking "OK", the values are stored in the scanner and in BCLConfig.

The scanner is now ready for the AutoReflAct operating mode.

Attention!

If other reflective objects are located in the reading window of the scanner besides the reflector, the application is to be checked carefully, because these reflective parts could possibly cause a mistrigger in the scanner!

Notice!

The reflector should be mounted at a distance of max. 300mm from the BCL 8.

10.8 Switch tab
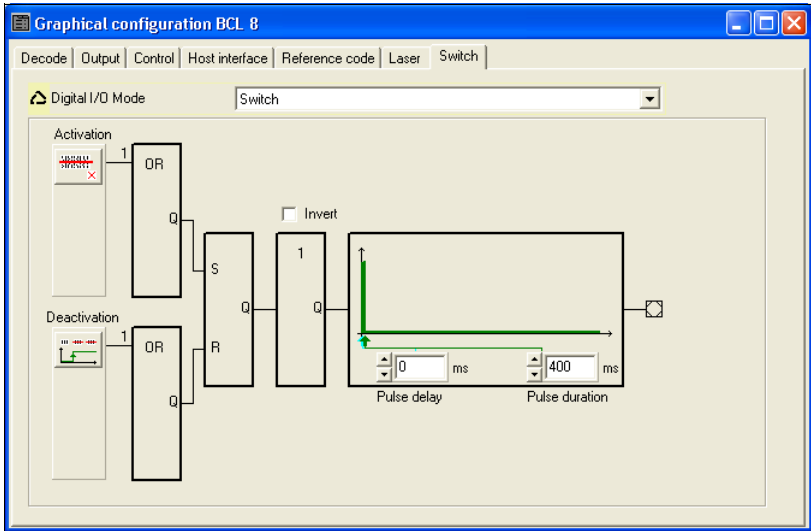
Figure 10.11: Switch tab

Activation Select the desired event which is to initiate the switching of the switching output here. Multiple events can also be simultaneously activated.

Deactivation Shown here is the event that results in the switching output being reset. (If the set pulse duration has not yet expired.) Multiple events can also be simultaneously activated.

Invert Level inverted

Pulse duration Duration of the switching output impulse.

Attention!

Depending on wiring, either a switching input or a switching output is available on the BCL 8.

By using an MA 8.1 or MA 8-01 connector unit, switching input and switching output can be used simultaneously,

11   Online commands

11.1   Overview of commands and parameters

Online commands can be used to send commands directly to the device for control and configuration. For this, the BCL 8 has to be connected to computer (host) via the serial interface.

For information on the transmission protocol, please see chapter 7.3.2.

Using the "**online" commands** you can:

- control/decode the reading gate.
- read/write/copy parameters.
- carry out an automatic configuration.
- teach/set a reference code.
- call up error messages.
- call up statistical device information.
- carry out a software reset in order to reinitialise the device.

Syntax

"Online" commands consist of one or two ASCII characters followed by command parameters.

No separation characters may be entered between the command and the command parameter(s). Both small and capitalised letters can be used.

Example:

Command **'CA'**:	autoConfig function
Parameter **'+'**:	Activation
Transmitted is:	**'CA+'**

Notation

Commands, command parameters and returned data are enclosed between single quotation marks **' '** in the text of this manual.

Most online commands are acknowledged by the BCL 8 and any requested data returned. For commands that are not acknowledged, command execution can be observed or monitored directly on the device.

11.1.1   General 'online' commands

Software version number

Command	'V'
Description	Requests device version information
Parameter	None
Acknowledge-ment	Ex.: **'BCL 8 V 01.10 05.10.2006'** The device type appears in the first line followed by the device's version number and date. The data which is actually displayed may vary from the values given here.

Notice!

You can use this command to check whether the communication to the connected computer is functional. If you do not receive an acknowledgement, please check the interface connections or the protocol.

Software reset

Command	'H'
Description	Carries out a software reset. The device is restarted and reinitialised, leaving it in the same state as when the supply voltage is switched on.
Parameter	None
Acknowledge-ment	**'S'** (start signal)

autoConfig

Command	'CA'
Description	Activates or deactivates the 'autoConfig' function. Certain label reading parameters are programmed automatically in the setup by the labels which are read while the 'autoConfig' function is active.
Parameter	**'+'**　　activates 'autoConfig' **'/'**　　rejects the last code read **'-'**　　deactivates 'autoConfig' and stores the decoded data in the current parameter set.
Acknowledge-ment	**'CSx'** **x**　　status 　　**'0'**　valid **'CA'** command 　　**'1'**　invalid command 　　**'2'**　autoConfig could not be activated 　　**'3'**　autoConfig could not be deactivated 　　**'4'**　result could not be deleted
Description	**'xx yy zzzzzz'** **xx**　　Code type of the read code 　　**'01'**　2/5 Interleaved 　　**'02'**　Code 39 　　**'06'**　UPC (A, E) 　　**'07'**　EAN 　　**'08'**　Code 128, EAN 128 　　**'09'**　Pharmacode 　　**'10'**　EAN/UPC 　　**'11'**　Codabar 　　**'12'**　Code 93 **yy**　　No. of digits of the read code **zzzzzz** 　　Contents of the decoded label. The $\uparrow$ appears if the label was not correctly read.

Manually define reference code

Command	RS
Description	This command can be used to define a new reference code in the BCL 8 by means of direct input via the serial interface. The data is saved in the parameter set according to your input under reference code 1 or 2 and stored in the working buffer for direct further processing.

Parameter	**'RSyvxxzzzzzzzz'**
	y, **v**, **x** and **z** are placeholders (variables) for the actual input.
	y def. reference code no.
	       '1' (Code 1)
	       '2' (Code 2)
	v Storage location for reference code:
	       '0' RAM+EEPROM
	       '3' RAM only
	xx def. code type (see command 'CA')
	z def. code information (1 … 30 characters)

Acknowledge-ment	**'RSx'**
	x status
	       '0' valid 'Rx' command
	       '1' invalid command
	       '2' insufficient memory for reference code
	       '3' reference code has not been saved
	       '4' reference code invalid

Example	Input = 'RS130678654331' (Code 1 (1), RAM only (3), UPC (06), code information)

Teach-In

Command	'RT'
Description	This command enables a reference code to be defined quickly by reading an example label.
Parameter	**'RTy'** **y** Function **'1'** defines reference code 1 **'2'** defines reference code 2 **'+'** activates the definition of reference code 1 or 2 **'-'** exits the Teach-In process
Acknowledge-ment	The BCL 8 first responds with the command **'RS'** and corresponding status (see command RS). After a barcode has been read, it sends the result in the following format: **'RCyvxxzzzzz'** **y**, **v**, **x** and **z** are placeholders (variables) for the actual input. **y** def. reference code no. **'1'** (Code 1) **'2'** (Code 2) **v** memory location for reference code **'0'** RAM+EEPROM **'3'** RAM only **xx** def. code type (see command 'CA') **z** def. code information (1 … 30 characters)

Notice!

With this function, only code types are recognised that are identified using the autoConfig function or which were set in the set-up.

✎ *After each reading via an 'RTy' command, explicitly switch off the function again since failure to do so will interfere with other commands as well as prevent execution of a new 'RTy' command.*

Read reference code

Command	'RR'
Description	The command reads out the reference code defined in the BCL 8. If no parameters are specified, all defined codes are output.
Parameter	<Reference code number> **'1'** Reference code 1 **'2'** Reference code 2
Acknowledge-ment	If no reference codes are defined, the BCL 8 responds with the **'RS'** command and corresponding status (see command RS)**.** For valid codes, the output corresponds to the following format: **RCyvxxzzzzzz** **y**, **v, x** and **z** are placeholders (variables) for the actual input. **y** def. reference code no. **'1'** (Code 1) **'2'** (Code 2) **v** memory location for reference code **'0'** RAM+EEPROM **'3'** RAM only **xx** def. code type (see command 'CA') **z** def. code information (1 … 30 characters)

Alignment mode

Command	'JP'
Description	This command is used for simplified mounting and alignment of the BCL 8 in static installation situations. After activating the function with **'JP+'**, the scanner continuously supplies status information to the serial interfaces. With this online command, the scanner is set to terminate the decoding after 100 successfully decoded labels and output the status information. Subsequently, the read process is reactivated automatically. As status, the output returns the following values: • scans which contain the valid label information on the basis of 100 scans, • the decoding result. These values can be used to determine the decoding quality. In addition to the output of the status information, the laser beam is used to display the reading quality. Depending on how many labels were able be extracted, the duration of the laser's "off" time increases. If the reading quality is high, the laser beam flashes in brief, regular intervals. The worse the decoder decodes, the longer the pauses become during which the laser is switched off.
Parameter	**'+'**: starts the adjustment mode. **'-'**: ends the adjustment mode.
Acknowledge-ment	**'xxxxx_yyyyy'** **xxxxx**: "Scans since reading gate release" (scans_with info): Number of scans that contain valid label information. The maximum value is 100. **yyyyy**: Barcode information.

11.1.2   'Online' commands for system control

Activating sensor input

Command	'+'
Description	The command activates decoding.
Parameter	None
Acknowledgement	None

Deactivating sensor input

Command	'-'
Description	The command deactivates decoding.
Parameter	None
Acknowledgement	None

Activate switching output

Command	'OA'
Description	The command activates a selected switching output.
Parameter	'OAx': Activate switching output **x** Switching output No. '1' (output 1)
Acknowledgement	None

Deactivate switching output

Command	'OD'
Description	The command deactivates a selected switching output.
Parameter	'ODx': Deactivate switching output **x** Switching output No. '1' (output 1)
Acknowledgement	None

11.1.3 'Online' commands for parameter set operations

Definitions

- **<BCC type>** Type of checksum calculation.
  '0': No checksum
  '3': XOR checksum (mode 3)
- **<PS type>** Parameter set type
  '0': Current parameter set (data stored non-volatilely in the EEPROM)
  '1': Reserved
  '2': Standard parameter set (not changeable)
  '3': Operating values (data in the RAM, will be lost after reset)
- **<Status>** Mode of parameter processing
  '0': Does not perform a reset following the write operation; no other parameters follow.
  '1': Does not perform a reset following the write operation; other parameters follow.
  '2': Subsequently performs a reset, no other parameters follow.
- **<Start address>** Relative address of the parameter within the parameter set
- **<Para0L> <Para0H>... <Para122L> <Para122H>**:
  Parameter-set data of the message. The sequence of the data is arranged identically to the BCL 8, i.e. when a word is transmitted, first the low byte is sent then the high byte. The parameter-set data is converted for transmission from HEX format to a 2-byte-ASCII format. During the conversion, two ASCII characters - representing the lower and higher nibbles - are created for each HEX value.
  Example:

Decimal	HEX	Transmission
4660	0x1234	**'1' '2' '3' '4'** = 31h 32h 33h 34h

- Para0H = 31h, Para0L = 32h, Para1H = 33h, Para1L = 34h
  Taking into consideration the maximum message length and the remaining command parameters, a maximum of 123 bytes of parameter data (246 bytes of message data) can be transmitted in a single operation.
  Valid values: '0' ... '9', 'A' ... 'F'
- **<Acknowledgement>**:
  Acknowledgement of the transmitted message
  '0' valid transmission
  '1' invalid message
  '2' invalid length of message
  '3' invalid block check type
  '4' invalid block check checksum
  '5' invalid data length
  '6' invalid message data
  '7' invalid start address
  '8' invalid parameter set
  '9' invalid parameter type

Copy parameter set

Command	'PC'
Description	The command copies complete parameter sets.
Parameter	**'03'** copy parameters from the EEPROM into the RAM and initialise all associated functions **'20'** copy standard parameters from the FLASH into the EEPROM **and** RAM and initialise all relevant functions **'30'** copy parameters from the RAM into the EEPROM
Acknowledge-ment	**'PSx'** **x** status 　**'0'** valid transmission 　**'1'** invalid message 　**'2'** invalid length of message 　**'3'** invalid block check type 　**'4'** invalid block check checksum 　**'5'** invalid data length 　**'6'** invalid message data 　**'7'** invalid start address 　**'8'** invalid parameter set 　**'9'** invalid parameter type
Example	**'PC20'** loads the default parameters

Request parameter set from the BCL 8

Command	'PR'
Description	The command requests parameter data from the BCL 8. Parameter <PS-type> displays the parameter set from which the data is to be transmitted.
Parameter	<BCC type><PS type><Start address><Data length>
Acknowledge-ment	**'PSx'** **x** status 　**'0'** valid transmission 　**'1'** invalid message 　**'2'** invalid length of message 　**'3'** invalid block check type 　**'4'** invalid block check checksum 　**'5'** invalid data length 　**'6'** invalid message data 　**'7'** invalid start address 　**'8'** invalid parameter set 　**'9'** invalid parameter type
Example	**'PR00102004'** Beginning with address 102, four (004) bytes are read out and transmitted

Acknowledge parameter message

Command	'PS'
Description	The command acknowledges the received message and delivers an acknowledgement status which indicates whether the message was valid or invalid.
Parameter	**'PSx'** **x** status **'0'** valid transmission **'1'** invalid message **'2'** invalid length of message **'3'** invalid block check type **'4'** invalid block check checksum **'5'** invalid data length **'6'** invalid message data **'7'** invalid start address **'8'** invalid parameter set **'9'** invalid parameter type

Transmit parameters

Command	'PT'
Description	The command transmits parameter data beginning with the set address and stores it there in an intermediate buffer. If the status indicates that still more messages follow, these are also stored in the intermediate buffer before they are stored in the EEPROM under the appropriate parameter set type. The transmission can optionally take place with a block-check test of the message data
Parameter	<BCC type> <PS type> <Status> <Start address> <Para0L> <Para0H> [… <Para122L>][<BCC>]
Acknowledge-ment	**'PSx'** **x** status **'0'** valid transmission **'1'** invalid message **'2'** invalid length of message **'3'** invalid block check type **'4'** invalid block check checksum **'5'** invalid data length **'6'** invalid message data **'7'** invalid start address **'8'** invalid parameter set **'9'** invalid parameter type
Example	**'PT03203305'** Address 33 (equal scans) is set to 5. Save in RAM with reset (immediate acceptance of the change and tempo-rary storage)

12   Maintenance

12.1   General maintenance information

Usually, the BCL 8 barcode reader does not require any maintenance by the operator.

Cleaning
Should it become soiled, clean the glass window of the BCL 8 with a soft cloth.

Notice!
Do not use aggressive cleaning agents such as thinner or acetone for cleaning the device.

12.2   Repairs, servicing

Repairs to the device must only be carried out by the manufacturer.

☞ *Contact your Leuze distributor or service organisation should repairs be required.*
For addresses, please refer to the back page of this operating manual.

12.3 Diagnostics and troubleshooting

Error	Possible error cause	Measures
Status LED: off	No supply voltage connected to the device.	Check supply voltage.
Status LED: flashing red	There is a device warning.	Query diagnostic data in the device and carry out the resulting measures or reset.
Status LED: continuous red light	Serious error, no function possible.	Internal device error, send in device for testing.
Status LED: flashing orange	Service operation is active.	Reset service operation, e.g. by resetting or interrupting the supply voltage
Decode LED	No error, see table 4.2 on page 11.	
No communication possible	Incorrect wiring.	Check wiring.
	Wrong interface selected.	Select correct interface in the BCLconfig tool.
	Different protocol settings.	Check protocol settings in the BCL 8 and BCLconfig tool or switch the BCL 8 to service mode.
No code reading possible	Code reading not possible (quality).	Improve code quality! Entire code in laser line?
	Code is not enabled.	Check entries in the code table (type and length).
	Excessive reflections.	Increase angle of the laser beam to > 10° with respect to vertical.

12.4   Example barcode label types

Code type 01: Interleaved 2 of 5
Modul 0,3

1122334455

Code type 02: Code 39
Modul 0,3

135AC

Code type 11: Codabar
Modul 0,3

a121314a

Code 128
Modul 0,3

abcde

Code type 08: EAN 128
Modul 0,3

leuze

Code type 06: UPC-A
SC 2

1 23456 78901 2

Code type 07: EAN 8
SC 3

3456 7890

Code type 10: EAN 13 Add-on
SC 0   S

1 122334 455666   77889

Figure 12.1:Example barcode label types