

Barcode reader BCL 8 with integrated decoder

Technical Description



1	General Information	4
1.1	Explanation of Symbols	4
1.2	Declaration of Conformity	4
2	Safety Notices	5
2.1	Safety Standards	5
2.2	Intended Use.....	5
2.3	Working Safely	6
3	Description	8
3.1	The Bar Code Reader BCL 8.....	8
3.2	Standalone operation.....	9
4	Specifications.....	10
4.1	General Specifications BCL 8	10
4.2	LED indicators.....	11
4.3	Dimensioned and Connection Drawings.....	12
4.4	Optical Data	14
4.4.1	Type overview.....	14
4.4.2	Reading Fields.....	15
5	Accessories / Order Designation	17
5.1	Accessories.....	17
5.1.1	Connector unit MA 8.....	18
5.1.2	Fastening Accessories.....	19
6	Installation	20
6.1	Storage, Transportation	20
6.2	Mounting	21
6.2.1	Device Arrangement	22
6.3	Connection.....	23
6.3.1	Connecting the BCL 8.....	23
6.3.2	Connection of switching input/output	24
6.3.3	Wire lengths.....	26
6.4	Disassembling, Packing, Disposing.....	26
7	Commissioning	27
7.1	Measures to be performed prior to the initial commissioning.....	27
7.2	Function Test	27
7.3	Setting the Parameters	28
7.3.1	Parameter sets	28
7.3.2	Service Operating Mode	29

2

Figure 2.1:	Example for the attachment of the sticky labels with warning notices.....	7
Figure 3.1:	BCL 8 device construction.....	8
Table 4.2:	LED indicators	11
Figure 4.1:	Dimensioned drawing BCL 8 S M ...0 with lateral beam exit	12
Figure 4.2:	Dimensioned drawing BCL 8 S M ...2 with front beam exit.....	13
Table 4.3:	Type overview	14
Figure 4.3:	Reading field BCL 8 S M ...2 with front beam exit	15
Figure 4.4:	Reading field BCL 8 S M ...0 with side beam exit.....	16
Table 5.1:	Accessories / Order Designation	17
Figure 5.1:	Connector unit MA 8.....	18
Figure 5.2:	Mounting devices for BCL 8	19
Figure 6.1:	Device name plate BCL 8.....	20
Figure 6.2:	Mounting example BCL 8	21
Figure 6.3:	Definition of the reading angles BCL 8.....	22
Figure 6.4:	BCL 8 connection assignment.....	23
Table 6.1:	Wiring description BCL 8.....	23
Figure 6.5:	Switching input BCL 8 connection version 1 (standard setting)	24
Figure 6.6:	Switching input BCL 8 connection version 2 (setting "inverted").....	24
Figure 6.7:	Switching output BCL 8.....	25
Table 6.2:	Wire lengths	26
Figure 7.1:	Connecting the RS 232 service interface to a PC or terminal	29
Figure 9.1:	Installation window	31
Figure 9.2:	Installation directory	32
Figure 9.3:	BCL 8 configuration software	32
Figure 10.1:	Default setting of the code menu with the CONFIG 3 configuration software.	33
Figure 10.2:	Standard setting of the properties of the code menu	34
Figure 10.3:	Output menu.....	35
Figure 10.4:	Control menu default settings.....	36
Figure 10.5:	Standard setting of the communication menu	37
Figure 10.6:	Standard setting of the property menu	38
Figure 10.7:	Reference code menu	39
Figure 10.8:	Standard setting of the switching input menu.....	40
Figure 10.9:	Laser menu	41
Figure 10.10:	AutoReflAct Wizard	42
Figure 10.11:	Standard setting of the switching output menu	43

1 General Information

1.1 Explanation of Symbols

The symbols used in this operating manual are explained below.



Attention!

Pay attention to passages marked with this symbol. Failure to heed this information can 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 bar code reader BCL 8 and the optional connector unit MA 8 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 bar code reader BCL 8 and the optional connector unit MA 8 have been developed, produced and tested subject to the applicable safety standards. They correspond to the state of the art.

2.2 Intended Use



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 bar code reader is conceived as stationary scanner with integrated decoder for all current bar codes used for automatic object recognition.

The optional connector unit MA 8 is intended for the easy connection of code readers of type BCL 8.

In particular, unauthorised uses include:

- rooms with explosive atmospheres
- operation for medical purposes

Areas of application

The bar code reader BCL 8 with optional connector unit MA 8 is conceived particularly for the following fields of application:

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

2.3 Working Safely



Attention Laser Radiation!

The bar code reader BCL 8 operates with a red light laser of class 2 acc. to EN 60825-1 (2001/11), resp. class II acc. to 21 CFR 1040.10. 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 of the BCL 8 at persons!

When mounting and aligning the BCL 8, take care to avoid reflections of the laser beam off reflective surfaces!

The use of operating and adjusting devices other than those specified in this technical description, carrying out of differing procedures, or improper use of the bar code reader may lead to dangerous exposure to radiation!

The use of optical instruments or devices in combination with the device increases the danger of eye damage!

Adhere to the applicable legal and local regulations regarding protection from laser beams acc. to EN 60825-1/21 CFR 1040.10 in its latest version.

The BCL 8 uses a laser diode with low power in the visible red light range with an emitted wavelength of about 650nm. The output power of the laser beam at the reading window is at most 1.3mW for a time period of 210µs acc. to EN 60825-1 (2001/11), resp. 21 CFR 1040.10.

The reading window is the only opening through which the laser radiation can escape from the device. The housing of the bar code reader BCL 8 is sealed and has no parts that need to be adjusted or maintained by the user. The device must not be tampered with and must not be changed in any way!



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 such that reading the notices cannot lead to looking into the laser beam!

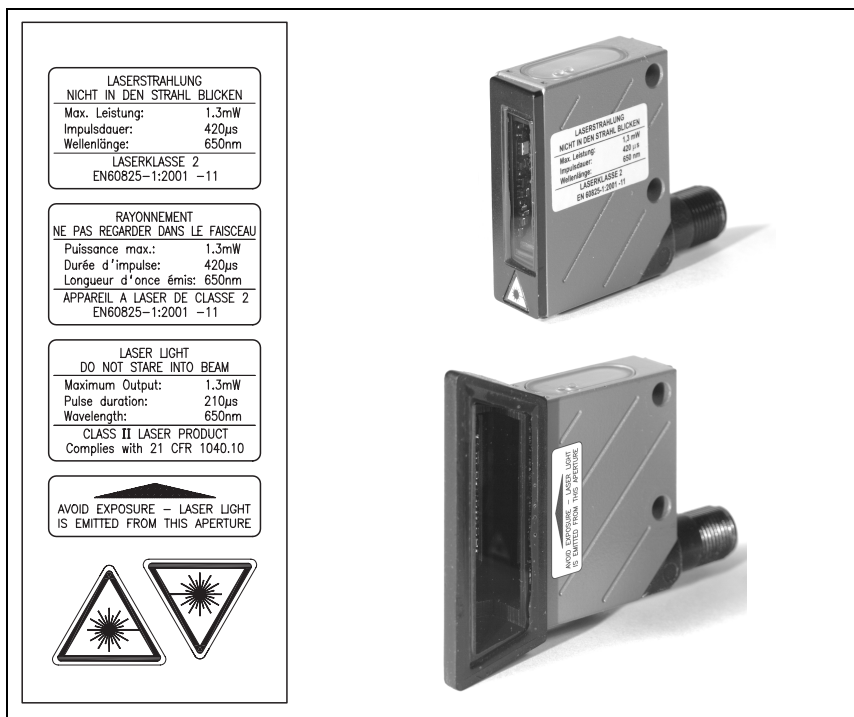


Figure 2.1: Example for the attachment of the sticky labels with warning notices



Attention!

Access to or changes on the device, except where expressly described in this operating manual, is 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

BCL 8 device construction

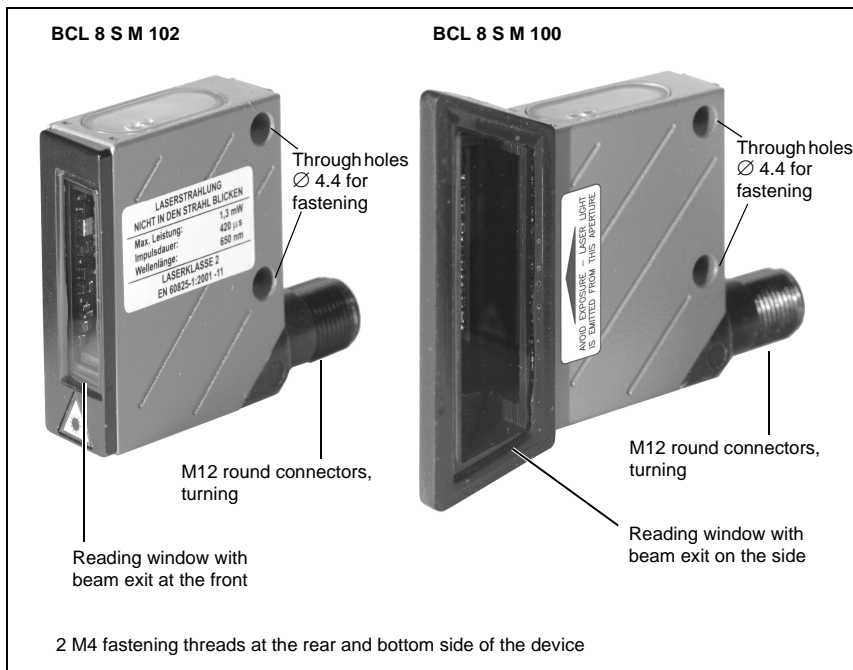


Figure 3.1: BCL 8 device construction

3.1 The Bar Code Reader BCL 8

The bar code reader BCL 8 is a laser scanner with integrated decoder for all bar codes currently in use, e.g. 2/5 Interleaved, EAN etc., with an extremely small housing.

The many possible configurations of the device allow its adaptation to a multitude of reading tasks. Due to the small dimensions of the unit and the 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 Standalone operation

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

With connector unit MA 8

The connector unit MA 8 simplifies the electrical installation of the bar code reader in standalone operation.

Separate data sheets are available that contain details about the connector units.

4 Specifications

4.1 General Specifications BCL 8

Optical Data

Light source	Laser diode 650nm
Scanning rate	600 scans/s
Resolution	m = 0.150mm ... 0.5mm / 6mil ... 20mil
Beam deflection	by means of rotating polygon mirror wheel
Beam exit	at front, alternatively on the side with deflection mirror (105°)
Reading distance	see reading fields
Reading field opening	see reading fields
Laser safety class	class 2 acc. to EN 60825-1 class II acc. to 21 CFR 1040.10
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
Service interface	RS 232 with fixed data format 9600Bd, 8 data bits, no parity, 1 stop bit STX "Data", CR, LF
Baud rate	4800 ... 57600Bd
Data formats	data bits: 7, 8 parity: None, Even, Odd stop bits: 1, 2
Protocols	framing protocol with/without handshake software handshake X ON / X OFF
Ports	1 switching input 5VDC or 1 switching output 5 ... 30V, 20mA
LEDs	1 device status 1 read status
Operating voltage	4.9 ... 5.4VDC, low voltage acc. to IEC 742
Current consumption	max. 250mA (2W power supply unit recommended)

Table 4.1: Specifications

Mechanical data

Protection class	IP 67
Connection type	M12 connector, 5-pin, turning 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: 48x58x17.4mm
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 61326-1, IEC 6100-4-2, -3, -4 and -6,
Certificates	CE, EN 55022, FCC Class B

Table 4.1: Specifications

4.2 LED indicators

Two 3-colour LEDs at the top of the case show the device and reading status:

LED	Colour	Meaning
Status LED	Green flashing	initialisation phase
	Green continuous	ready for operation
	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 with side beam exit

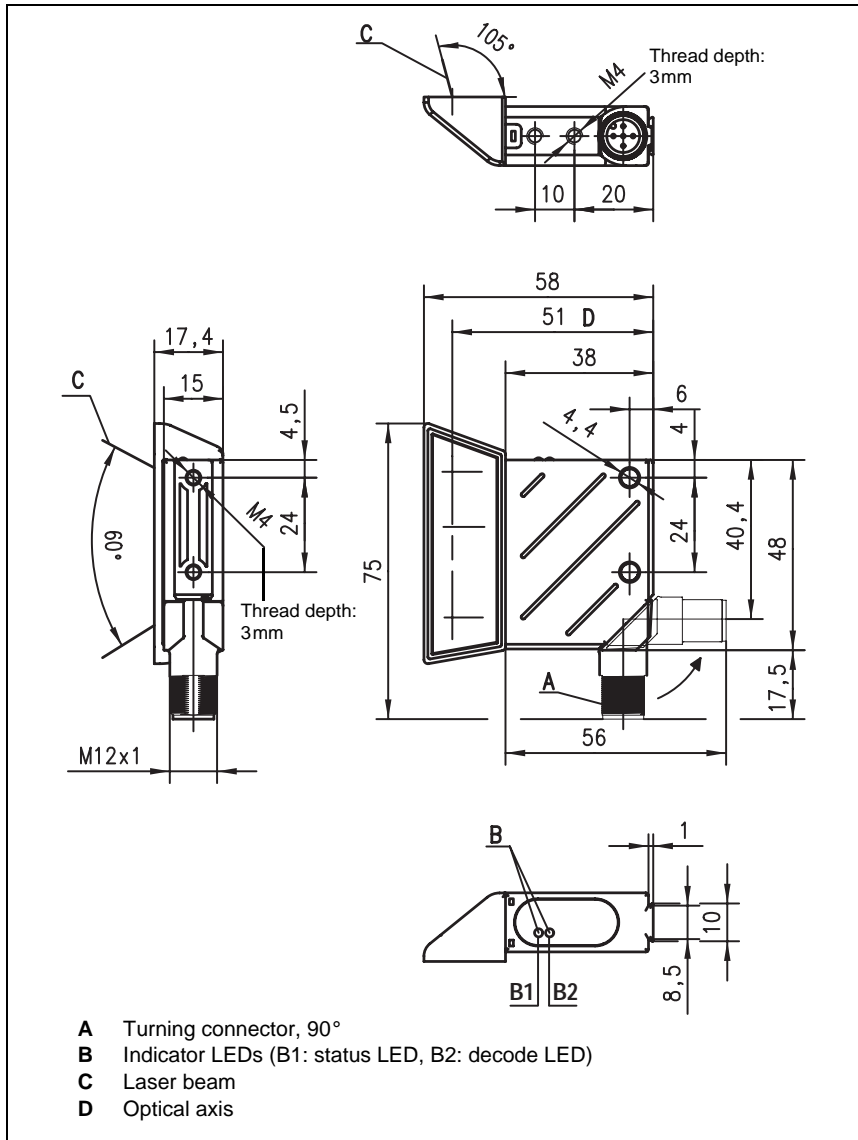


Figure 4.1: Dimensioned drawing BCL 8 S M ...0 with lateral beam exit

BCL 8 S M ...2 with front beam exit

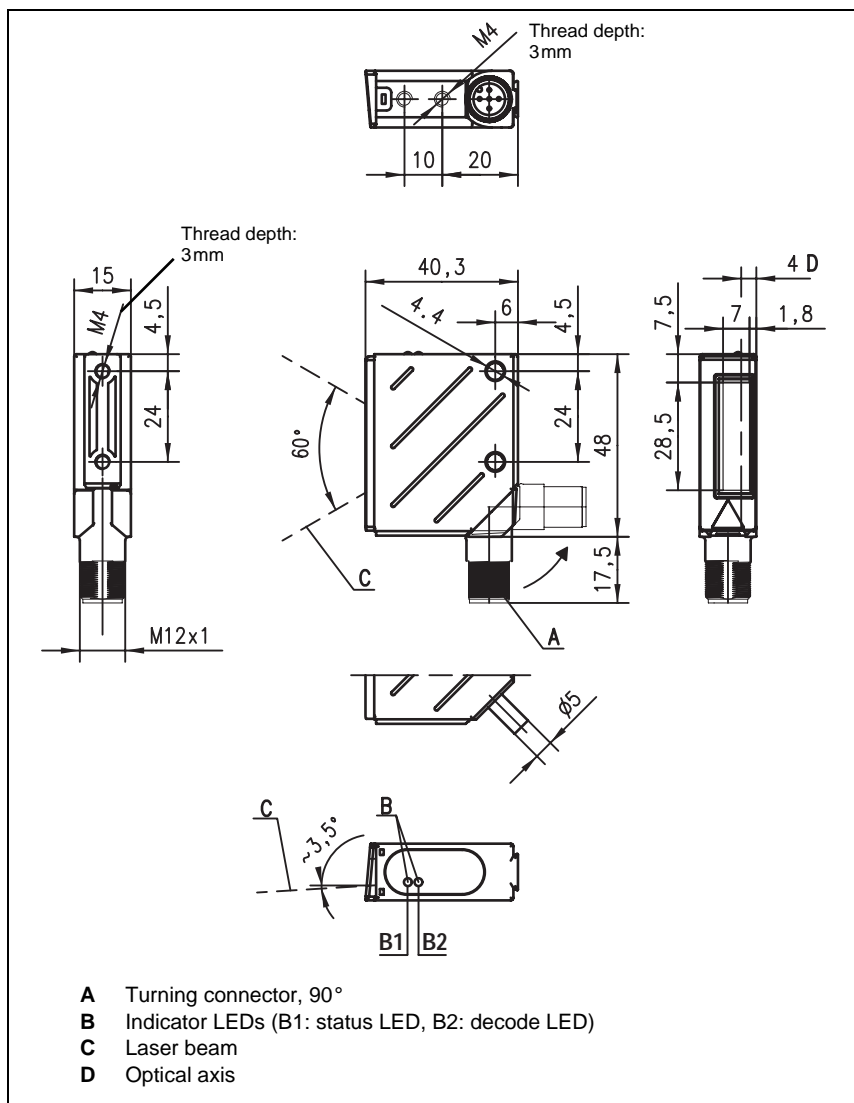


Figure 4.2: Dimensioned drawing BCL 8 S M ...2 with front beam exit

4.4 **Optical Data**



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

The BCL 8 is available in various models for various reading tasks and connection requirements (see chapter 4.4.1 "Type overview").

4.4.1 **Type overview**

Model	Range	Module/ resolution [mm]	Connection	Scanner type beam exit	Part No.
BCL 8 S M 100	up to 160mm	0.15 ... 0.5	M12 round 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

4.4.2 Reading Fields



Notice!

Please notice that the real 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 reading distance always refers to the front edge of the housing of the beam window.

Reading field BCL 8 with front beam exit

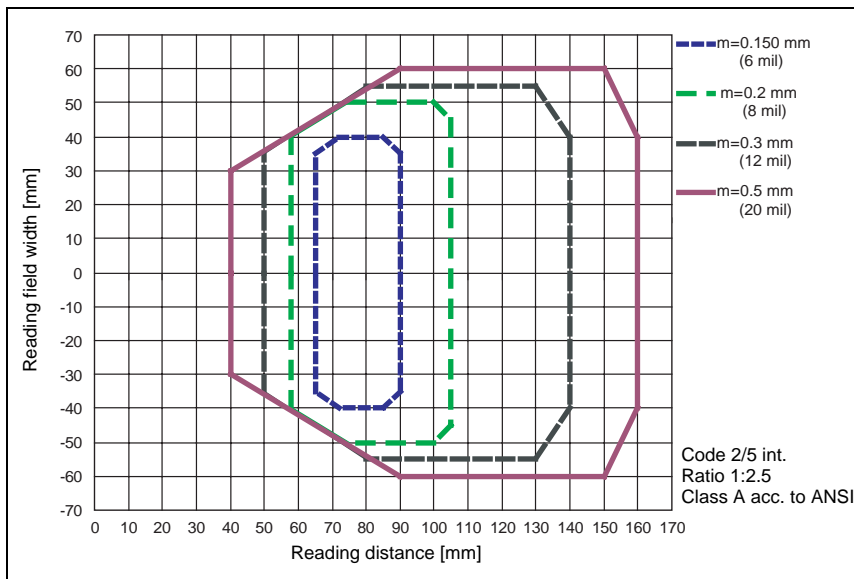


Figure 4.3: Reading field BCL 8 S M ...2 with front beam exit

Reading field BCL 8 with side beam exit

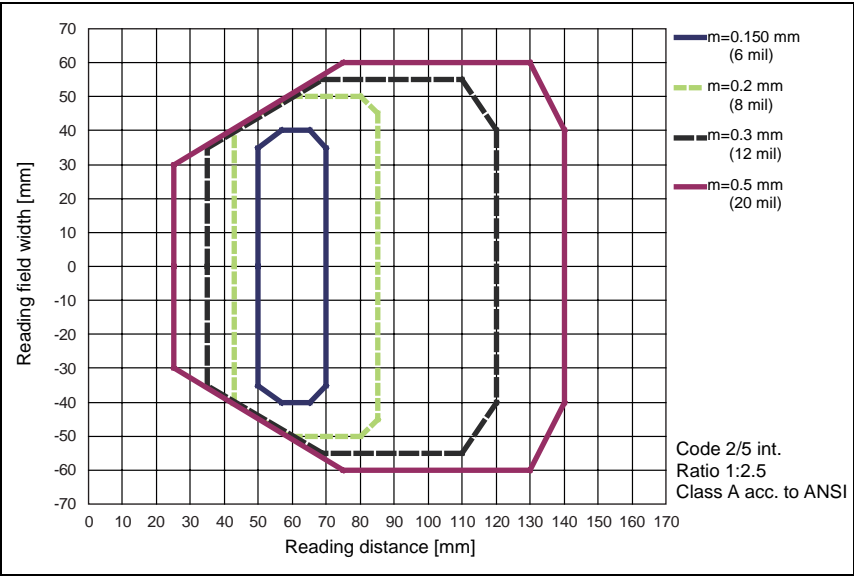


Figure 4.4: Reading field BCL 8 S M ...0 with side beam exit

5 Accessories / Order Designation

5.1 Accessories



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	500 40091	Connector unit MA 8 for BCL 8; standard design with 1 switching input or 1 switching output, 24VDC
BT 8-0	500 36196	Mounting device with dovetail
BT 8-D10	500 35017	Mounting device for rods \varnothing 10mm or mounting sheet
BT 8-D12	500 35018	Mounting device for rods \varnothing 12 mm or mounting sheet
BT 8-D14	500 35019	Mounting device for rods \varnothing 14 mm or mounting sheet
UMS 8-D10	500 35020	Dovetail mounting system for rod \varnothing 10mm
UMS 8-D12	500 35021	Dovetail mounting system for rod \varnothing 12mm
UMS 8-D14	500 35022	Dovetail mounting system for rod \varnothing 14mm
UMS 8.1-D10	500 35023	Turning mounting system, with dovetail, for rod \varnothing 10mm
UMS 8.1-D12	500 35024	Turning mounting system, with dovetail, for rod \varnothing 12mm
UMS 8.1-D14	500 35025	Turning mounting system, with dovetail, for rod \varnothing 14mm
UMS 8.2-D10	500 35026	Turning and inclinable mounting system, with dovetail, for rod \varnothing 10mm
UMS 8.2-D12	500 35027	Turning and inclinable mounting system, with dovetail, for rod \varnothing 12mm
UMS 8.2-D14	500 35028	Turning and inclinable mounting system, with dovetail, for rod \varnothing 14mm
BCLConfig	Download from www.leuze.de	Programming software

Table 5.1: Accessories / Order Designation

5.1.1 Connector unit MA 8

The connector unit MA 8 is used to simplify the electrical installation of the BCL 8. It has the following advantages compared to the installation of the BCL 8 as a standalone device:

- M12 socket for switching input or switching output
- M12 plug for RS 232 interface and voltage supply 24VDC
- M12 socket for connection of the BCL 8

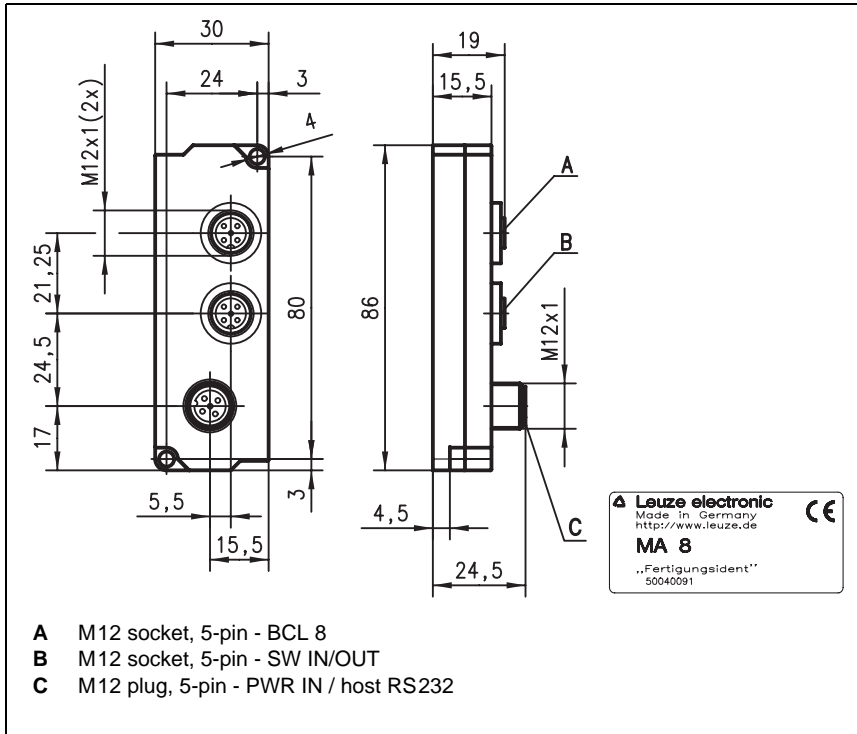


Figure 5.1: Connector unit MA 8

5.1.2 Fastening Accessories

A wide range of mounting devices is available for the attachment of the BCL 8, designed for either rod or screw connections (see also Leuze Catalog, Accessories for Series 8).

Mounting devices

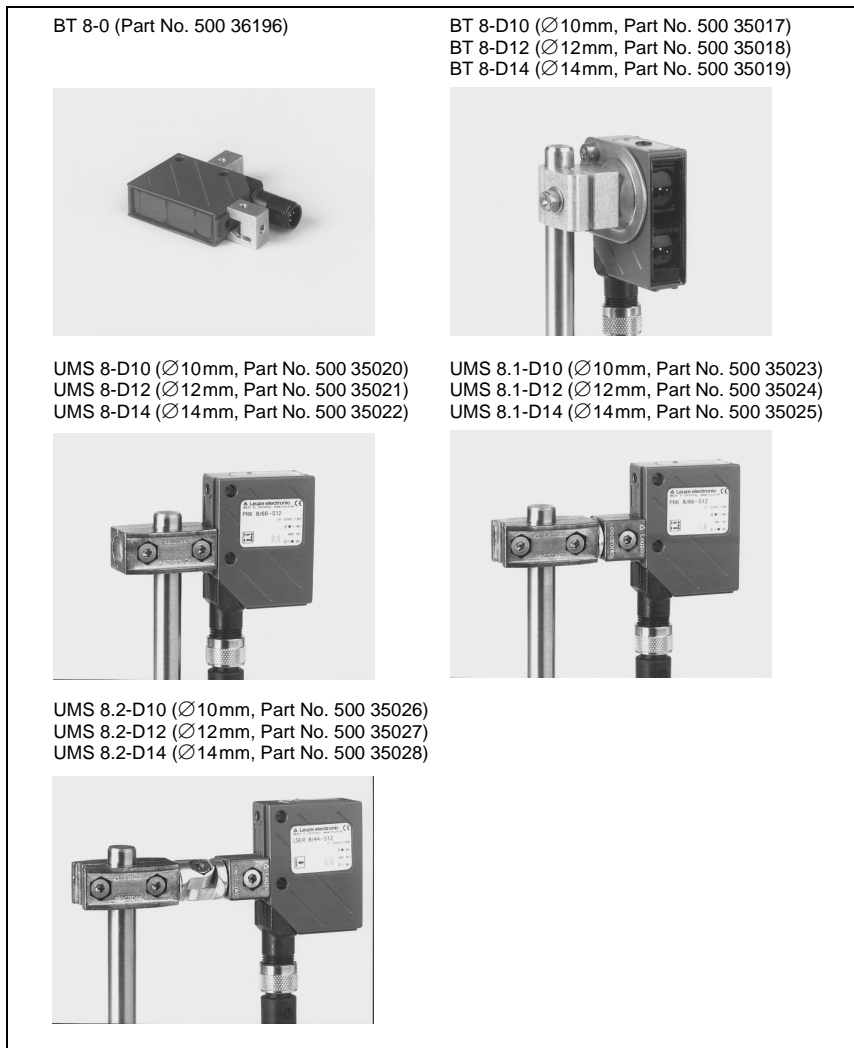


Figure 5.2: Mounting devices for BCL 8

6 Installation

6.1 Storage, Transportation



Attention!

When transporting, package the device so that it is protected against collision and humidity. Optimal 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.

Name plate BCL 8

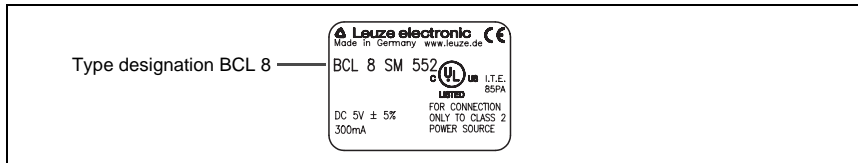


Figure 6.1: Device name plate BCL 8

✚ *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 local regulations regarding disposal and packaging.*

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

The wide variety of mounting systems is available for installation. They may be ordered separately from Leuze electronic. Please select the part number from the separate data sheet (available from the Internet under www.leuze.de).

Mounting the BCL 8

There are three basic types of mounting arrangements for the BCL 8:

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

Mounting example BCL 8

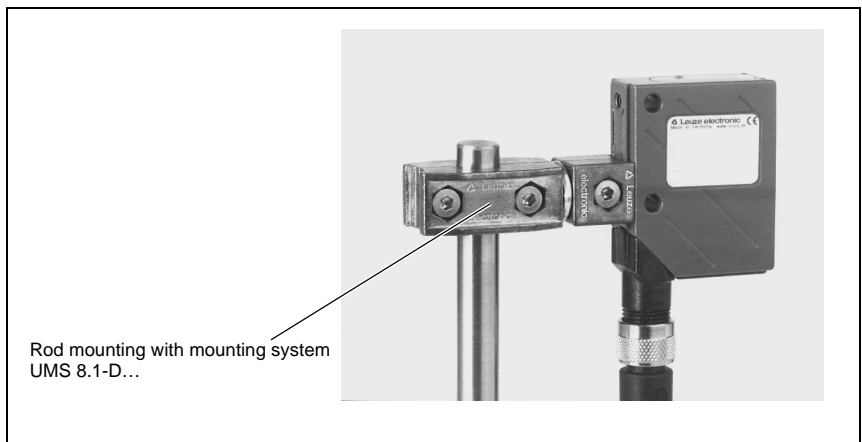


Figure 6.2: Mounting example BCL 8

Installation of connector unit MA 8

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

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 bar codes on the objects to be scanned
- the reading field of the BCL 8 in relation to the bar code module width
- the resulting minimum and maximum reading distance from the respective reading field (for specific information, please refer to chapter 4.4)



Notice!

The best reading results are obtained when

- the bar code is moved along the reading window rotated by $> 10^\circ$
- the reading distance lies in the middle area of the reading field
- you do not use high-gloss labels.



Notice!

In the case of front beam exit, the beam at the BCL 8 exits almost perpendicular to the reading window. In the case of the side beam exit, it exits with a deviation of 15° from the perpendicular. The bar code label must be rotated by $> 10^\circ$ to avoid a total reflection of the laser beam in the case of shiny labels.

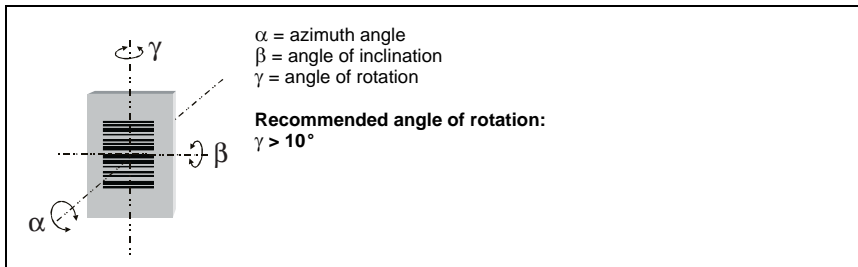


Figure 6.3: Definition of the reading angles BCL 8

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 foreign light influence (no direct sunlight).

6.3 Connection



Attention!

The bar code reader BCL 8 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 nameplate.

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 respective connector units must have a secure electrical insulation through double insulation and safety transformers according to DIN VDE 0551 (IEC 742).

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

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 connection assignment

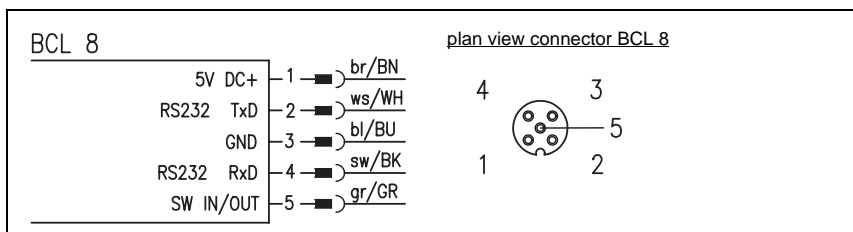


Figure 6.4: BCL 8 connection assignment

Wiring description

Pin 1	+5V DC	operating voltage 5V DC
Pin 2	RS 232 TxD	signal line TxD of the RS232 interface
Pin 3	GND	operating voltage 0V DC / reference ground
Pin 4	RS 232 RxD	signal line RxD of the RS232 interface
Pin 5	SW IN/OUT	switching input or switching output

Table 6.1: Wiring description BCL 8

6.3.2 Connection of 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)

In the standard setting (active low), you can trigger a read process via the combined switching input or output connector SW IN/OUT by connecting SW IN/OUT (pin 5) to GND (pin 3). The 2.2 k Ω "pull-up" resistor must be connected externally (**Connection version 1**, figure 6.5).

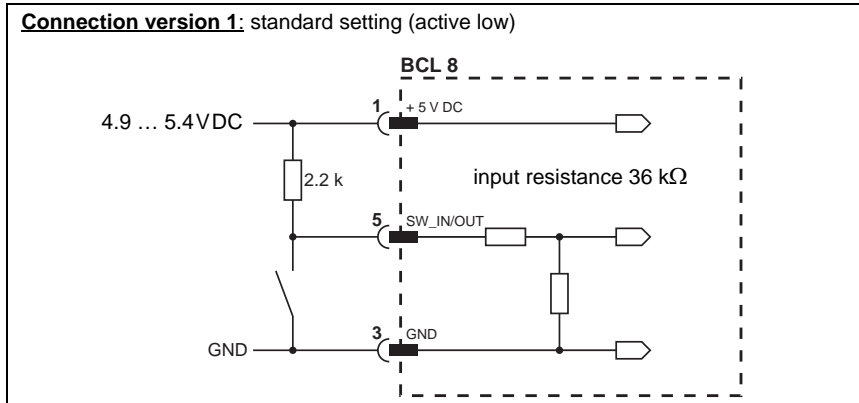


Figure 6.5: Switching input BCL 8 connection version 1 (standard setting)

In the setting "inverted" (active high), you can trigger a read process by feeding a voltage of 5VDC (pin 1) to SW IN/OUT (pin 5) (**Connection version 2**, figure 6.6).

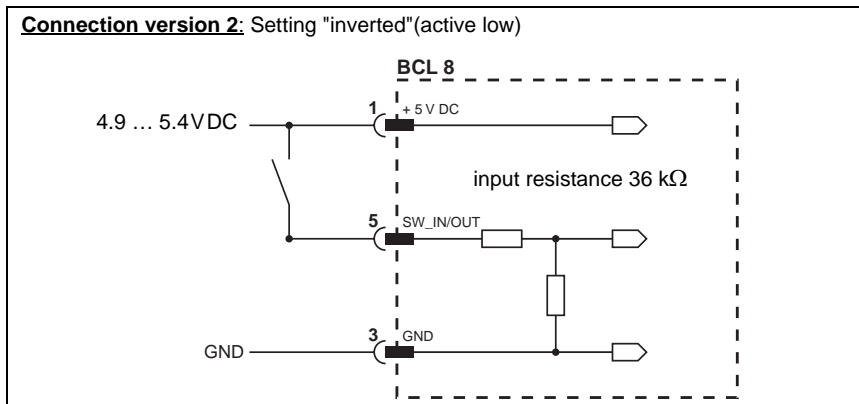


Figure 6.6: Switching input BCL 8 connection version 2 (setting "inverted")

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 default setting, the switching output SW IN/OUT is switched to GND (pin 3) if a code is recognised.

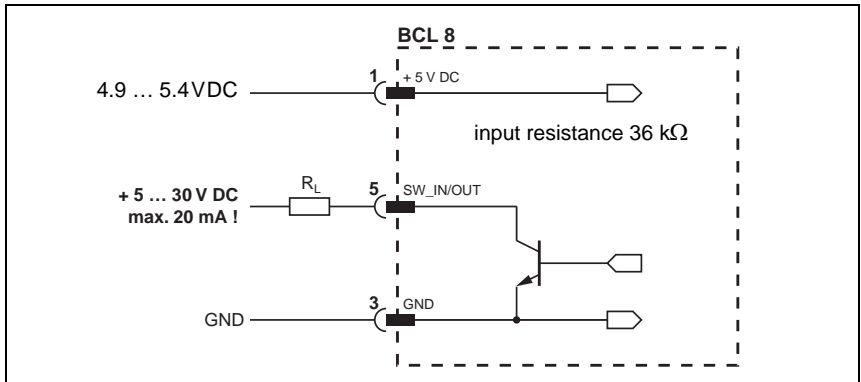


Figure 6.7: Switching output BCL 8



Attention!

Do not load the BCL 8 switching output with more than 20mA at +5 ... 30VDC!



Notice!

You can configure the switching input/output according to your needs, using the program BCL Config supplied.

6.3.3 Wire lengths

The following maximum lengths for wires must be observed:

Connection	Interface	Max. wire length
BCL 8 - Host	RS 232	< 3m
Switching input/output		< 3m
Supply voltage		< 3m

Table 6.2: Wire lengths

6.4 Disassembling, Packing, Disposing

Repacking

For later reuse, 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. Then, the green status LED on the top side of the BCL 8 lights up.

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 bar code 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.

In order to operate the BCL 8, it is typically sufficient to set code type and code length in accordance with the bar codes that are to be read. However, depending on the application, you will additionally activate the autoReflAct function and configure the switching inputs/output according to your requirements.

The setting of code type and code length is usually accomplished by using the program BCLConfig, see "Installing the BCLConfig software" on page 31.

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 parameter sets then takes place in the operating mode "service", 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 default 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 parameterisation program
- 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 configuration software BCLConfig and the subsequent copying into 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

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

- by a parameter reset, see page 52

7.3.2 Service Operating Mode

Setting the required parameters is carried out easiest in the "service" operating mode. The operating mode Service makes the following defined operating parameters available on the RS232 interface, independent from the BCL's configuration for standard operation:

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

Service interface active

The service interface may be activated as follows:

- via a command during power-up (initialisation phase).
- via a defined bar code label ("Service", see accompanying leaflet) in front of the reading window during power-up (initialisation phase).

Connection

You can connect a PC or terminal to the BCL 8 via the serial interface and configure the BCL 8 through this connection. The connection is made using a crossed 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 connection specifications please refer to the data sheet of the connector unit.

Service Operating Mode

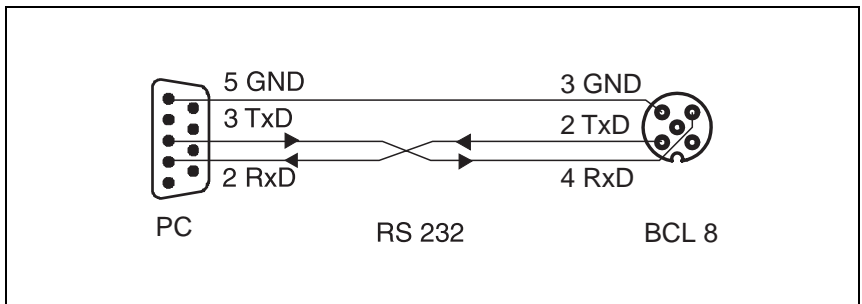


Figure 7.1: Connecting the RS 232 service interface to a PC or terminal

8 Operation



Attention Laser Radiation!

Follow the safety notices in chapter 2.3 on page 6!

8.1 Display Elements

On the BCL 8, you will find two LEDs that show the operational readiness and the reading state of the bar code 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 only.

Types of errors

Errors are divided up into the following types:

- Warnings
- Serious errors

Warnings

Warnings indicate temporary operating faults which do not effect 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 reinitialise 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.

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)*

The following window appears:

Installation window

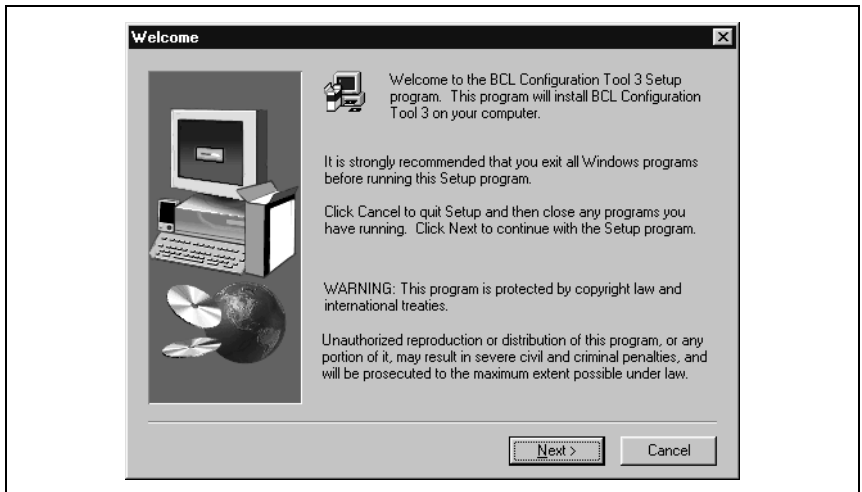


Figure 9.1: Installation window

✚ *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 Continue, then follow the installation routine.

For further information, please see the online help for the "BCLConfig" software.

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

The following window is then displayed:

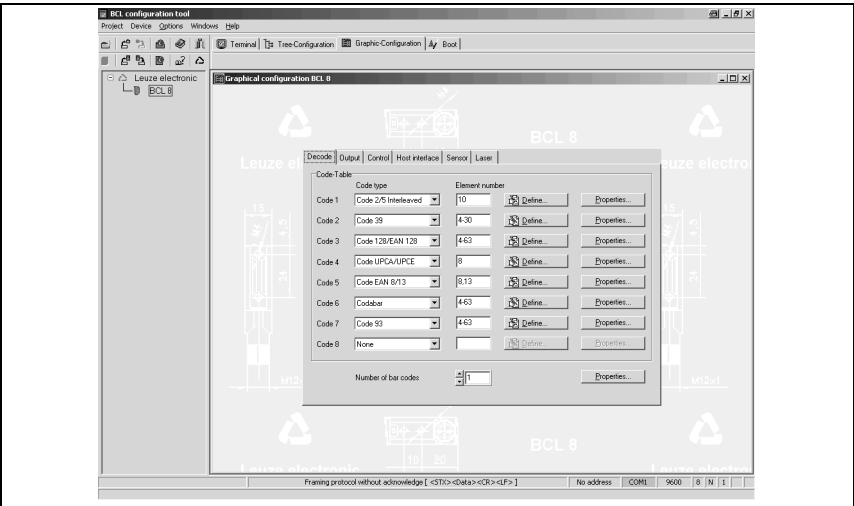


Figure 9.3: BCL 8 configuration software

10 Important Parameters

10.1 Code menu

Code	Code type	Element number	Define...	Properties...
Code 1	Code 2/5 Interleaved	10	Define...	Properties...
Code 2	Code 39	4-30	Define...	Properties...
Code 3	Code 128/EAN 128	4-63	Define...	Properties...
Code 4	Code UPCA/UPCE	8	Define...	Properties...
Code 5	Code EAN 8/13	8,13	Define...	Properties...
Code 6	Codabar	4-63	Define...	Properties...
Code 7	Code 93	4-63	Define...	Properties...
Code 8	None		Define...	Properties...

Number of bar codes: 1

Figure 10.1: Default setting of the code menu with the CONFIG 3 configuration software.

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.

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

10.2 Properties of the Code menu

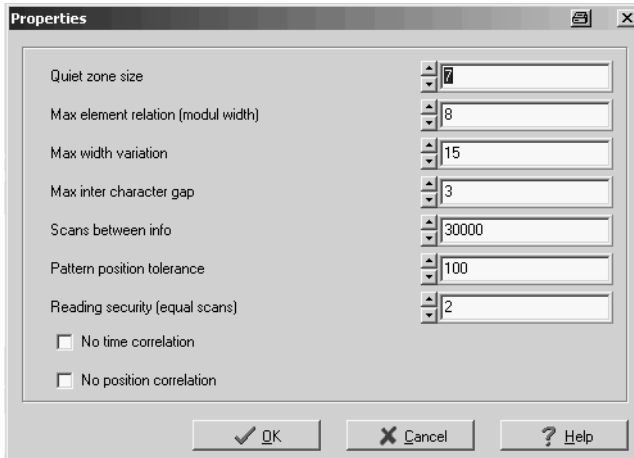


Figure 10.2: Standard setting of the properties of the code menu

Quiet zone size Quiet zone: the area to the left and right of the bar code
 Module: width of the narrowest line in the bar code
 According to the code specifications, each bar code must have a quiet zone which is 10x as wide as the module of the bar code.
Ex: for a code having a module of 0.5mm, 5mm blank space must be present at both the left and right of the code.
 By default, the scanner checks the a quiet zone which is 7 times greater than the module. This means that 7x or greater is o.k.

Reading Security (Equal Scans) Specifies how often a code must be decoded before the result is valid and output. This value should be increased for inspection and test purposes only.

No time correlation If this parameter is set, a gap between two identical labels is ignored and they are treated as a single label.

No position correlation If this parameter is set, then the position of a bar code label in the reading beam is not taken into account. Identical labels are treated as a single label



Notice!

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

10.3 Output menu

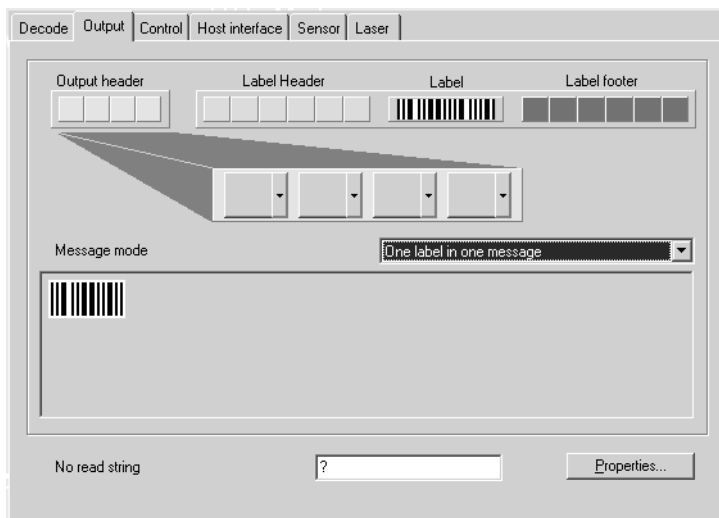


Figure 10.3: Output menu

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 bar codes 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 bar code. Multiple characters (=string) may be entered here. Up to 20 characters are possible.

Properties Set the desired formatting modes and formatting characters as necessary.

10.4 Control

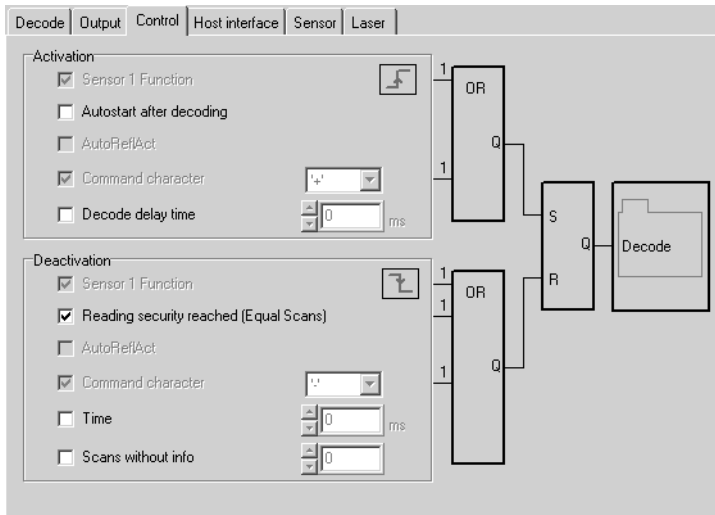


Figure 10.4: Control menu default settings

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.

Deactivation

Sensor 1 function see menu "switching input"

Reading security reached (equal scans) If this item is activated, the read result is output immediately after the bar code 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 For test purposes.
If the scanner is activated, the reading gate is automatically closed by the scanner after this preset time has elapsed.

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.

10.5 Communication

The screenshot shows a software window with several tabs: Decode, Output, Control, Host interface, Sensor, and Laser. The 'Sensor' tab is selected. Inside the window, there are four dropdown menus: 'Baud Rate' set to 9600, 'Data mode' set to '8 Data bits, none Parity, 1 Start/Stop', 'Handshake' set to 'No handshake', and 'Protocol' set to 'Framing protocol without acknowledge'. Below these are two sections, 'Receive' and 'Transmit', each containing three character codes: <STX>, <Data>, and <CR><LF>. At the bottom right, there is a button labeled 'Properties...'.

Figure 10.5: Standard setting of the communication menu

Select the desired baud rate, the stop bits, the data bits, the parity, and various transmission modes here.

10.5.1 Communication properties

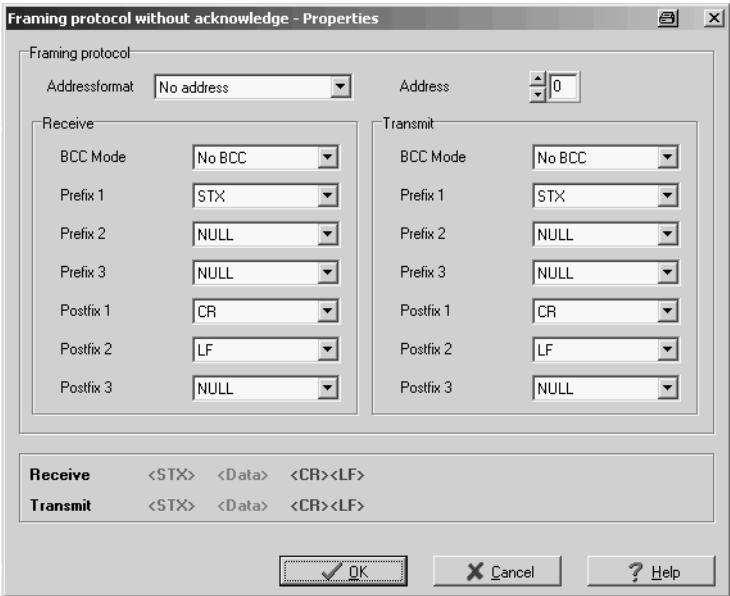


Figure 10.6: Standard setting of the property menu

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

10.6 Reference code

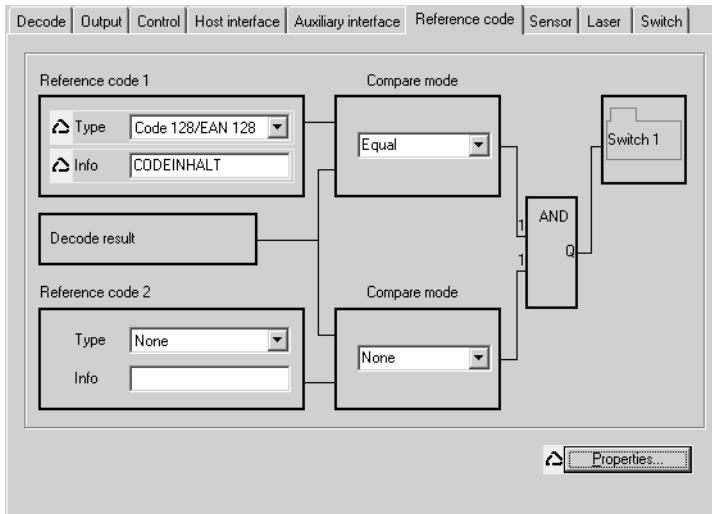


Figure 10.7: Reference code menu

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

This reference code can be compared with the current decoded bar code in various modes and, thus, set appropriately for the switching output. 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

10.7 Sensor

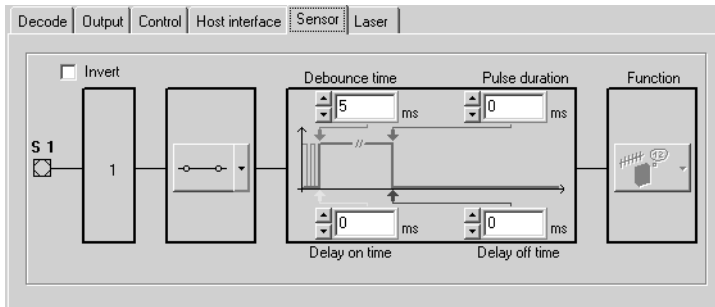


Figure 10.8: Standard setting of the switching input menu

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 the connection configuration, the BCL 8 either has a switching input or a switching output.

10.8 Laser

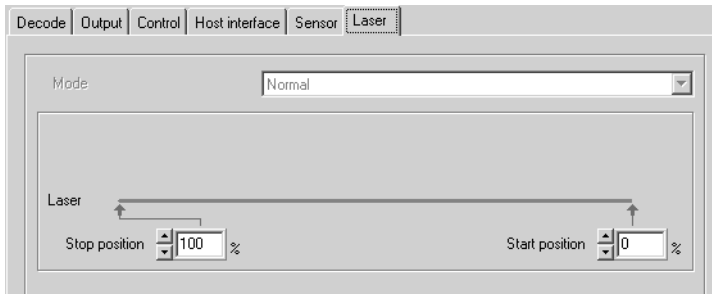


Figure 10.9: Laser menu

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

Mode

- **Standard reading operation**
This is the standard mode without the reflector polling function
- **Slow reflector polling with automatic reading gate control**
In this mode, the decoding of the label is automatically started after the scanning beam to the reflector has been interrupted. The decoding is terminated no later than when the scanning beam to the reflector is cleared. This mode is intended for applications with slow transport speeds of about $< 0.5 \text{ m/s}$.
- **Fast reflector polling without automatic reading gate control**
In this mode, the decoding does not start automatically. Starting must be activated via a controller or via a switching input. This mode is intended for scanners with fast transport speeds of about $> 0.5 \text{ m/s}$.
This mode is also of interest if a programmable logic controller wants to know whether the scanning beam to the reflector is currently interrupted or not. If this is the case, the PLC can start the decoding by sending the + command. The PLC detects the change by receiving the characters "reflector discovered" or "reflector not discovered".
- **Fast reflector polling with automatic reading gate control**
As mode 2 for fast transport speeds of about $> 0.5 \text{ m/sec}$
- **Slow reflector polling without automatic reading gate control**
As mode 3, but for slower transport speeds of about $< 0.5 \text{ m/sec}$

Reflector polling

Reflector polling, also called autoReflAct, is an operating mode in which no external sensor is required. The activation and deactivation of the scanner is carried out via the reflector supplied. It must be installed within the scan range of the BCL 8.

For easy alignment in the autoReflAct mode, please select the menu "Wizard" (currently under implementation). In the top left corner, below the terminal icon, a small symbol "AutoReflAct Wizard" appears.



If you click on this symbol, the wizard tries to establish a connection to the BCL 8 connected. If this is successful, please select one of the four reflector polling modes under "mode" in the menu that appears. A screen like the following appears:

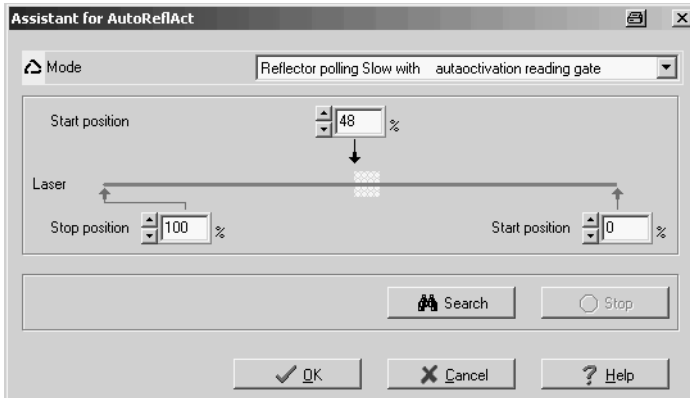


Figure 10.10:AutoRefIAct Wizard

When you activate the "search" icon, the BCL 8 scans its reading range and tries to detect a reflector. For this, the reflector must be positioned in the reading range of the scanner. After a reflector has been detected, it passes on the start position of the reflector in its reading range.

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

The scanner is now ready for the AutoRefIAct operating mode.



Attention!

If reflecting objects other than the reflector are in the reading window of the scanner, the application must be checked carefully, as these reflecting objects may cause an incorrect triggering at the scanner!

The "fast reflector polling ..." modes are more suitable for applications with reflecting objects than the "slow reflector polling ..." modes

10.9 Switching output

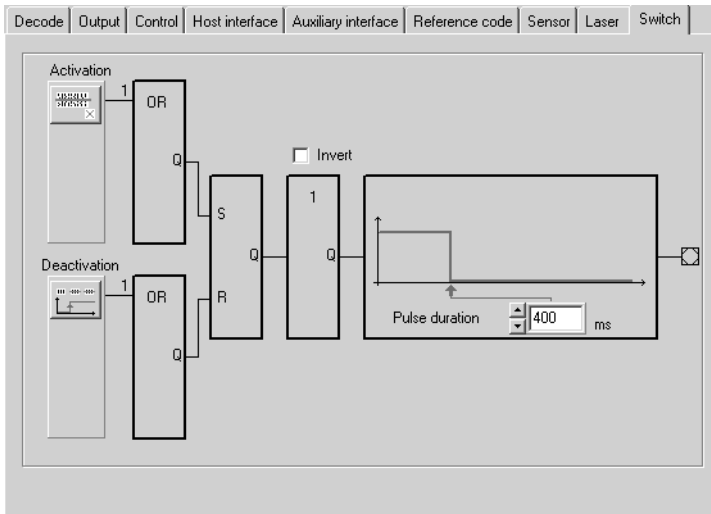


Figure 10.11: Standard setting of the switching output menu

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

Deactivation This implements the event that leads to the switching output being reset. (in case that the set pulse duration has not expired.) Multiple events can also be simultaneously activated.

Invert Level inverted

Pulse duration Duration of the switching output impulse.



Attention!

Depending on the connection configuration, the BCL 8 either has a switching input or a switching output.

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 a computer 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 may 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 ' '.

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	no
Acknowledgement	Ex.: 'BCL 8 V 01.00 08.01.2003' The device type appears in the first line followed by the devices version number and date. The data which are 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	no
Acknowledgement	'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
Acknowledgement	'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 '10' EAN/UPC '11' Codabar yy Number of digits of the code detected zzzzzz Contents of the decoded label. The ↑ appears if the label was not correctly read.

Manual definition of the reference code

Command	RS
Description	<p>This command can be used to define a new reference code in the BCL 8 by means of direct entry via the serial interface. The data are saved in the parameter set according to their input under reference code 1 or 2 and stored in the working buffer for further processing.</p>
Parameter	<p>'RSyvxzzzzzzzz'</p> <p>y, v, x and z are placeholders (variables) for the actual input.</p> <p>y: def. reference code No</p> <p>'1' (Code 1)</p> <p>'2' (Code 2)</p> <p>v Storage location for reference code:</p> <p>'0' RAM+EEPROM</p> <p>'3' only RAM</p> <p>xx def. Code type (see Command 'CA')</p> <p>z def. Code information (1 ... 63 characters)</p>
Acknowledgement	<p>'RSx'</p> <p>x: status</p> <p>'0' valid 'Rx' command</p> <p>'1' invalid command</p> <p>'2' insufficient memory for reference code</p> <p>'3' reference code has not been saved</p> <p>'4' reference code invalid</p>
Example	<p>Input = 'RS130678654331'</p> <p>(Code 1 (1), only RAM (3), UPC (06), code information)</p>

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 ' - ' exit the Teach-In process
Acknowledgement	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: 'RCyvxzzzzz' 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 the reference code ' 0 ' RAM+EEPROM ' 3 ' only RAM xx def. Code type (see Command 'CA') z def. Code information (1 ... 63 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.

Reading a 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
Acknowledgement	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: RCyvxzzzzz 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 the reference code '0' RAM+EEPROM '3' only RAM xx def. Code type (see Command 'CA') z def. Code information (1 ... 63 characters)

11.1.2 'Online' Commands for System Control

Activate sensor input

Command	'+'
Description	The command activates decoding.
Parameter	no
Acknowledgement	no

Deactivate sensor input

Command	'-'
Description	The command deactivates decoding.
Parameter	no
Acknowledgement	no

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	no

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	no

11.1.3 'Online' Commands for Parameter Set Operations

Definitions

- **<BCC type>** type of the checksum calculation.
'0': no checksum
'3': XOR checksum (mode 3)
- **<PS type>** type of the parameter set
'0': current parameter set (data stored in the EEPROM non-volatile)
'1': reserved
'2': standard parameter set (not changeable)
'3': operating values (data in the RAM, will be lost after reset)
- **<Status>** mode of the 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 are converted for transmission from HEX format to a 2-byte-ASCII format. In 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 at one time.
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
Acknowledgement	'PSx' x: status '0' valid transmission '1' invalid message '2' invalid message length '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

Request parameter set from the BCL 8

Command	'PR'
Description	The command requests parameter data from the BCL 8. The parameter <PS-Type> indicates from which parameter set the data are to be transmitted
Parameter	<BCC type> <PS type> <Start address> <Data length>
Acknowledgement	'PSx' x: status '0' valid transmission '1' invalid message '2' invalid message length '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

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 message length '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 from the specified address and stores them in an intermediate buffer. If the status indicates that additional messages follow, they are also stored in the intermediate buffer before being stored under the appropriate parameter-set type in the EEPROM. 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>
Acknowledgement	'PSx' x: status '0' valid transmission '1' invalid message '2' invalid message length '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

12 Maintenance

12.1 General Maintenance Information

Usually, the barcode reader BCL 8 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.*



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