

Bar Code Reader BCL 21/22 with Integrated Decoder and Connector Unit MA 2

Technical description



Table of Contents

1	General Information	6
1.1	Explanation of Symbols	6
1.2	Declaration of Conformity	6
2	Safety Notices	6
2.1	Safety Standard	6
2.2	Intended Use	7
2.3	Working Safely	7
3	Description	8
3.1	Features of the bar code readers BCL 21/22	8
3.1.1	Networking	9
4	Technical Data	10
4.1	General Specifications BCL 21/22	10
4.2	LED indicators	11
4.3	Dimensioned and Connection Drawings	11
4.4	Optical data	12
4.4.1	Type overview	12
4.4.2	Optics variants and reading fields	12
5	Accessories/Order Designation	14
5.1	Accessories	14
5.1.1	Connector unit MA 2/dimensioned drawing	14
5.1.2	Mounting accessories	15
6	Installation	15
6.1	Storage, Transportation	15
6.2	Mounting	16
6.2.1	Device Arrangement	17
6.3	Connection	19
6.3.1	Connecting BCL 22 Stand-alone (RS 232)	20
6.3.2	Connecting BCL 21 with MA 2 (RS 485)	20
6.3.3	Wire lengths and shielding	23
6.4	Disassembling, Packing, Disposing	23
7	Commissioning	24
7.1	Measures to be performed prior to the first commissioning	24
7.2	Function test	24
7.3	Setting parameters	25
7.3.1	Service Operating Mode	26
8	Operation	27
8.1	Display elements	27
8.2	Handling errors	27

9	Communicating with the Device	28
9.1	Installing the BCLConfig" software	28
9.2	Overview of Commands and Parameters	29
9.2.1	General 'online' commands	30
9.2.2	'Online' commands for system control	32
9.2.3	'Online' commands for system testing	33
9.2.4	'Online' command for querying error messages	34
9.2.5	'Online' commands for parameter-set operations	35
10	Maintenance	38
10.1	General Maintenance Information	38
10.2	Repairs, Maintenance	38

Figures and Tables

Figure 3.1:	BCL 21/22 device construction	8
Figure 3.2:	Networking possibilities using the multiNet plus (BCL 21).....	9
Figure 4.1:	Dimensioned drawing BCL 21/22	11
Figure 4.2:	Reading field, optics model N (high density)	13
Figure 4.3:	Reading field, optics model M (medium density, normal range).....	13
Figure 4.4:	Reading field, optics model F (low density, long range)	13
Figure 5.1:	Connector unit MA 2/dimensioned drawing	14
Figure 5.2:	Mounting unit BT 20.....	15
Figure 6.1:	Device type plates BCL 21/22	15
Figure 6.2:	Mounting example BCL 21/22	16
Figure 6.3:	Applications with different beam outlets	17
Figure 6.4:	Additional mirror (lateral beam outlet).....	18
Figure 6.5:	Changing the beam outlet.....	19
Figure 6.6:	BCL 22 Sub D pin assignments.....	20
Figure 6.7:	BCL 21 with connector unit MA 2	21
Figure 6.8:	Connector unit MA 2	21
Figure 6.9:	MA 2 wiring	23
Figure 7.1:	Control elements in the MA 2	24
Figure 7.2:	Connecting the MA 2 service interface to a PC or terminal	26
Figure 9.1:	Installation window.....	28
Figure 9.2:	Installation directory.....	28
Table 1:	General Specifications.....	10
Table 10:	Wire Lengths and Shielding.....	23
Table 2:	LED indicators	11
Table 3:	Type overview.....	12
Table 4:	Accessories/Order Designations	14
Table 5:	Wiring description BCL 22	20
Table 6:	Terminal assignment MA 2	21
Table 7:	Terminal assignments for switching inputs	22
Table 8:	Terminal assignments for switching inputs	22
Table 9:	Terminal assignments for switching outputs.....	22

1 General Information

1.1 Explanation of Symbols

The symbols used in this operating manual are explained below.

**Attention**

This symbol appears in front of text which must be carefully observed. Failure to heed this information can lead to injuries to personnel or damage to the equipment.

**Attention Laser Radiation**

This symbol warns of possible danger through hazardous laser radiation.

**Notice**

This symbol indicates text which contains important information.

1.2 Declaration of Conformity

The bar code readers BCL 21/22 and the connector unit MA 2 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. in D-73277 Owen/Teck, possesses a certified quality assurance system in accordance with ISO 9001.



2 Safety Notices

2.1 Safety Standard

The bar code readers BCL 21/22 and the connector unit MA 2 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.

Bar code readers of the type BCL 21/22 are conceived as stationary, high-speed scanners with integrated decoders for all current bar codes used for automatic object recognition.

The connector and interface unit MA 2 simplifies the connection of bar code readers of type BCL 21. The connection of other bar-code-reader devices is not permitted.

In particular, unauthorized uses include:

- rooms with explosive atmospheres
- operation for medical purposes

Fields of application

The bar code readers BCL 21/22 with optional connector unit MA 2 are conceived particularly for the following fields of application:

- labelling and packaging machines
- automatic analysers
- space-critical bar code reading tasks
- storage and conveying engineering, in particular for object identification on fast-moving conveyor belts
- pharmaceutical industry

2.3 Working Safely



Attention Laser Radiation

The BCL 21/22 are laser devices of the Laser Protection Class 2. Do not look directly into the laser beam.

Observe the applicable legal and local regulations for the operation of laser units.



Attention

Access to or changes on the device, except where expressly described in this operating manual, is not authorized.

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 21/22 device construction

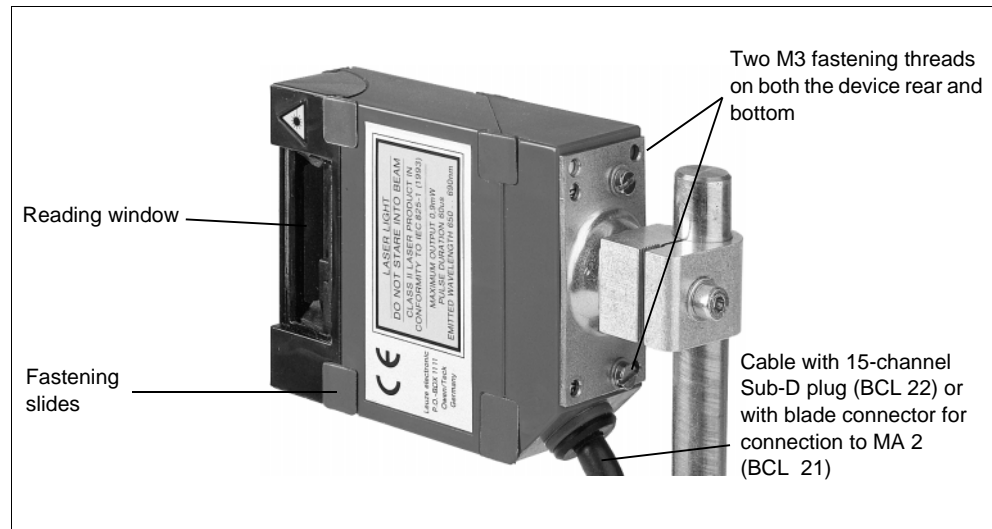


Figure 3.1: BCL 21/22 device construction

3.1 Features of the bar code readers BCL 21/22

The bar code readers BCL 21/22 are high-speed scanners with integrated decoder for all bar codes currently in use, e.g. 2/5 Interleaved, EAN etc.

The many possible configurations, which can be set via software, allow its adaptation to a multitude of reading tasks. Due to their small sizes, the BCL 21/22 can also be used in very compact spaces. Their low weights allow them to be installed in machines not designed for heavier components. The variable beam outlet expands the scope of use and the adaptability of the BCL 21/22. For information on changing the beam outlet, please refer to Chapter 6.2.1.

The MA 2 connector unit can also be used together with the BCL 21 for simple electrical installation.

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

BCL 22 "Stand alone"

The bar code reader BCL 22 is operated as a "stand alone" individual device. Electrical connection of the supply voltage, the interface and the switching inputs is made by means of a cable attached to the BCL.

BCL 21 with MA2

If several BCLs are to be networked, it is recommended that an MA2 connector unit be used for each BCL 21. The electrical connection, commissioning and service can be performed easily and quickly. BCL 21 and MA 2 are arranged separately from one another. Both devices are connected by a cable.

3.1.1 Networking

Up to 31 scanners can be networked together using the connector unit MA 2 and a busmaster MA 30/31. In addition, each BCL 21 is assigned an individual hardware address in the corresponding MA 2. The devices are networked by connecting the individual RS 485 interfaces in parallel.

multiNet plus

In the Leuze multiNet plus, the individual network devices sequentially transfer their data to the network master MA 30/31 when requested. In addition, each network device declared as a slave maintains a device address which is set in the respective MA 2 by means of a coding switch. When a scanner is replaced, the device address in the MA 2 remains the same.

The master then transmits the data of all network devices via its host interface to a primary PLC control system or a computer, i.e. it "collects" the scanner data in the network and transmits them to an interface on the host computer. This reduces interface costs (CPs) and time spent programming the software.

Networking via multiNet plus

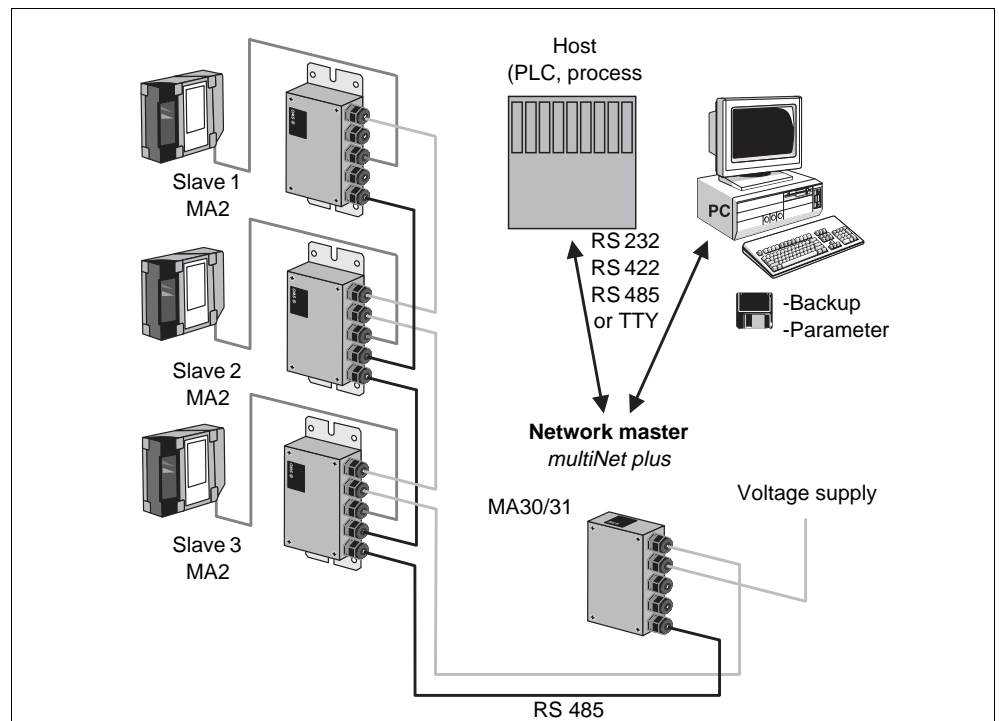


Figure 3.2: Networking possibilities using the multiNet plus (BCL 21)

Two-wire RS 485

The Leuze MultiNet plus is optimized for fast transmission of scanner data to a primary host computer. The multiNet plus consists physically of a two-wire RS 485 interface through which the multiNet plus software protocol is controlled. This makes wiring the network easy and inexpensive as slaves are connected to one another in parallel.

Interface modules

Shielded, twisted pair conductors should be used for the multiNet. This allows a total network length of up to 1200 m. Connection of the network to the primary computer is made via the host interface of the MA 30/31 which can be equipped with 4 different physical interface modules. Modules are available for RS 422, RS 232, TTY and RS 485.

4 Technical Data

4.1 General Specifications BCL 21/22

	BCL 21/22
General Specifications	
Housing	ABS
Dimensions	82 x 68 x 28 mm (H x W x D)
Weight	180 g/260 g with cable
Protection class	IP 65
Optical data	
Resolution	BCL 2x SN: 0.15 to 0.5 mm module width BCL 2x SM: 0.2 bis 1.0 mm module width BCL 2x SF: 0.3 bis 1.0 mm module width
Light source	Laser diode, red 650 nm, safety class 2, CDRH Class II
Beam deflection	by means of rotating polygon mirror wheel
Scanning rate	1000 scan/s, vers. M; 800 scan/s, vers. N, F
Reading distance	50 ... 450 mm (depending on optics model N, F, M)
Reading field opening	70 mm at 50 mm distance
Decoder	
Code types	2/5 Interleaved
	Code 39
	Code 128
	EAN 128
	EAN/UPC
	EAN Adendum
	Codabar
	Pharma Code
Interfaces	
Model	RS 232 (BCL 22) RS 485 (BCL 21), additional service interface (RS 232)
Baud rate:	adjustable 100 ... 57600 baud
Switching input	one/two switching input(s)/output(s) (BCL 21/BCL 22)
Data format:	Data bit: 7, 8, 9; parity: none, even, odd; stopbit: 1, 2
Power supply	
Operating voltage	10 ... 30 V DC
Power consumption	3.2 W
Environmental conditions	
Ambient temperature	0 ... +40 °C
Air moisture	max. 90% rel. humidity, non-condensing
Storage temperature	-20°C - +60°C
Vibration	IEC 68.2.6
Shock	IEC 68.2.27
EMC	IEC 801

Table 1: General Specifications

4.2 LED indicators

LED name	PWR/Ready	ERR/Error	DEC/Decode
LED color	green	red	yellow
State			
no voltage	off	off	off
Initialisation (after reset)	flashing (frequency 1)	off	off
System ready	on	off	off
Read gate active	on	off	on
hardware error	off	on	-
• defective motor			
• defective laser			
• defective system, etc.			
autoConfig/teach-in	flashing (frequency 1)	flashing (frequency 2)	-
service interface active	on	flashing (frequency 2)	-

Table 2: LED indicators



Notice

The flash frequency is 5 Hz; cycle 2 is the reverse of cycle 1.

4.3 Dimensioned and Connection Drawings

BCL 21/22

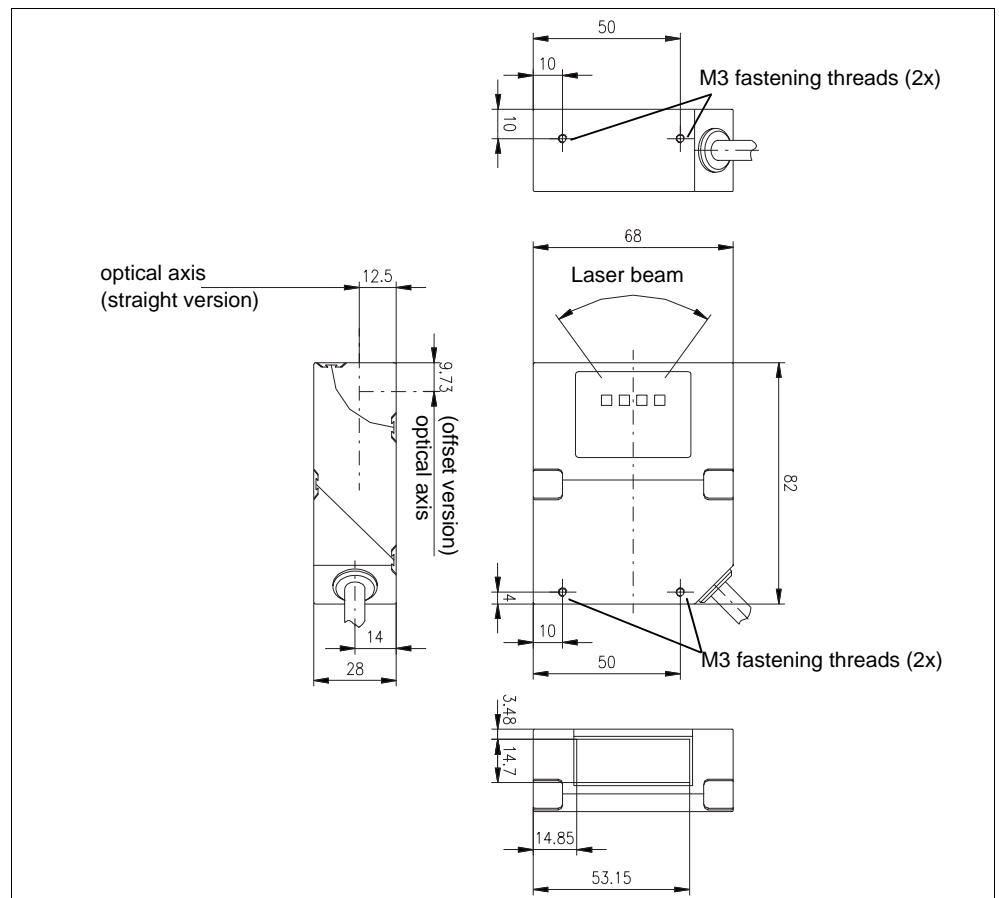


Figure 4.1: Dimensioned drawing BCL 21/22

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 21/22 is available in various models for various reading tasks. Please refer to the following table or the respective scanning curves for ratings.

4.4.1 Type overview

Model	Range	Module/resolution (mm)	Scanning rate (scan/s)	Beam-outlet	Part No.
BCL 21 SN 200	up to 95 mm	0.15 ... 0.5	800	perpendicular	500 30 986
BCL 21 SN 202				front	500 30 987
BCL 22 SN 300				perpendicular	500 30 990
BCL 22 SN 302				front	500 30 991
BCL 21 SM 200	up to 260 mm	0.2 ... 1.0	1000	perpendicular	500 30 988
BCL 21 SM 202				front	500 30 989
BCL 22 SM 300				perpendicular	500 30 992
BCL 22 SM 302				front	500 30 993
BCL 21 SF 200	up to 450 mm	0.3 ... 1.0	800	perpendicular	500 31 080
BCL 21 SF 202				front	500 31 082
BCL 22 SF 300				perpendicular	500 31 104
BCL 22 SF 302				front	500 31 106

Table 3: Type overview



Notice

BCL 21: interface RS 485 and cable/PG;
BCL 22: interface RS 232 and cable/Sub-D

4.4.2 Optics variants and reading fields

The BCL 21/22 is available with three different optics. The optics differ in range and resolution (see Chapter 4.4.1).

- Optic N: for small modules.
- Optic M: for small to medium modules
- Optic F: for medium to large modules

The following graphic displays the scanning curves of the various BCL models.



Notice

Please note that the actual scanning curves can vary due to factors such as label material, print quality, reading angle, print contrast, etc.

Scanning curves
BCL 21/22 with optic N

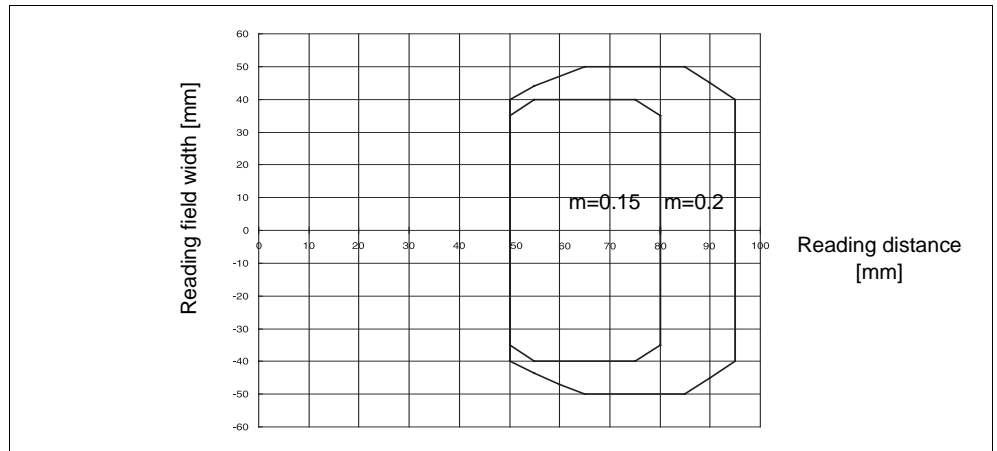


Figure 4.2: Reading field, optics model N (high density)

Scanning curves
BCL 21/22 with optic M

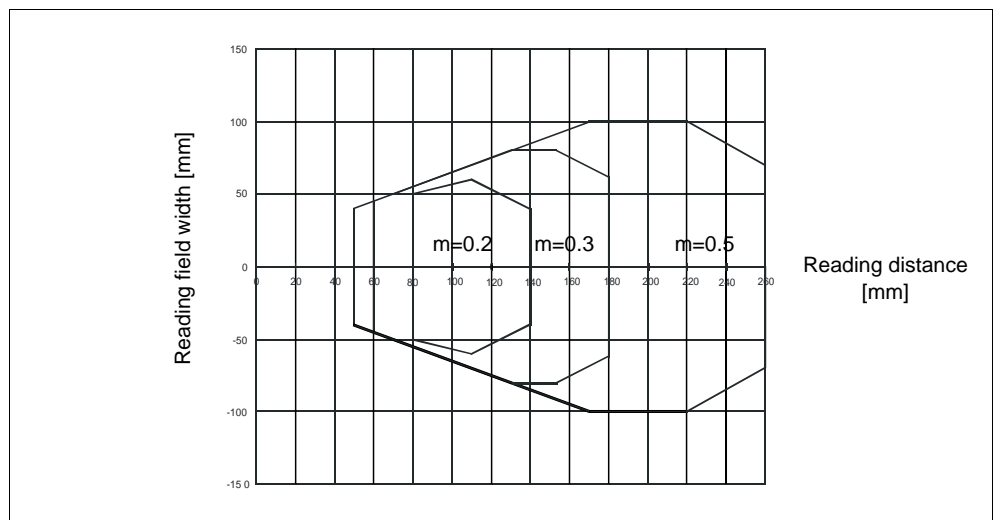


Figure 4.3: Reading field, optics model M (medium density, normal range)

Scanning curves
BCL 21/22 with optic F

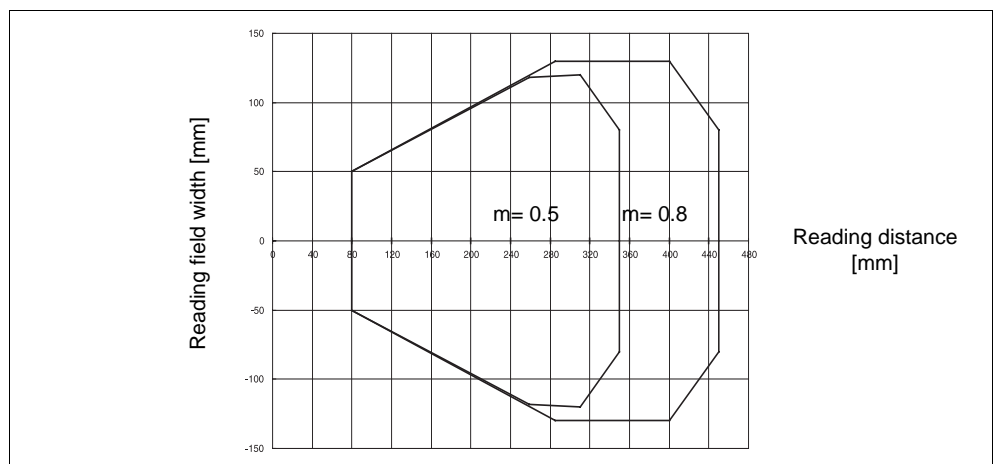


Figure 4.4: Reading field, optics model F (low density, long range)

5 Accessories/Order Designation

5.1 Accessories



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

Designation	Order No.	Short Description
MA2	500 31 256	Connector unit MA2 for BCL 21; standard, multiNet Slave with host interface RS 485
BT 20	500 60 503	Mounting part
BCLConfig	500 60 298	Programming software

Table 4: Accessories/Order Designations



Notice
The connector unit MA 2 is also available with an RS 232 interface (9-pole Sub D-plug).

5.1.1 Connector unit MA 2/dimensioned drawing

Connector unit MA 2

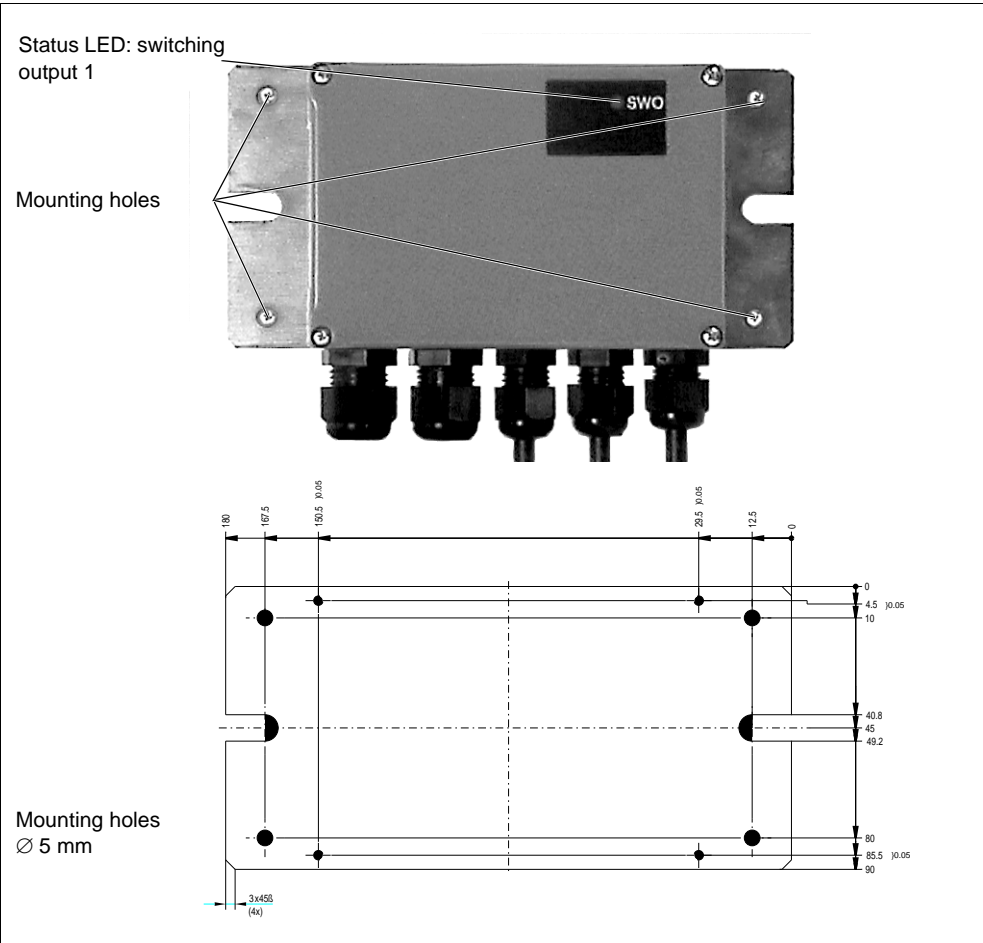


Figure 5.1: Connector unit MA 2/dimensioned drawing

5.1.2 Mounting accessories

The mounting unit BT 20 is available for mounting the BCL 21/22. It can be used for both rod and sheet-metal-clamp mounting.

Mounting unit BT 20

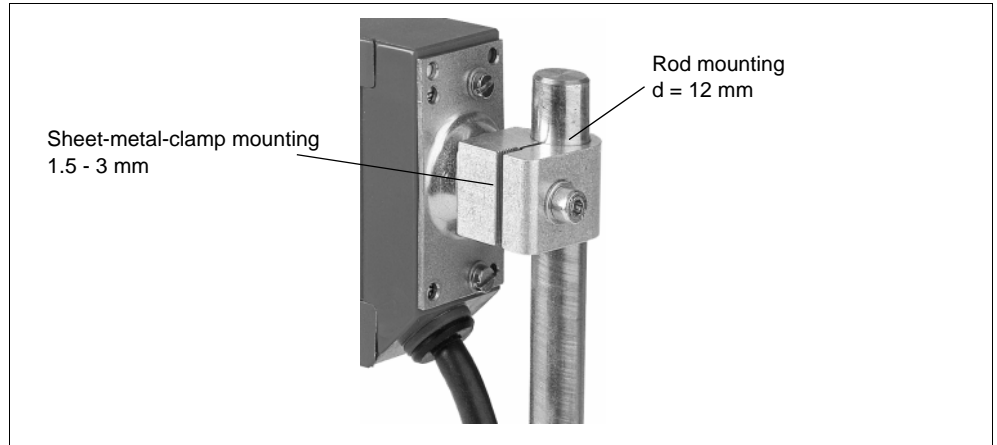


Figure 5.2: Mounting unit BT 20

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 name-plate
- accessories
- operating 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 plates, BCL-models

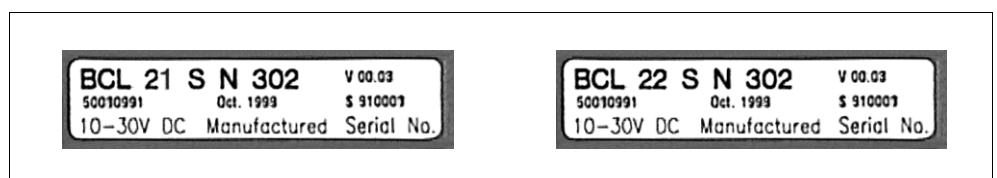


Figure 6.1: Device type plates BCL 21/22

✎ *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 21/22 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

Mounting systems are available which you can order separately from Leuze electronic. For order numbers, see Chapter 5.

The mounting system BT 20 is suitable for both bar mounting ($d = 12 \text{ mm}$) and mounting with sheet metal clamps with a sheet metal thickness of 1.5 - 3 mm. The mounting threads on the back and bottom of the device are also suitable for individual mounting of the BCL 21/22 depending on the application for which it is to be used.

Mounting example BCL 21/22

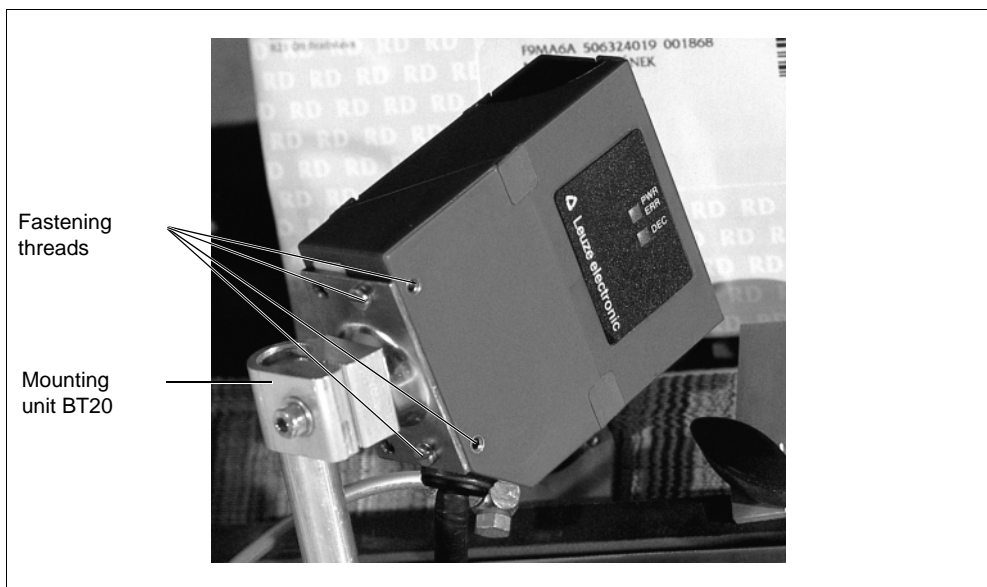


Figure 6.2: Mounting example BCL 21/22

Mounting MA2

The MA 2 can be individually mounted using the bore holes located on the mounting plate (See Fig. 5.1 "Connector unit MA 2/dimensioned drawing"). Afterwards, connect the BCL 21 to the connector unit MA 2 as described in Chapter 6.3.2.

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 21/22 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 moves past the reading window at an angle of approx. 9° - 15°*
- *the reading distance lies in the middle area of the reading field*
- *you do not use high-gloss labels.*



Notice

By changing the beam outlet, you can individually adapt the BCL 21/22 to your application. If you require both options, (perpendicular and straight outlet), you must order the BCL with perpendicular beam outlet.

The two following illustrations show possible areas of application of the BCL 21/22:

Application examples

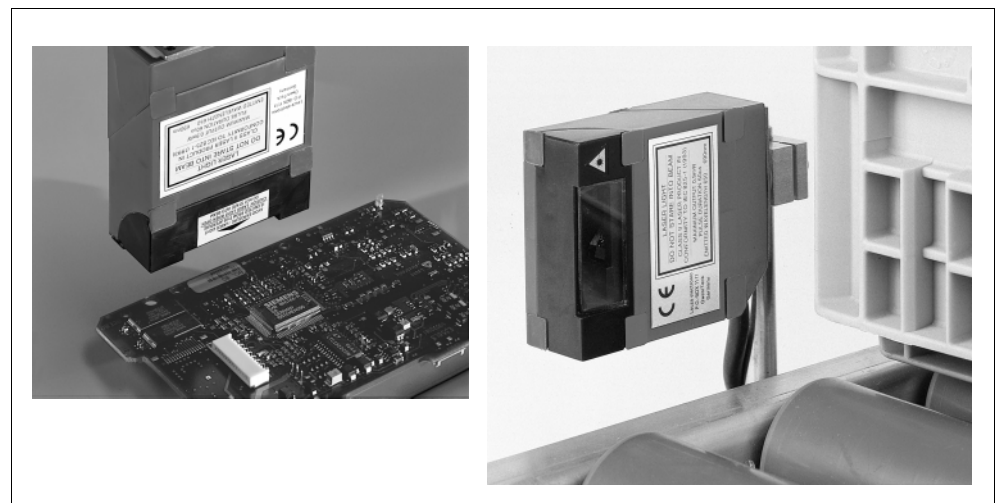


Figure 6.3: Applications with different beam outlets

When changing the beam outlet, proceed as follows:

Changing the beam outlet

- ✚ Remove the upper four fastening slides around the black reading window and carefully lift off.

A mirror which is required for the lateral beam outlet is located in the interior of the reading window.

- ✚ Remove the mirror and the retaining clamps. Store both in a suitable location and protect from damage.

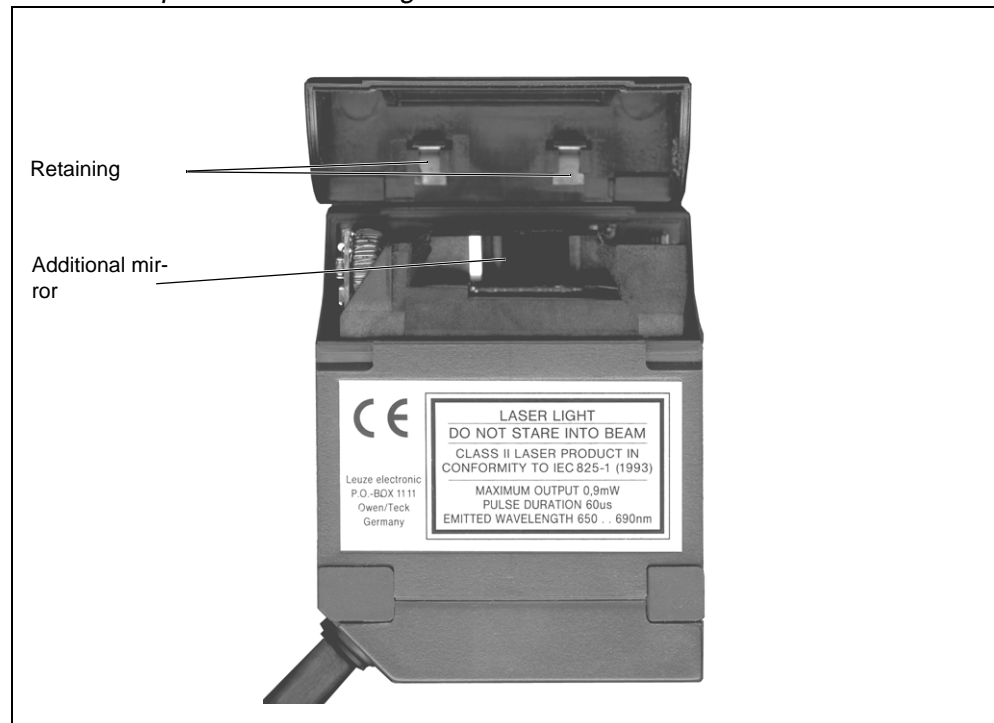


Figure 6.4: Additional mirror (lateral beam outlet)

- ✚ Now refasten the four fastening slides.



Notice

The beam outlet must be changed in an absolutely clean environment in order to protect the functionality of the scanner. Make certain that no contaminants are present at any time on the seal or in the scanner and that the seal is properly seated. In addition, never remove the other fastening slides on the BCL housing, as protection class IP 65 can thereafter no longer be ensured.

Changing the beam outlet

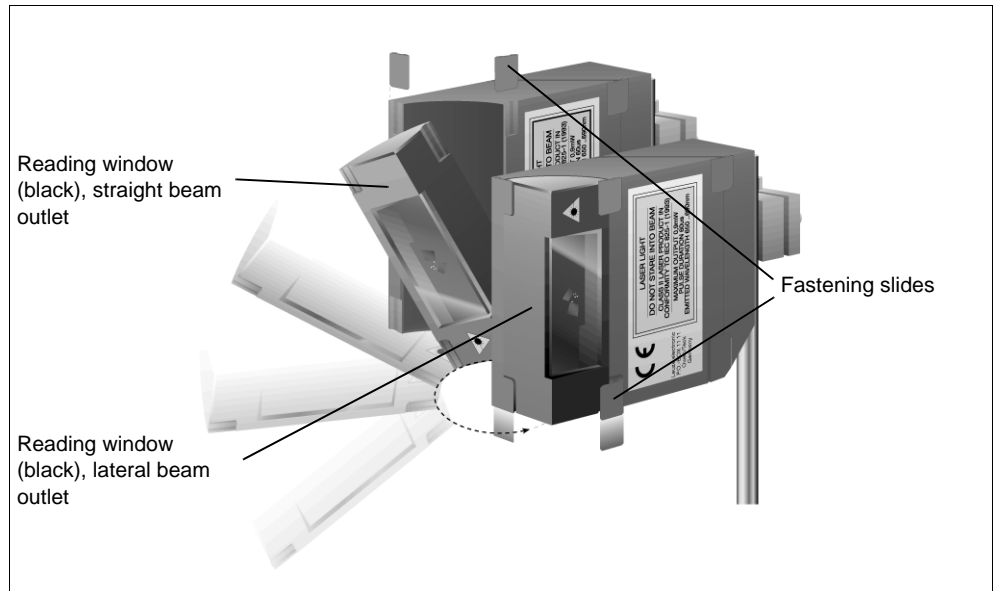


Figure 6.5: Changing the beam outlet

Mounting location

When selecting a mounting location, pay attention to

- maintaining the required environmental conditions (humidity, temperature),
- 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.

6.3 Connection



Attention

Never open the device yourself, as this may compromise protection class IP 65. When changing the beam outlet, follow the instructions in this manual exactly.

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

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

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

The power supply unit used to power the BCL 21/22 and the MA 2 must have protected electrical separation by means of a safety transformer with double insulation according to DIN VDE 0551 (equivalent IEC 742)

Be sure that the earthing conductor is connected correctly. Error-free operation is only guaranteed when the device is properly earthed.

6.3.1 Connecting BCL 22 Stand-alone (RS 232)

BCL 22 Sub D pin assignments

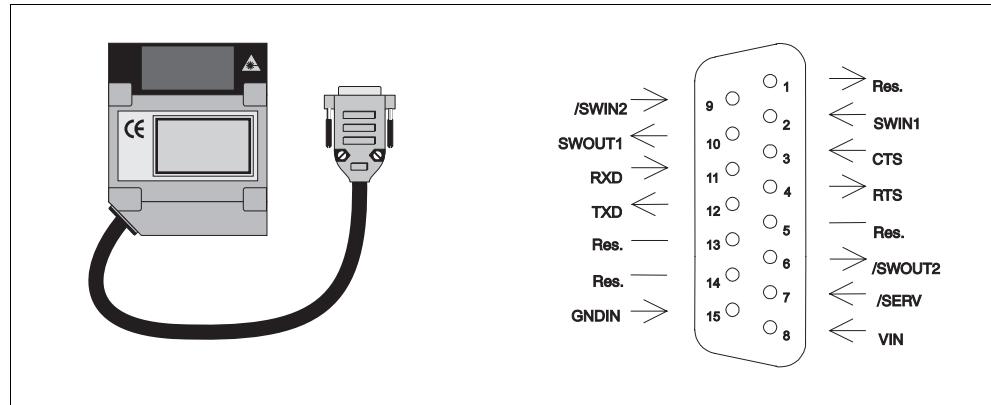


Figure 6.6: BCL 22 Sub D pin assignments

Wiring description

Pin	Res.	Reserved
Pin 1	Res.	Reserved
Pin 2	SWIN1	Switching input 1, 12 ... 30 V DC, (See Fig. 6.9 "MA 2 wiring")
Pin 3	CTS	CTS signal, host interface RS 232
Pin 4	RTS	RTS signal, host interface RS 232
Pin 5	Res.	Reserved
Pin 6	/SWOUT2	Switching output 2
Pin 7	/Serv	Bridge with pin 15: service operation
Pin 8	VIN	Supply voltage + 10 ... 30 V DC
Pin 9	/SWIN2	Switching input 2, 12 ... 30 V DC
Pin 10	/SWOUT1	Switching output 1
Pin 11	RXD	RXD signal, service interface RS 232
Pin 12	TXD	TXD signal, service interface RS 232
Pin 13	Res.	Reserved
Pin 14	Res.	Reserved
Pin 15	GNDIN	Supply voltage 0 V DC
Metal collar	PE	Cable shielding (The cable shielding of the Sub-D cable is connected to the plug housing (collar)).

Table 5: Wiring description BCL 22

Switching inputs

A read process can be triggered by applying a voltage of 12 ... 30 V DC to the switching input connections SWIN1 and SWIN2.

6.3.2 Connecting BCL 21 with MA 2 (RS 485)

The connection of the BCL 21 is considerably easier when using the MA 2 connector unit. Unlike the BCL 22, the BCL 21 has a blade connector for connecting to the MA 2 connector unit. The following figure illustrates the combination of the two devices.

BCL 21 and MA 2



Figure 6.7: BCL 21 with connector unit MA 2

Open the MA 2 housing

Loosen the four screws on the front side of the MA 2 and carefully lift off the housing cover. All components inside of the connector unit are accessible.



Notice

All electrical connections can be carried out on the terminal strip quickly and without screwing down or soldering. Wires with ferruled ends can be inserted directly into the terminal without depressing the clamping lever.

Connection locations in the MA 2

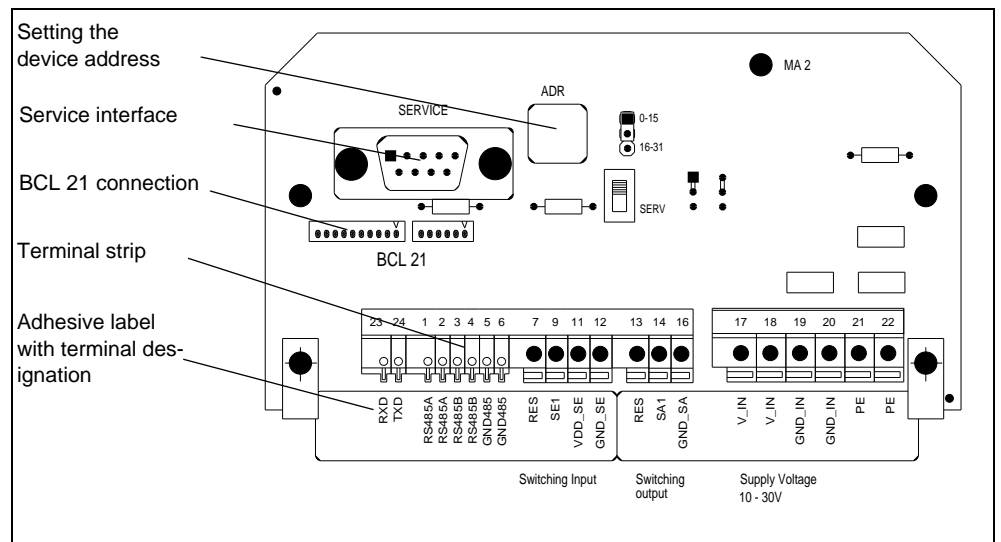


Figure 6.8: Connector unit MA 2

Wiring description

Terminals 1 through 6 and 23, 24 are assigned in the MA 2 as described below. The MA 2 is provided with double RS 485 interfaces for wiring through:

Terminal	Signal
1	RS 485A
2	RS 485A
3	RS 485B
4	RS 485B
5	GND 485

Table 6: Terminal assignment MA 2

Terminal	Signal
6	GND 485
23	RXD (Service)
24	TXD (Service)

Table 6: Terminal assignment MA 2

Voltage supply

The connector unit MA 2 is equipped with double voltage supply connections. This makes it possible to wire through or to supply voltage to additional components.

Terminal	Signal	Function
17	V_IN	Operating voltage 10 ... 30 V DC
18	V_IN	Operating voltage 10 ... 30 V DC
19	GND_IN	Operating voltage 0 V DC
20	GND_IN	Operating voltage 0 V DC
21	PE	Protective earth, grounding
22	PE	Protective earth, grounding

Table 7: Terminal assignments for switching inputs

**Switching inputs
1 and 2**

The connector unit MA 2 is equipped with two switching inputs: SE 1 and SE 2.

- Input voltage: 12 ... 30 V DC

Terminal	Signal	Function
7	SE2	Switching input 2, 12 ... 30 V DC
9	SE1	Switching input 1, 12 ... 30 V DC
11	VDD_SE	Supply voltage, switching input, equal to V_IN device
12	GND_SE	Supply voltage, switching input, equal to GND_IN device

Table 8: Terminal assignments for switching inputs

**Switching outputs
1 and 2**

The MA 2 is equipped with two switching outputs (SA1 and SA2) that can be programmed for various switching functions using the "BCLConfig".

- Output voltage is equal to the operating voltage
- Output current: $I_{\max} = 100 \text{ mA}$

The switching voltage for the output is produced by the operating voltage V_IN:

- VDD_SA = VDD_IN
- GND_SA = GND_IN

Terminal	Signal	Function
13	SA2	Switching output 2
14	SA1	Switching output 1
16	GND_SA	External supply voltage switching output 0 V DC

Table 9: Terminal assignments for switching outputs

Wiring MA 2

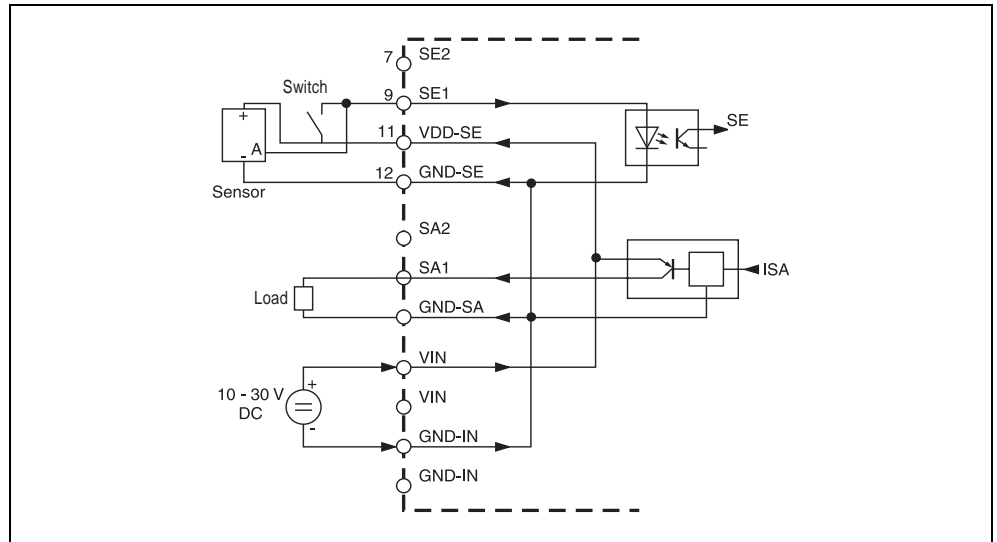


Figure 6.9: MA 2 wiring

6.3.3 Wire lengths and shielding

The following maximum lengths for wires and the type of shielding to be used must be observed:

Connection	Interface	Max wire lengths	Shielding
BCL 21/22 - Service	RS 232	10 m	absolutely required, shield meshing
BCL 21/MA 2 - Host	RS 485	1200 m	absolutely required, flexible leads as twisted pairs
Switching inputs 1+2		10 m	not necessary
Switching outputs 1+2		10 m	not necessary

Table 10: Wire Lengths and Shielding

6.4 Disassembling, Packing, Disposing

Repacking Package the device for later use so that it is protected against collision and humidity. 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

7.1 Measures to be performed prior to the first commissioning

- ⚡ Before commissioning, familiarise yourself with the operation and configuration of the device(s)!
- ⚡ Before switching on, recheck all connections and ensure that they have been properly made.

Control elements in the MA 2

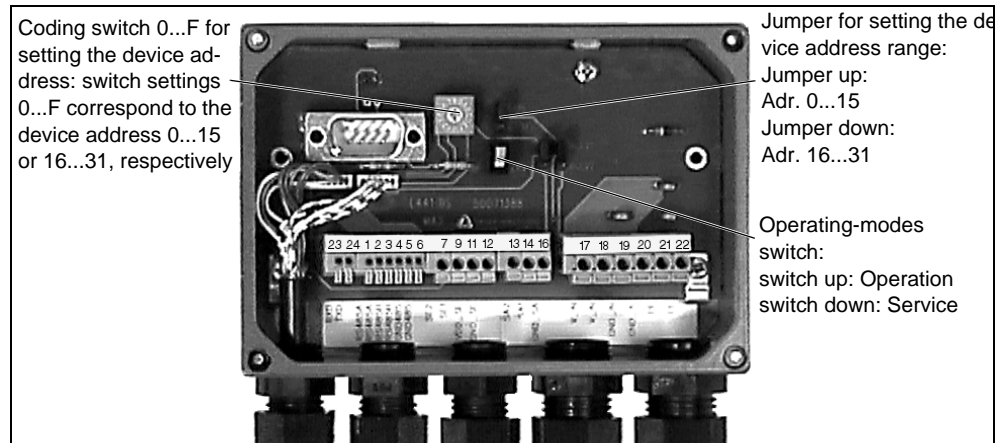


Figure 7.1: Control elements in the MA 2

Setting the device address

The device address is set in the MA 2 using a rotary code switch. The setting is made as described below:

- ⚡ Set the device address to
 - 0, if the combined BCL 21/MA 2 unit will not be operated in a network,
 - 1...31, if several BCL 21/MA 2 units will be operated in a network. Each multiNet plus network device must have a different device address assigned to it. If the MA 2 is connected to the multiNet Master, the combined BCL 21/MA 2 automatically become a multiNet plus slave device.



Notice

The BCL 21 detects from the hardware address that it should function as part of a network. With the BCL 21/22, it is possible to perform a reset using the software and the online commands. In addition, it is possible to perform a reset by switching off the supply voltage. The parameters are not lost as a result of the reset. For information on the reset commands, see Chapter 9. The LED remains dark during a reset; the green LED illuminates when the device is ready for operation.

7.2 Function test

"Power On" test

After connecting the operating voltage, the devices carry out an automatic "Power On" function test. The LED on the front side of the MA 2 illuminates. With factory default settings, the green LED flashes. In the additional service mode, the orange LED illuminates.

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. For order numbers, see Chapter 5.

"Online" commands Using the "Online" commands, the 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 parameters

In the device combination BCL 21/MA 2, two different parameter sets are managed:

- parameter set with factory default settings
- current parameter set

Before a parameter set is loaded into the BCL 21 processor memory, the validity of the parameter set is checked using checksums.

Parameter set with factory default settings This parameter set contains the default settings made ex works for all BCL 21 parameters. It is permanently stored in the ROM of the BCL 21. The parameter set with the default settings is loaded into the memory of the BCL 21

- 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 22 is in operation, the parameter set is stored in the EEPROM of the BCL. The current set can be stored:

- by copying a valid parameter set from the host computer
- by means of an off-line setup with the PC setup program BCLConfig

The current parameter set is loaded into the memory of the BCL 21/22

- each time the supply voltage is connected
- following a software reset

7.3.1 Service Operating Mode

Setting the required parameters is carried out easiest in the 'service' operating mode.

Service interface By switching the operating-modes switch in the MA 2 from "Operation" (switch up) to "Service" (switch down), the connection to the host computer is interrupted and the RS 232 interface activated. With the BCL 22, the interface is activated by means of a bridge between PINs 7 and 15 on the 15-channel Sub-D plug.

The MA 2 connector unit offers a service interface for commissioning the read stations in a network. It can be accessed when the housing cover is removed and has a 9-channel Sub-D plug (See Fig. 7.1 "Control elements in the MA 2").

Connection A PC or terminal can be connected to the MA 2 via the RS 232/V.24 serial interface and used to set the parameters of the BCL 21. The connection is made using a crossed RS 232 connection cable that establishes the Rx/D, Tx/D and GND connections. A hardware handshake via RTC, CTS is not supported at the service interface.

Service operating mode

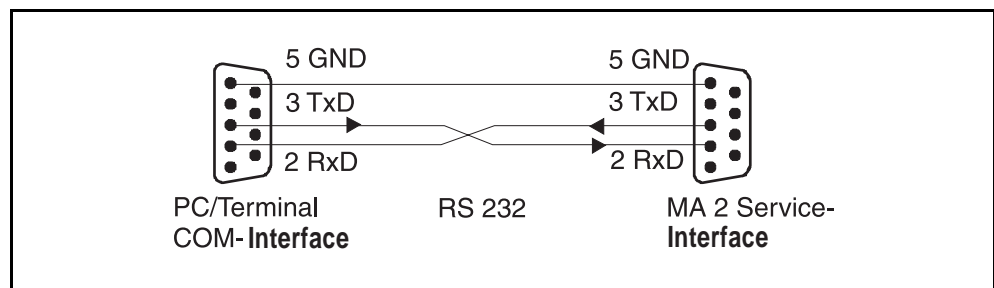


Figure 7.2: Connecting the MA 2 service interface to a PC or terminal



Notice

The service interface has a fixed transmission protocol with the following parameters:

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

8 Operation

8.1 Display elements

An LED labeled "SWO" is located on the MA 2 that indicates the status of switching output 1. The BCL 21/22 is provided with three LEDs which indicate various states. For exact information on the status displays, please refer to Chapter 4.2.

8.2 Handling errors

Errors are visibly indicated on the BCL 21/22 via the ERR LED. Further error, warning and status messages are transferred via the host interface.

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 re-initialised.

Troubleshooting Isolated warnings can be ignored, since the BCL 21/22 will continue to function properly.

Following a serious error, you should re-initialise the BCL. It will then usually again function properly. If a hardware problem is present, the BCL 21/22 will not re-initialise.

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", via commands at the serial interface or using the easy-to-use "BCLConfig" control software.

9.1 Installing the BCLConfig" software

✎ Insert the installation diskette into your disk drive.

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

The following window appears:

Installation window



Figure 9.1: Installation window

✎ As necessary, confirm the following license agreement, then select an installation directory 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.

9.2 Overview of Commands and Parameters

Online commands can be used to send commands directly to the device for control and configuration.

In order to use this feature, the BCL 21/MA 2 or BCL 22 must be connected to a host or service computer via the serial interface. The commands can be sent either via the host or the service interface.

For information on the transmission protocol, please see Chapter 7.3.1.

With the commands, you can

Control/decode

- online commands.
- Read/write/copy parameters.
- Carry out an automatic configuration.
- Call up error messages.
- Call up statistical device information.
- Carry out a software reset in order to re-initialise 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 21/22 and any requested data returned. With commands that are not acknowledged, the results of carrying out the command can be observed or checked directly at the device.

9.2.1 General 'online' commands

Software version number

Command	'V'
Description	Requests device version information
Parameter	no
Acknowledgement	'BCL 2x V 01.00 08.01.1999' The device type of the scanner is given in the first line, followed by the device version number and version date. (The data which are actually displayed may vary from the values given here.)



Notice

Using this command, you can check whether the connected host or service computer is properly connected and configured. If no acknowledgments are received, then the interface connections, protocol and service switch must be checked.

Software reset

Command	'H'
Description	Carries out a software reset. The device is restarted and reinitialized, leaving it in the same state as when the supply voltage is switched on.
Parameter	no
Acknowledgement	'S' (Start character)

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 detected code '-' 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 characters in the read code zzzzzz Contents of the decoded label. ↑ appears if the label was not correctly read.

**Manual definition of the
reference code**

Command	'RS'
Description	This command can be used to define a new reference code in the BCL 2x 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 through 9 and stored in the working buffer for direct further processing.
Parameter	'RSyvxzzzzzz' y , v , x and z are placeholders (variables) for the actual input. y : def. reference code no. '1' (code 1) '2' (code 2) ... '9' (code 9) v memory location for reference code: '0' RAM+EEPROM, '3' RAM only xx def. code type (see Command 'CA') z def. code information (1 ... 63 characters)
Acknowledgement	'RSx' x : Status '0' valid 'Rx'-command '1' invalid command '2' insufficient memory for reference code '3' reference code was not 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 ... '9' defines reference code 9 '+' activates the definition of reference code 1 up to the value of parameter no_of_labels '-' ends the teach-in process
Acknowledgement	The BCL 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) ... '9' (code 9) v : memory location for reference code '0' RAM+EEPROM, '3' RAM only xx def. code type (see Command 'CA') z def. code information (1 ... 63 characters)


Notice

With this function, only code types are recognized that are identified using the 'autoConfig' function or which were set in the setup.

⚠ After each reading via an 'RTx' 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 'RTx' command.

Reading a reference code

Command	'RR'
Description	The command reads out the reference code defined in the BCL. If no parameters are specified, all defined codes are output.
Parameter	<Referenzcodenummer> '1' ... '9' value range of reference codes 1 to 9
Acknowledgement	If no reference codes are defined, the BCL 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) ... '9' (code 9) v: memory location for reference code '0' RAM+EEPROM, '3' RAM only xx def. code type (see Command 'CA') z def. code information (1 ... 63 characters)

9.2.2 'Online' commands for system control

Activate sensor input 1

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

Deactivate sensor input 1

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

Activate sensor input 2

Command	','
Description	The command activates the definition of reference code 1.
Parameter	no
Acknowledgement	no

Deactivate sensor input 2

Command	','
Description	The command deactivates the definition of reference code 1.
Parameter	no
Acknowledgement	no

Activate switching output

Command	'OA'
Description	The command activates a selected switching output.
Parameter	'OA x ': activate switching output x : switching output no. '1' (output 1) '2' (output 2)
Acknowledgement	no

Deactivate switching output

Command	'OD'
Description	The command deactivates a selected switching output.
Parameter	'OD x ': deactivate switching output x : switching output no.: '1' (output 1) '2' (output 2)
Acknowledgement	no

9.2.3 'Online' commands for system testing

Diagnose laser

Command	'DL'
Description	The command controls or tests the laser diode.
Parameter	'+' switches on the laser diode '-' switches off the laser diode 'C' delivers the laser current
Acknowledgement	No acknowledgment occurs for parameters '+' and '-'. For parameter 'C': 'DLC xxx ' xxx is the laser current in mA.

Diagnose motor

Command	'DM'
Description	The command requests the operational data of the motor. In addition, the motor can be switched on and off
Parameter	'S' Request rotary frequency of the motor. (Message from host) 'C $xxxxx$ ' Transmission of the motor rotary frequency as a decimal number with 5 digits. (Message to host)
Acknowledgement	'S $xxxxx$ '
Description	$xxxxx$ is the current rotary frequency of the motor in revolutions/minute. In case of malfunction, the BCL responds with the command 'DS' and the corresponding status. (see Command 'DS')

*Status message for
diagnosis commands*

Command	'DS'
Description	The command serves as an acknowledgement message to the host. The command contains as a two-digit decimal number an acknowledgement status which provides information about the processing of the requested diagnosis function.
Parameter	'0' valid processing '1' invalid diagnosis message '2' message too long '3' invalid message parameter of the laser-diagnosis command '4' invalid laser diagnosis message length '5' invalid message parameter of the motor-diagnosis command '6' invalid motor-diagnosis message length

9.2.4 'Online' command for querying error messages

*Query memory error
messages*

Command	'ER'
Description	The command queries the buffer memory of the error messages.
Parameter	no
Acknowledgement	1st line: new: cc 2nd through 11th lines: '- 00.000' if no error present 'F tt.fff' if a fatal error is present 'E tt.fff' if an error is present 'C tt.fff' if a critical warning is present 'W tt.fff' if a warning is present
Description	cc : number of (new) errors in the error buffer tt : task/ function number fff : error number Upon output, the counter for the number of errors in the error buffer is deleted, but not the buffer itself!



Notice

If an error occurs, note the error number and contact your local Leuze service organization. The addresses can be found on the back page of this operating manual.

9.2.5 'Online' commands for parameter-set operations

Definitions

- **<BCC type>** type of the checksum calculation.
 '0': no checksum
 '3': XOR checksum (mode 3)
- **<PS type>** parameter-set type
 '0': current parameter set (data stored non-volatily in EEPROM)
 '1': reserved
 '2': standard parameter set (cannot be changed)
 '3': operating values (data in RAM; are lost following a 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 parameters within the parameter set
 valid values from '000' to '893'
- **<Para0L> <Para0H>... <Para122L> <Para122H>:**
 Parameter-set data of the message. The sequence of the data is arranged identically to the BCL, 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 nipples - 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 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-set type

Copy parameter set

Command	'PC'
Description	The command copies complete parameter sets.
Parameter	<p>'03' copy parameters from EEPROM into RAM and initialise all associated functions</p> <p>'20' copy standard parameters from FLASH into EEPROM and RAM and initialise all associated functions</p> <p>'30' copy parameters from RAM into EEPROM</p>
Acknowledgement	<p>'PSx'</p> <p>x: Status</p> <p>'0' valid transmission</p> <p>'1' invalid message</p> <p>'2' invalid message length</p> <p>'3' invalid block-check type</p> <p>'4' invalid block-check checksum</p> <p>'5' invalid data length</p> <p>'6' invalid message data</p> <p>'7' invalid start address</p> <p>'8' invalid parameter set</p> <p>'9' invalid parameter-set type</p>

Request parameter set from the BCL

Command	'PR'
Description	The command requests parameter data from the BCL. The parameter <PS-Typ> indicates from which parameter set the data are to be transmitted.
Parameter	<BCC type> <PS type> <Start address> <Data length>
Acknowledgement	<p>'PSx'</p> <p>x: Status</p> <p>'0' valid transmission</p> <p>'1' invalid message</p> <p>'2' invalid message length</p> <p>'3' invalid block-check type</p> <p>'4' invalid block-check checksum</p> <p>'5' invalid data length</p> <p>'6' invalid message data</p> <p>'7' invalid start address</p> <p>'8' invalid parameter set</p> <p>'9' invalid parameter-set type</p>

**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-set 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-set type

10 Maintenance

10.1 General Maintenance Information

The bar code readers BCL 21/22 and the connector unit MA 2 normally should not require any maintenance by the user.

Cleaning Should it become soiled, clean the glass window of the BCL 21/22 with a soft cloth.



Notice

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

10.2 Repairs, Maintenance

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.*



Leuze electronic GmbH + Co.
Postfach 11 11, D-73277 Owen/Teck
Tel. (07021) 5730, Fax (07021) 5731 99
E-mail: info@leuze.de
http://www.leuze.de

Sales and Service

A

Ing. Franz Schmachtl KG
Postfach 362
A-4021 Linz/Donau
Tel. Int. + 43 (0) 732/7646-0
Fax Int. + 43 (0) 732/785036

Zweigbüros:
Kolpingstraße 15
A-1232 Wien
Tel. Int. + 43 (0) 1/6162180
Fax Int. + 43 (0) 1/616218099

Theodor-Körner-Straße 54
A-8010 Graz
Tel. Int. + 43 (0) 316/672185
Fax Int. + 43 (0) 316/672439

Arzlerstr. 42 b, A-6020 Innsbruck
Tel. Int. + 43 (0) 512/265060
Fax Int. + 43 (0) 512/266151

ARG

Neumann SA.
Calle 55 N° 6043 (ex Buenos Aires 945)
1653 Villa Ballester
Provincia Buenos Aires
Argentina
Tel. Int. + 54 (0) 1/767-2388
Fax Int. + 54 (0) 1/764-2026

AUS

Leuze Australasia Pty. Ltd.
48 Skarratt Street
AUS-Silverwater NSW 21 28
Sydney, Australia
Tel. Int. + 61 (0) 2/97483788
Fax Int. + 61 (0) 2/97483817
E-mail: 100241.3435@compuserve.com

B

Leuze electronic nv/sa
Steenweg Buda 50
B-1830 Machelen
Tel. Int. + 32 (0) 2/2531600
Fax Int. + 32 (0) 2/2531536
Leuze.info@leuze.be

BR

Leuze electronic Ltda.
Av. Juruá, 150-Alphaville
BR-06455-010 Barueri-S. P.
Tel. Int. + 55 (0) 11/72956134
Fax Int. + 55 (0) 11/72956177
E-mail: leuze@leuze.com.br

CH

Leuze electronic AG
Ruchstuckstrasse 25
CH-8306 Brüttisellen
Tel. Int. + 41 (0) 1/8340204
Fax Int. + 41 (0) 1/8332626

CZ + SK

Schmachtl CZ Spol. SR. O.
Videňská 185
25242 Vestec-Praha
Tel. Int. + 420 (0) 2/44 910701
Fax Int. + 420 (0) 2/44 910700
E-mail: schmachtl@mbox.vol.cz

CO

Componentes Electronicas Ltda.
P.O. Box 478, CO-Medellin
Tel. Int. + 57 (0) 4/3511049
Telex 66922
Fax Int. + 57 (0) 4/3511019

DK

Desim Elektronik APS
Tuasingevej
DK-9500 Hobro
Tel. Int. + 45/98510066
Fax Int. + 45/98512220

D

Leuze electronic GmbH + Co.
Geschäftsstelle Dresden
Niedersedlitzer Straße 60
01257 Dresden
Telefon (0351) 2809319/20
Telefax (0351) 2809321
E-mail: vgd@leuze-owen.de

Lindner electronic GmbH
Schulenburg Landstraße 128
30165 Hannover
Telefon (0511) 966057-0
Telefax (0511) 966057-57
E-mail: lindner@leuze-owen.de

W+M planttechnik
Dipl.-Ing. Wörtler GmbH + Co.
Tannenbergsstraße 62
42103 Wuppertal
Telefon (0202) 37112-0
Telefax (0202) 318495
E-mail: wmlan@rga-net.de

Leuze electronic GmbH + Co.
Geschäftsstelle Frankfurt
Moselstraße 50
63452 Hanau
Telefon (06181) 9177-0
Telefax (06181) 917715
E-mail: vgf@leuze-owen.de

Leuze electronic GmbH + Co.
Geschäftsstelle Owen
In der Braike 1
73277 Owen/Teck
Telefon (07021) 9850-910
Telefax (07021) 9850-911
E-mail: vgo@leuze-owen.de

Leuze electronic GmbH + Co.
Geschäftsstelle München
Ehrenbreitsteiner Straße 44
80993 München
Telefon (089) 14365-200
Telefax (089) 14365-220
E-mail: vgm@leuze-owen.de

E

Leuze electronic S.A.
Gran Via de Las Cortes
Catalanes, Nr. 641, Atico 4
E-08010 Barcelona
Tel. Int. + 34 9 3/3023080
Fax Int. + 34 93/3176520
E-mail: leuze@chi.es

F

Leuze electronic sarl.
Z.I. Nord Torcy, B.P. 62-BAT 4
F-77202 Marne la Vallée Cedex 1
Tel. Int. + 33 (0) 1/60051220
Fax Int. + 33 (0) 1/60050365
E-mail: leuze@club-internet.fr

FIN

SKS-teknikka Oy
P.O. Box 122
FIN-01721 Vantaa
Tel. Int. + 358 (0) 9/852661
Fax Int. + 358 (0) 9/8526820

GB

Leuze Mayser electronic Ltd.
Alington Road, Eynesbury,
GB-St. Neots, Cambs., PE19 2RD
Tel. Int. + 44 (0) 1480/408500
Fax Int. + 44 (0) 1480/403808

GR

U.T.E. Co ABEE
16, Mavromichali Street
GR-18538 Piraeus
Tel. Int. + 30 (0) 1/4290710,
4290685, 4290991
Fax Int. + 30 (0) 1/4290770

H

Kvalix Automatika Kft.
Postfach 83
H-1327 Budapest
Tel. Int. + 36 (0) 1/3794708
Fax Int. + 36 (0) 1/3698488
E-mail: info@kvalix.hu
http://www.kvalix.hu

HK

Electrical Systems Ltd.
14/F Tai Po Commercial Centre
152 Kwong Fuk Road
Tai Po N.T. Hongkong
Tel. Int. + 852/26566323
Fax Int. + 852/26516808

I

IVO Leuze Vogtle Malanca s.r.l.
Via Soperga 54, I-20127 Milano
Tel. Int. + 39 02/26110643
Fax Int. + 39 02/26110640
E-mail: ivoleuze@tin.it

IL

Galoz electronics Ltd.
P.O. Box 35
IL-40850 Rosh Ha'ayin
Tel. Int. + 972 (0) 3/9023456
Fax Int. + 972 (0) 3/9021990

IND

Global Tech Corp.
403, White House
1482 Sadashir Peth, Tilak Road
Pune 411030, India
Tel. Int. + 91 (0) 212/470085
Fax Int. + 91 (0) 212/470086

J

SSR Engineering Co., Ltd.
2-18-3 Shimomoguro
Meguro-Ku. Tokyo
Tel. Int. + 81 (0) 3/34936613
Fax Int. + 81 (0) 3/34904073

MAL

Ingermark (M) SDN.BHD
No. 29 Jalan KPK 1/8
Kawasan Perindustrian Kundang
MAL-48020 Rawang,
Selangor Darul Ehsan
Tel. Int. + 60 (0) 3/6042788
Fax Int. + 60 (0) 3/6042188

N

Elteco A/S
Postboks 96
N-3901 Porsgrunn
Tel. Int. + 47 (0) 35/573800
Fax Int. + 47 (0) 35/573849

NL

Leuze electronic B.V.
Postbus 1276
NL-3430 BG Nieuwegein
Tel. Int. + 31 (0) 30/6066300
Fax Int. + 31 (0) 30/6060970
E-mail: info@leuze.nl
http://www.leuze.nl

P

LA2P, Lda.
Rua Almirante Sousa Dias, Loja D
Nova Oeiras, P-2780 Oeiras
Tel. Int. + 351 (0) 1/4422608/58
Fax Int. + 351 (0) 1/4422808

PL

Rotiw Sp.z.o.o.
Ul. Roździeńskiego 188 B
PL-40203 Katowice
Tel. Int. + 48 (0) 32/596031
Fax Int. + 48 (0) 32/7572734

RCH

Imp. Tec. Vignola S.A.I.C.
Plaza Justicia, Sub El Peral 25
Casilla 93-V
RCH-Valparaiso
Tel. Int. + 56 (0) 32/257073,
256521, Telex 33 0404
Fax Int. + 56 (0) 32/258571

ROC

Great Cofue Technology Co., Ltd.
4F-8, 39, Sec. 4, Chung Hsin Road
San-Chung City
Taipei Hsien, Taiwan, R. O. C.
Tel. Int. + 886 (0) 2/29838077
Fax Int. + 886 (0) 2/29853373

ROK

Useong Electrade Co.
No 222, Jail Electron B/D
63, Changsa Dong, Chongno-Gu
Seoul, Korea
Tel. Int. + 82 (0) 2/6867314/5
Fax Int. + 82 (0) 2/6867316

RP

JMTI Industrial Corporation
No. 5, Saturn Street
Bricktown, Moonwalk
Paranaque, Metro Manila, Philippines
Tel. Int. + 63 (0) 2/8446326
Fax Int. + 63 (0) 2/8932202

RSA

Countpulse Controls (PTY.) Ltd.
P.O.Box 40393,
RSA-Cleveland 2022
Tel. Int. + 27 (0) 11/6157556-8
Fax Int. + 27 (0) 11/6157513

S

Leuze electronic AB
Headoffice
Box 4025
181 04 Lidingö
Tel. + 46 (0) 8/7315190
Fax + 46 (0) 8/7315105

SGP

Pepperl + Fuchs Pte. Ltd.
P + F Building
18, Ayer Rajah Crescent, N. 06-03
SGP-Singapore 139942
Tel. Int. + 65/7799091
Fax Int. + 65/8731637

SLO

Tipteh d.o.o.
Cesta v Gorice 40
SLO-1111 Ljubljana
Tel. Int. + 386 (0) 61/2005150
Fax Int. + 386 (0) 61/2005151

TR

Arsilan Elektronik A. S.
Lüleçihendek Cod. Nr. 47
Tophane Karaköy
TR-Istanbul
Tel. Int. + 90 (0) 2/12/2434627
Fax Int. + 90 (0) 2/12/2518385

USA + CDN + MEX

Leuze Lumiflex Inc.
300 Roundhill Drive, Unit 4
USA-Rockaway, NJ 07866
Tel. (201) 586-0100
Fax Int. (201) 586-3230
E-mail: norstat@mailhost2.planet.net

