

OPERATING INSTRUCTIONS

CLP100
Bar Code Reader



Software Versions

Device/Software/Tool	Function	Version
CLP100	Firmware	from V 1.10
CLP Setup	Configuration software	from V 1.10
CLP Setup Help	Online help (HTML)	from V 1.10

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Abbreviations used

CLP	Code Leser Parallel (Code Reader Parallel)
CCD	Charge Coupled Device
PLC	Progammable Logic Controller
HTML	Hyper Text Markup Language
LED	Light Emitting Diode

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1 Notes on this document

1.1 Function

This document provides instructions for **technical staff** on the installation and operation of the CCD bar code reader CLP100 in the following versions:

- front end or side reading window
- connection via cable with 9-pin D Sub plug or cable with open end

A summary of all device versions is given in [Table 3-2, Page 13](#).

The document contains information on

- Installation and electrical installation
- Startup and configuration
- Maintenance
- Troubleshooting
- Replacing the CLP100 bar code reader

All actions are described step-by-step.

Important The CLP100 bar code reader will all simply be called "CLP100" below.

1.2 Target audience

This document is intended for persons who are responsible for the following activities:

Tasks	Target group
Installation, electrical installation, maintenance and replacement	Qualified staff, e.g. electricians and service technicians
Startup and configuration	Qualified staff, e.g. technicians and engineers

Table 1-1: Target group of the document

1.3 Information content

This document contains all the information required for the installation, electrical installation and startup of the CLP100 with the **default setting** at the installation location.

Configuration of the CLP100 for the **application-specific reading conditions** is carried out using the CLP Setup configuration software. The CLP Setup configuration software contains an online help system to facilitate configuration. Installation and use of the software are described in the appendix.

Further information on the construction of the bar code reader as well as the bar code technology can be obtained from SICK AG, Auto Ident Division.

On the Internet at www.sick.com.

1.4 Symbols used

To gain easier access, some information in this document is emphasised as follows:

NOTICE

Notice!

Indicates a potential risk of damage or impair on the functionality of the CLP100.



WARNING

Warning notice!

A warning notice indicates real or potential danger. This should protect you against accidents.

The safety symbol next to the warning notice indicates why there is a risk of accident. e.g. due to electricity. The warning levels (CAUTION, WARNING, DANGER) indicate the seriousness of the risk.

- Carefully read and follow the warning notices.

Reference Italic script denotes a reference to further information.

Important This important note informs you about specific features.

Recommendation A "Recommendation" provides information on how to carry out an action optimally.

TIP A "TIP" explains the setting possibilities in the CLP Setup configuration software.

THIS FONT characterizes a term used in the user interface of the CLP Setup configuration software (for example, menu item, tab card).

- There is a procedure which needs to be carried out. This symbol indicates operational instructions which only contain one operational step or operational steps in warning notices which do not have to be followed in any particular order.

Operational instructions comprising several steps are denoted using consecutive numbers.

2 Safety information

This chapter deals with your safety and operator safety in the operational area.

- Read this chapter carefully **before** using the CLP100.

2.1 Authorized users

The CLP100 must be installed and operated by qualified personnel in order to ensure that it functions correctly and safely.

NOTICE

Repairs to the CLP100 should only be carried out by qualified and authorised SICK AG service staff.

The following qualifications are required for the various activities:

Tasks	Qualifications
Installation, maintenance	<ul style="list-style-type: none"> - General technical training - Knowledge of the standard guidelines relating to safety in the workplace
Electrical installation, replacement	<ul style="list-style-type: none"> - Practical electrical training - Knowledge of the common electrical safety guidelines - Knowledge regarding the operation of the devices in the relevant application (for example, packaging machines, clinical automatic analyzer, access control)
Startup, configuration	<ul style="list-style-type: none"> - Basis knowledge of the Windows™ operating system - Basis knowledge of working with an HTML browser (e.g. Internet Explorer™) for using the online help - Basic knowledge of data transfer - Basic knowledge of bar code technology
Operation of the devices in each operational area	<ul style="list-style-type: none"> - Knowledge regarding the operation and handling of the devices in the relevant application (for example, packaging machines, clinical automatic analyzer, access control) - Knowledge of the hardware and software environment of the relevant application

Table 2-1: Required qualifications for starting up the CLP100

2.2 Intended use

The CLP100 is used for the automatic detection and decoding of bar codes. It is installed as a reading station and reads, for example, bar codes on objects of a clinical automatic analyser. The CLP100 transmits the decoded bar code information via its host interface to a host computer for further processing.

NOTICE

Claims under the warranty rendered void!

Any warranty claims against SICK AG shall be deemed invalid in the case changes to the CLP100, such as opening the housing, this includes modifications during installation and electrical installation or changes to the SICK software.

- Only operated the CLP100 in the permitted ambient air temperature range (see [Chapter 9 Technical data, Page 43](#)).

2.3 General safety instructions

- Read the general safety instructions thoroughly and observe them strictly at all activities at the bar code reader. This also applies to the warnings before the handling instructions in the individual chapters of this document.

2.3.1 LED illumination



CAUTION

LED radiation!

The illumination of the CLP100 operates with LEDs of LED class 1. Under normal and sensible conditions, the accessible radiation of the LEDs is not hazardous.

The entire area of the reading window acts as a LED outlet aperture.

Caution – use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

- Never look directly into the illumination.
- Do not open the housing.
(Opening the housing does not deactivate the LEDs by the reading pulse.)
- Always observe the latest valid version of laser protection regulations.

Important The illumination LEDs operate at a wavelength of $\lambda = 630 \text{ nm}$ (visible red light). The product is classified in LED class 1 in accordance with EN/IEC 60825-1. Maintenance is not required to ensure compliance with LED class 1.

2.3.2 Electrical installation

NOTICE

- Electrical installation should only be carried out by qualified staff.
- Connect or disconnect current linkages only under de-energised conditions.
- Wire cross sections and their correct protection have to be selected and implemented according to valid engineering standards.
- Observe the current safety regulations when working on electrical systems.

2.4 Quick- Stop and Quick-Restart

The CLP100 can be switched on or off using the user's main switch.

2.4.1 Switching off the CLP100

- Switch off the supply voltage or remove the 9-pin D Sub plug.

At the most the last read result is lost.

2.4.2 Switching on the CLP100 again

- Switch on the supply voltage or reconnect the 9-pin D Sub plug.

The CLP100 resumes operation with the last parameter set saved.

2.5 Environmental information

The CLP100 is designed so that it harms the environment as little as possible. It does not contain or emit any substances harmful to the environment and is not a source of faults for, for example, coating wetting in paint shops.

The maximum power consumption of the CLP100 amounts to 2 W.

2.5.1 Disposal after final removal from service

At present SICK AG does not take back devices which have become unusable or irreparable.

- Dispose of unusable or irreparable devices in accordance with the respective state regulations on waste disposal in a manner compatible with the environment.

The CLP100 design allows it to be separated into recyclable secondary raw materials (housing) and hazardous waste (electronic scrap). See [Chapter 7.4, Page 39](#).

3 Product description

This chapter describes the design, the features and the functions of the CLP100.

- For installation, electrical installation and startup assistance as well as for the application-specific configuration of the CLP100 using the CLP Setup configuration software, please read this chapter **prior** to carrying out any of the tasks.

3.1 Design

The CLP100 consists of an optical system with CCD line and an electronic unit with integrated decoder. All components are located in an industry-compatible housing (enclosure rating IP 40). The light exits and enters via a reading window in the housing.

For an adaptation to on-site space conditions two housings are available: a housing with front reading window and a housing with side reading window. Via the integrated angle attachment, the reflected light enters through the side reading window at an angle of 90°, referred to the centre-line of the housing.

Two LEDs on the rear of the CLP100 indicate the status depending on the operating mode.

Depending on the type, the CLP100 is electrically connected by a shielded cable with a D-Sub plug or with an open end.

3.1.1 View of device

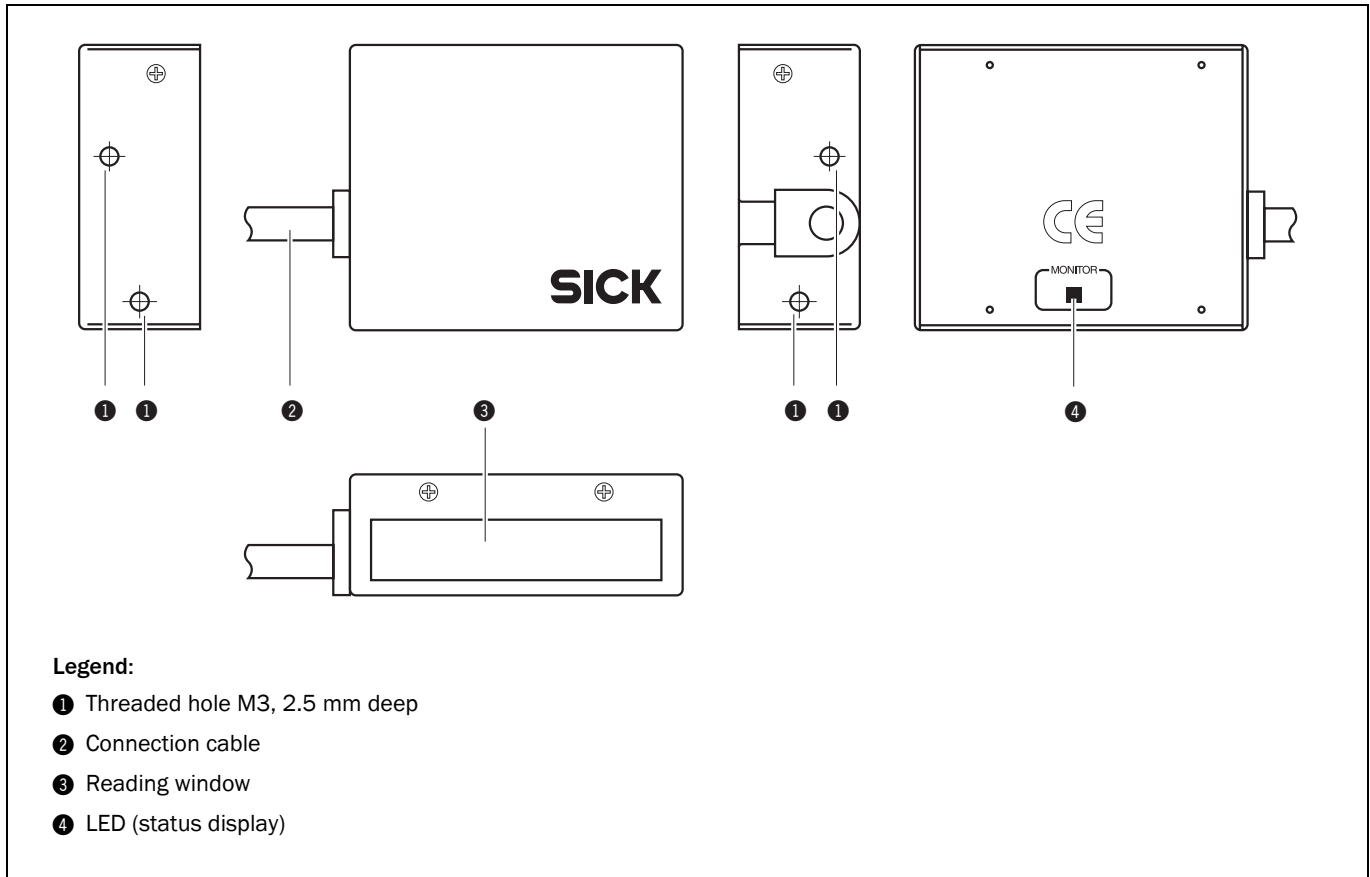


Fig. 3-1: Design of the CLP100 with front end reading window

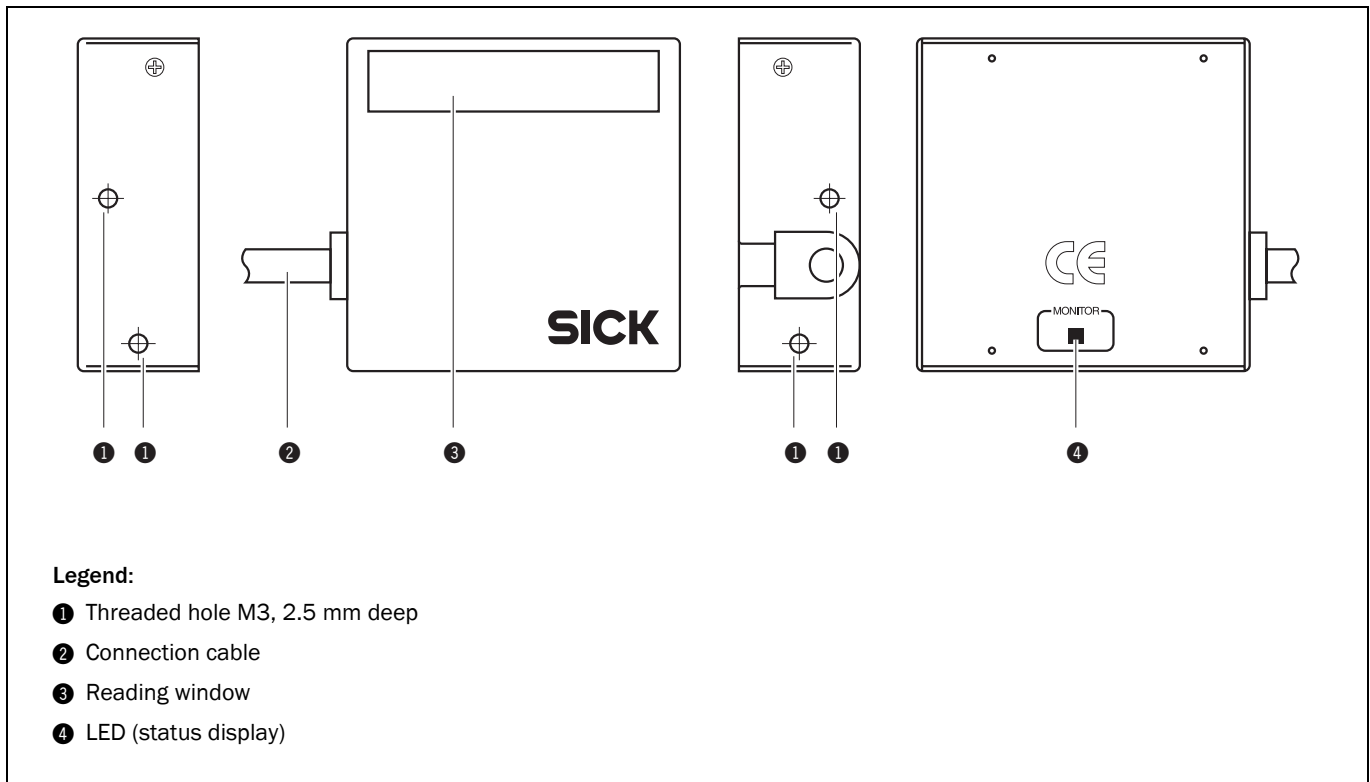


Fig. 3-2: Design of the CLP100 with side reading window

3.1.2 Scope of delivery

Delivery of the CLP100 includes the following components:

No.	Component	Comment
1	CLP100 bar code reader	Type depends on version, see Table 3-2
1	Notes on device with electrical connection diagram and quick start as primary information	Included in the device packing of the CLP100
1	CD-ROM "Manuals & Software Bar Code Scanners"	Included in the device packing of the CLP100
	CLP100 Operating Instructions in printed form, in German and/or English	Optional, depending on the number of issues explicitly ordered upon purchase

Table 3-1: CLP100 delivery

3.1.3 Contents of the CD-ROM (no. 2029112)

- **CLP Setup:** Configuration software for standard PC (Windows™) with integrated online help system CLP Setup Help (HTML files)
- **CLP100 operating instructions:** PDF version in German and English as well as further publications of other SICK devices (connection modules, bar code scanners)
- **Adobe Reader:** Freely available PC software for displaying PDF files

Important All current versions of publications and programs on the CD-ROM can also be downloaded at www.sick.com.

3.1.4 Variants

At present the CLP100 is available in the following variants:

Device	Order no.	Reading window	Connection
CLP100-0010	1018331	Front	9-pin D-Sub plug
CLP100-2010	1018332	Side	9-pin D-Sub plug
CLP100-0110	1018333	Front	Open cable end
CLP100-2110	1018334	Side	Open cable end

Table 3-2: Variants of the CLP100

3.1.5 System requirements

The following are required to start-up and operate the CLP100:

- A supply power pack with a stabilised output voltage of 5 V DC \pm 5 % in accordance with IEC 60364-4-41 (functional extra-low voltage) and at least 2 W power output
- In the case of external reading pulsing via the "Sensor" switching input: A suitable sensor for signaling an object with bar code, for example, a photoelectric reflex switch
- A PC as followed:
 - Min. 80486, 66 MHz, 16 MB RAM, CD drive, a serial port (COM x), mouse (recommended), colour screen (resolution min. 800 x 600 pixel)
 - Operating system Windows 95™/98™, Windows NT™, Windows 2000™ or Windows XP™.
 - Free space available on the hard disk: approx. 6.5 MB
- An RS 232 data connection cable (null modem, TxD and RxD transposed)
- In order to install the CLP Setup configuration software and to use the CLP Setup Help online help system an HTML browser, for example, Internet Explorer™.

3.2 Product features and functions (overview)

Feature	Characteristic
High-performance bar code reader	<ul style="list-style-type: none"> • Optical system with CCD line and integrated LED illumination • Fixed focus • Front reading window or side reading window • Resolution 0.15 to 1.0 mm (5.9 mil to 39.5 mil), reading range (DOF) see Fig. 9-1, Page 44 • Scanning/decoding frequency 500 Hz
Safety and user-friendly features	<ul style="list-style-type: none"> • Robust, compact metal housing, CE certification • LED class 1 • Automatic self-test on startup • Low power consumption
Easy configuration	<ul style="list-style-type: none"> • Configuration (online/offline) via CLP Setup configuration software with integrated help system • Configuration alternatively with simple command strings, also for use with special devices • Two status LEDs
Operating modes	<ul style="list-style-type: none"> • Reading mode • Diagnostic mode • Adjusting mode • Online test mode
Reading pulse	<ul style="list-style-type: none"> • External reading pulse, via switching input(s) or serial data interface (command)
Bar code evaluation	<ul style="list-style-type: none"> • All standard bar code types • Max. 10 codes per reading pulse • Code length max. 32 digits (depends on number of codes per reading pulse) • Code comparison (one matchcode)
Data communication	<ul style="list-style-type: none"> • Host interface: variable output format for reading result • Auxiliary interface (auxiliary data interface): same output format as on host interface
Electrical interfaces	<ul style="list-style-type: none"> • Host interface (RS 232), variable data transfer rate and protocol • Auxiliary interface (RS 232 TTL), same data transfer rate and protocol as on host interface • One digital switching input for external reading pulse • One digital switching output for signaling the reading status
Connection technology (design)	<ul style="list-style-type: none"> • Data and switching interfaces as well as power supply: <ul style="list-style-type: none"> - Cable with 9-pin D Sub plug or - Cable with open end

Table 3-3: Overview of the product features and functions

3.3 Working method of the device

The CCD bar code reader CLP100 detects bar codes in an illuminated scan field (scan line) and decodes the bar codes. The CLP100 transmits this data via the serial host interface to a host/PC for further processing. Refer to [Fig. 3-3](#) for an overview of the functionality of the CLP100.

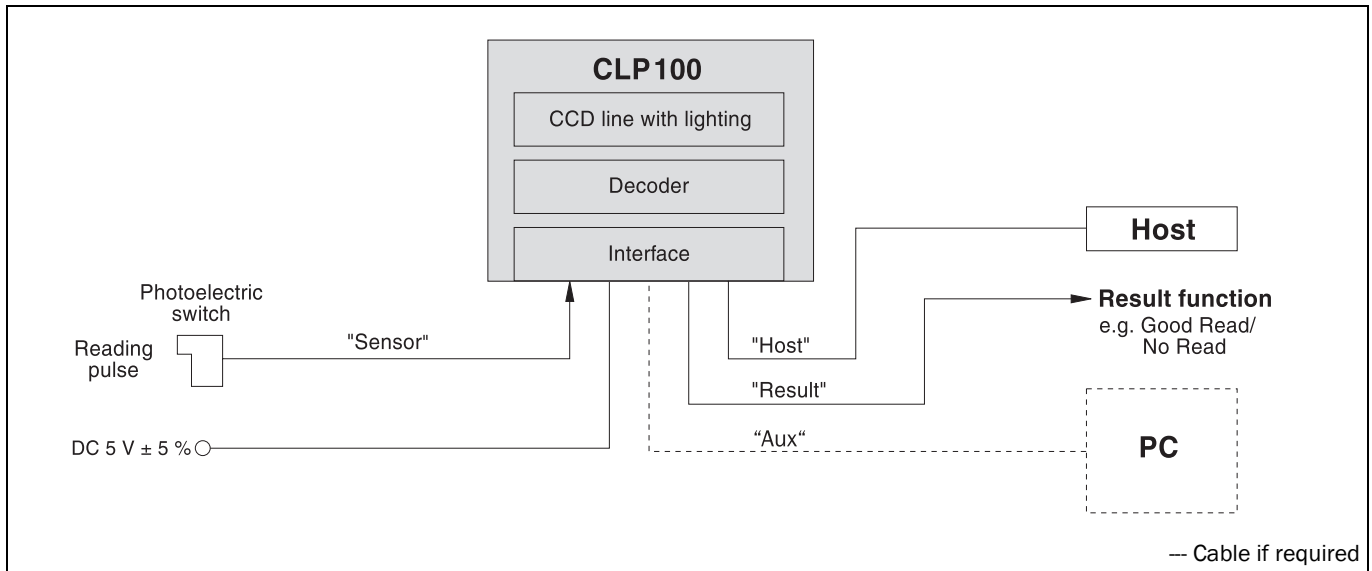


Fig. 3-3: Function of the CLP100

The CLP100 derives useful data for diagnostics from the reading processes. The quality of the reading data can be checked in the diagnosis mode.

The CLP100 requires suitable pulsing (triggering) in order to start a reading process when there is an object in the reading area. This results in a time window for the reading process being opened in the CLP100. Triggering is carried out either with an external sensor or with a command string via the host interface. Both options are active in the default setting.

The switching input ("Sensor" input) informs the CLP100 when it must start a reading process. The switching output ("Result" output) can have result functions assigned to them and triggers external devices such as, for example, a PLC input.

3.4 Display and operating elements

The CLP100 is operated or configured via the host interface by using the CLP Setup PC software or with command strings. The CLP100 is adapted to various applications by means of parameterization. The CLP Setup software is used, for example, to carry out the following settings:

- Configuration of the code types to be read
- Read, evaluation and output properties
- Communication parameters of the host interface
- Structure of the data output strings of the host interface
- Function of the auxiliary interface (terminal interface)

[Chapter 10.2, Page 46](#) describes the installation and handling of the CLP Setup software. The procedure for configuring the CLP100 with the software is explained in [Chapter 6.4, Page 30](#).

An LED status display ("Monitor") with two LEDs (red and green) on the rear of the CLP100 indicates the current operating state of the device. The meaning of the display for the respective operating mode is shown in [Table 3-4](#). The display can be parameterized differently in some operating modes. The table lists all the possible meanings.

Operating mode	Display	Function
Start	Green/red	<ul style="list-style-type: none"> • Light up during the switching on phase if the self-test is successful • Extinguish when changing to the read standby state
Reading mode	Green/red	<ul style="list-style-type: none"> • Light up when the signal for reading is given, until the beginning of the next reading cycle
	Green	<ul style="list-style-type: none"> • Lights up after successful reading ("Good Read")
	Red	<ul style="list-style-type: none"> • Extinguishes after successful reading ("Good Read")
Adjusting mode	Green	<ul style="list-style-type: none"> • Extinguishes after unsuccessful reading ("No Read")
	Red	<ul style="list-style-type: none"> • Lights up after unsuccessful reading ("No Read")
Matchcode operation	Green/red	<ul style="list-style-type: none"> • Extinguish, when there was no signal for reading and there is no read result
	Red	<ul style="list-style-type: none"> • Lights up at "No Read" or "Read & No Match" or in accordance with the parameterization • Lights up at "No Read" or "Read & Match"
	Green	<ul style="list-style-type: none"> • Lights up at "Read & Match" or in accordance with the parameterization • Lights up at "Read & No Match"

Table 3-4: Meaning of the LEDs

4 Installation

This chapter describes the installation sequences for the CLP100.

4.1 Installation sequence

The typical installation sequences are listed below:

- Select the installation site for the CLP100
- Connect the power supply
- Align the CLP100 to the bar code
- Install the CLP100
- Adjust the CLP100
- Install the external sensor for the reading pulse

NOTICE

Claims under the warranty rendered void!

Do not open the housing of the CLP100. If the device is opened, the SICK AG warranty shall not apply.

4.2 Preparations for installation

The following general requirements should be observed for installation:

- Typical space requirement: application-specific and type-dependent (reading range, orientation of reading window)
- Unobstructed view of the objects for the CLP100
- Stable installation holder with sufficient load capacity and dimensions suited to the CLP100 (see [Chapter 9.3 Dimensional drawings, Page 45](#))
- Shock absorbent and vibration free attachment

The following tools and resources are required for installation:

- 2 screws M3 for fixing the CLP100 to the installation site, Screw length depends on the wall thickness of the base. Screws may not be screwed more than 2.5 mm (0.1 in) into the CLP100
- Tool
- Measuring tape
- Angulometer

4.2.1 Laying out the components to be installed ready

- CLP100 bar code reader

4.2.2 Threaded holes

The CLP100 is fastened by means of two threaded holes (M3) to the top or bottom of the device ([Fig. 4-1, Page 18](#)). The complete housing dimensions are shown in [Chapter 9.3 Dimensional drawings, Page 45](#).

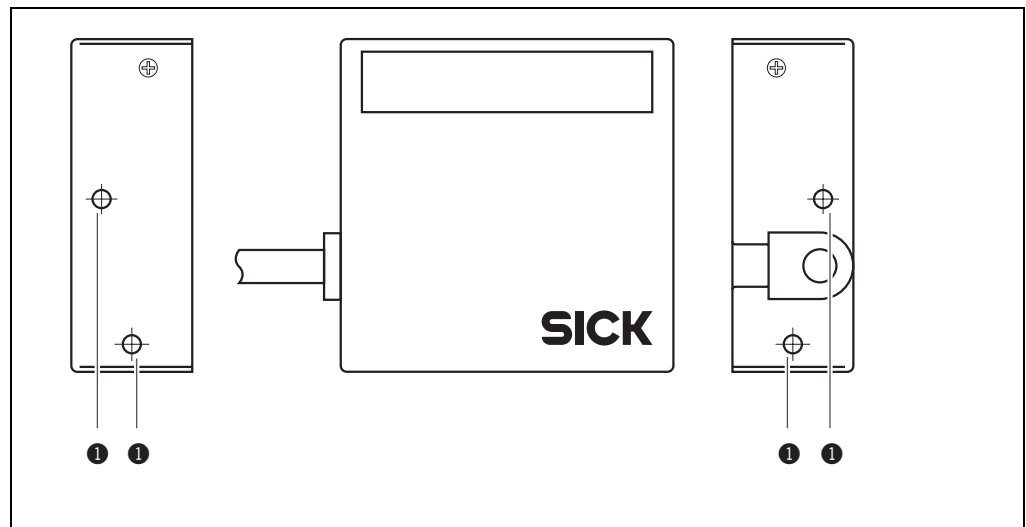


Fig. 4-1: Position of the threaded holes ① at CLP100

4.3 Installation site

The following aspects are relevant for the selection of the installation location:

- Reading distance to the code/field of view dimensions
- Angle alignment of the CLP100
- Avoiding surface reflections

When selecting the installation site take the distance between the CLP100 and the host.

4.3.1 Distance between the CLP100 and the host

The maximum distance between the CLP100 and the host when extension cables are used amounts to 12 m (39.37 ft) (host interface RS 232).

4.3.2 Distance between the CLP100 and the bar code/field of view dimensions

The distance a between the reading window of the CLP100 and the bar code must amount to 20 to 70 mm (0.79 to 2.76 in) depending on the width of the bar code (see [Fig. 4-2](#)). [Chapter 9.2 Reading field diagram, Page 44](#) shows the width of the reading area of the CLP100 in relation to the reading distance for various resolutions (module widths).

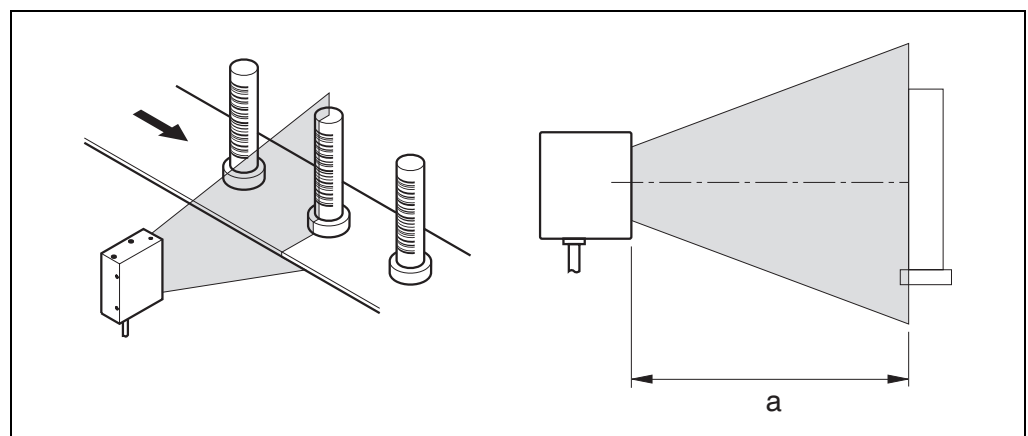


Fig. 4-2: Reading distance to the object

Angle alignment of the CLP100

The angle between the scan line and bar code is selected, so that a good reading is possible. The optimum alignment of the CLP100 is reached at an angle of 90° between the scan line and the bar code bars (see Fig. 4-3). Possible reading angles which can arise between the scan line and the bar code bars must be taken into consideration (see Fig. 4-4 and Table 4-1).

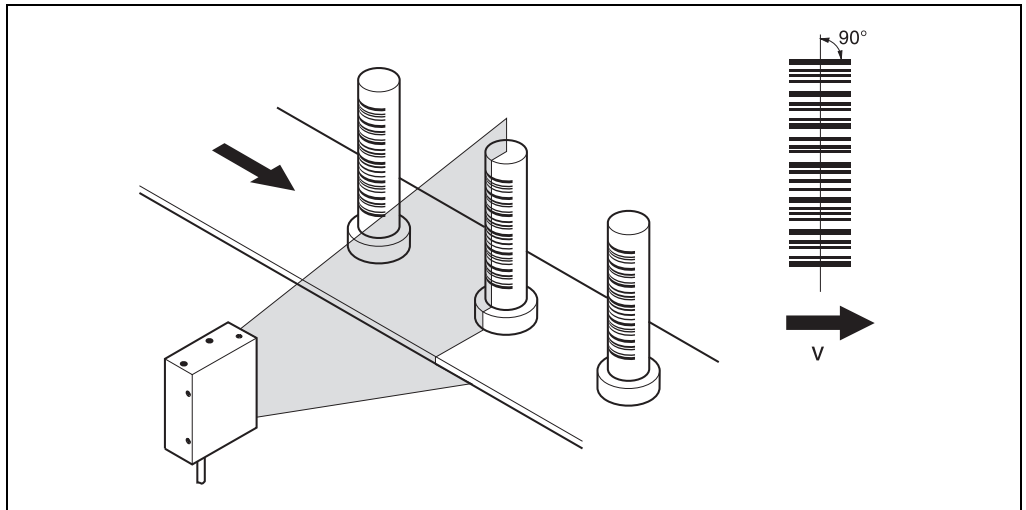


Fig. 4-3: 90° angle between the scan line and the bar code bars

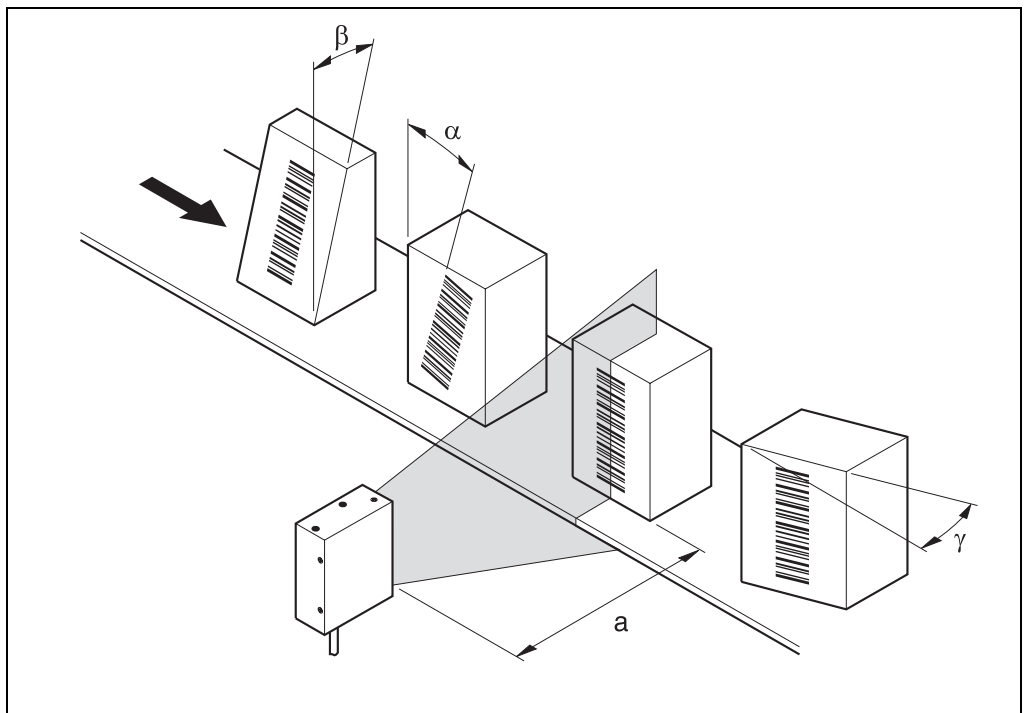


Fig. 4-4: Reading angle occurring between the scan line and the bar code bars

Angle	Limit
Tilt α	$0^\circ \pm 2^\circ$
Pitch β	$0^\circ \pm 5^\circ$
Skew γ	$10^\circ \pm 5^\circ$

Table 4-1: Permissible angle occurring between the scan line and the bar code bars

Important If the light of the scan line falls exactly vertically on the surface of the bar code, disturbing reflections can occur when the reflected light is received. In order to avoid this effect the CLP100 must be installed so that the emitted light is tilted relative to the perpendicular (see Fig. 4-5).

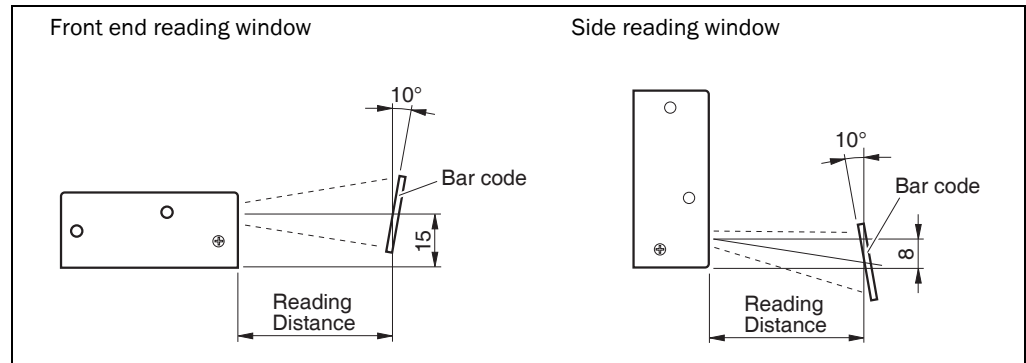


Fig. 4-5: Angle between the emitted light and the bar code (tilted to the perpendicular)

4.4 Installation and adjustment of the device

4.4.1 Installing the CLP100

1. Align the CLP100 so that the angle between the scan line and the bar code bars amounts to 90°. Take any possible reading angle occurring into consideration (see [Fig. 4-4, Page 19](#)).
2. In order to avoid disturbing reflections align the CLP100 so that the emitted light impacts on the bar code at an angle of 100° (see [Fig. 4-5, Page 20](#) and [Fig. 4-6](#)).

NOTICE

Damage to the device!

The screws may not be screwed more than 2.5 mm (0.1 in) into the CLP100. Longer screws may damage the device.

- Use screws with a suitable length.

3. Screw the screws through the base to which the CLP100 is fastened into the threaded hole.
4. Tighten the screws slightly.
5. Adjust the CLP100 as described below.

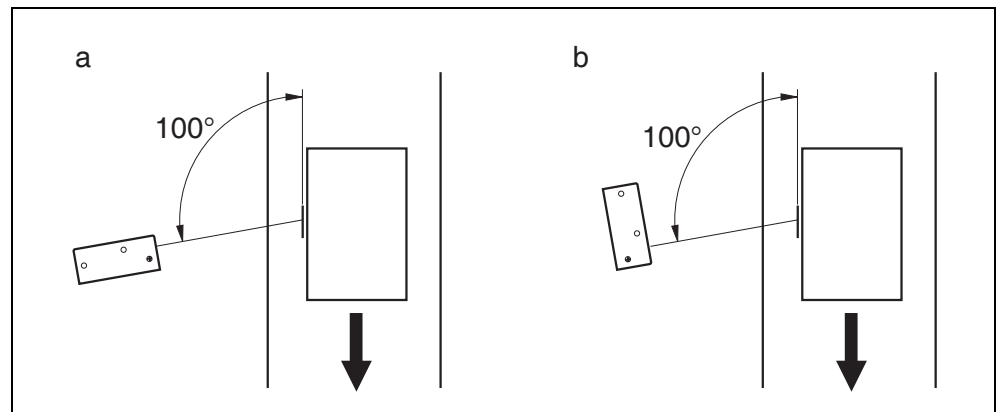


Fig. 4-6: Adjustment of the CLP100 in order to avoid reflections;
a: With front end reading window, b: With side reading window

4.4.2 Adjusting the CLP100

The adjusting operating mode supports the adjustment of the CLP100. In this operating mode the green LED extinguishes if the reading process fails ("No Read"). If the green LED does not light up, the CLP100 cannot read the bar code. If the green LED flickers, the CLP100 can only read the bar code badly. If the green LED shows steady light, the CLP100 is aligned optimally. The scanning frequency in adjusting mode amounts to 500 Hz.

1. Connect the CLP100 to the supply voltage and switch on the supply voltage.
2. Connect the CLP100 to the PC.
3. Start the CLP Setup configuration software (see [Chapter 10.2, Page 46](#)).
4. In the CLP Setup select the DEVICE CONFIGURATION tab card.
5. Click in the OPERATING MODE field and select ADJUSTING MODE.
6. Click in the LED DISPLAY field and select NO READ/GOOD READ.
7. Carry out the download to the CLP100 (see [Chapter 6.4.1, Page 31](#)).

8. Guide objects with bar codes realistically into the reading area of the CLP100. Ensure that the permitted reading angle is not exceeded.
9. Start the reading pulse: Cover the optical path of the sensor or make connection (see [Chapter 4.5, Page 22](#)).
10. Align the CLP100 so that the green LED lights up steadily as far as possible (reading result "Good Read").
11. Tighten the screws.
The CLP100 is aligned optimally to the bar code.

4.5 Installing the reading-pulse sensor

If the CLP100 is triggered via an external sensor, the sensor and a reflector have to be installed near the CLP100. [Fig. 4-7](#) shows an example of the installation site of the sensor.

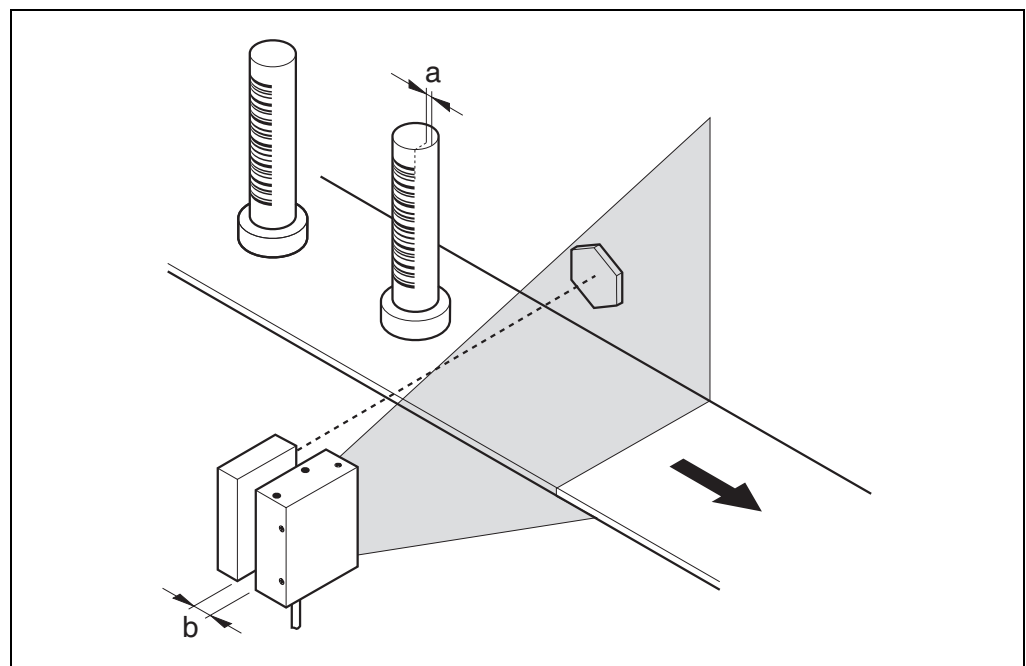


Fig. 4-7: Installation site for the reading-pulse sensor and the reflector (b smaller than a)

1. Install the reading-pulse sensor at the installation site.
2. Connect the reading-pulse sensor to the CLP100 (see [Chapter 5.4.4, Page 27](#)).
3. Call up the CLP Setup and check the read result with the terminal emulator (see [Chapter 6.4, Page 30](#)).
4. Check whether the reading process of the CLP100 is synchronized with the incoming objects.

4.6 Disassembling the device

1. Switch off the supply voltage.
2. Disconnect the cable connection.
3. Screw off the CLP100.
4. Dispose of the CLP100 ecologically friendly (see [Chapter 7.4, Page 39](#))

5 Electrical installation

5.1 Overview of installation sequences

Important Electrical installation should only be carried out by qualified staff.

The following list provides an overview of a typical installation sequence:

- Connecting the supply voltage
- Wiring the host interface (Connecting the PC)
- Wiring the "Sensor" switching input
- Wiring the "Result" switching output

Once electrical installation has been completed, the CLP100 is started up and configured (see [Chapter 6 Startup and configuration, Page 29](#)).

5.2 Planning the electrical installation

The following general requirements should be observed for the electrical installation:

- Supply voltage 5 V DC \pm 5 % (functional extra-low voltage in accordance with IEC 60364-4-41). The power supply unit must output a continuous output of 2 W and be provided by the customer using e.g. a supply power pack.
- With external reading pulsing: Suitable reading pulse sensor (start/stop), e.g. photo-electric reflex switch, for registering an object in the field of view
- Host computer with RS RS 232 data interface for further processing the reading data

The following tools and resources are required for electrical installation:

- Tool
- Digital measuring device (current/voltage measurement)

5.3 Electrical connections and cables

The electrical connection of the CLP100 is carried out either via a 9-pin D-Sub cable plug or the open cable end. The cable length is 0.9 m (2.95 ft).

5.3.1 Pin assignment of the connection plug or wire colors of the cable end

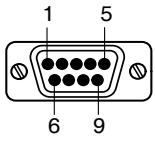
	
Pin	Signal
1	Sensor
2	RxD (Host)
3	TxD (Host)
4	Result "GO/NG"
5	GND
6	Not assigned
7	RxD (Terminal), TTL
8	TxD (Terminal), TTL
9	+5 V

Table 5-1: Pin assignment of the D Sub plug

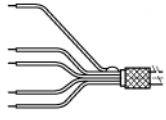
	
Wire color	Signal
Pink	Sensor
Brown	RxD (Host)
Gray	TxD (Host)
White	Result "GO/NG"
Black	GND
Yellow	RxD (Terminal), TTL
Orange	TxD (Terminal), TTL
Red	+5 V
Blue	RTS
Green	CTS

Table 5-2: Assignment of the wire colors of the open cable end

5.4 Carry out the electrical installation

NOTICE

Claims under the warranty rendered void!

Do not open the housing of the CLP100. If the device is opened, the SICK AG warranty shall not apply.

- Connect or disconnect current linkages only under de-energised conditions.
- Wire cross sections and their correct protection have to be selected and implemented according to valid engineering standards.
- For data connection use only shielded data cables (twisted pair).
- In order to avoid interferences, do not install data cable parallel to the power- supply and motor cables over long distances (for example in cable ducts).
- Lay all cables so that there is no possibility of people tripping over them and so that they are protected against damage.

5.4.1 Supply voltage

For operation the CLP100 requires a supply voltage of 5 V DC \pm 5 % in accordance with IEC 60364-4-41 (functional extra-low voltage). The functional extra-low voltage can be generated by a power supply unit using a safety transformer . The power supply unit must output a continuous output of 2 W.

Important The output circuit of the power supply unit must be electrically insulated from the input circuit. This is usually created by means of a safety transformer in accordance with IEC 742.

To ensure that the incoming supply cables are protected against short-circuits/overloads, the wire cross-sections must be dimensioned and protected in accordance with valid standards.

Connecting the supply voltage:

- Connect the supply voltage to Pin 5 and Pin 9 of the 9-pin D Sub plug (see [Table 5-1, Page 24](#)) respectively to the wires of the open cable end (see [Table 5-2, Page 24](#)).

5.4.2 Wiring the host interface (Connecting the PC)

The CLP100 is operated and configured with the CLP Setup software. For this purpose it must be connected temporarily to the PC via the host interface.

The host interface of the CLP100 is an RS 232 interface.

For the pin assignment refer to [Table 5-1, Page 24](#) or [Table 5-2, Page 24](#). [Table 5-3](#) shows the recommended maximum cable length as a function of the data transmission rate.

Interface type	Transmission rate	Max. distance to the host
RS 232	Up to 19,200 Bd	12 m (39.37 ft)

Table 5-3: Maximum cable length between the CLP100 and the host computer

When the PC is connected, the communications parameters are set as described in [Chapter 6.4.1 Transferring the parameter set between the CLP Setup and CLP100, Page 31](#).

Fig. 5-1 shows the wiring of the host interface.

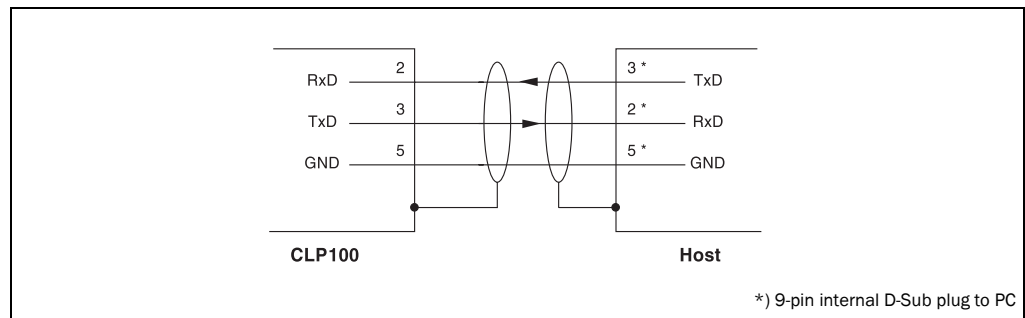


Fig. 5-1: Wiring the host interface (RS 232)

NOTICE

Damage to the interface module in the CLP100!

Electronic components can be damaged if the host interface is wired incorrectly.

- Wire the host interface correctly in accordance with Fig. 5-1.
- Check the wiring before switching on the CLP100.

- Connect the host interface of the CLP100 EMC-compatibly to the host by means of shielded cables. Observe the maximum cable lengths (see Table 5-3, Page 25).

Recommendation

- Connect the shielding at one end.
 1. Switch off the PC and the supply voltage of the CLP100.
 2. Connect the desired port "COM x" of the PC to the CLP100. To this purpose use an RS-232 data connection cable (null modem, RxD and TxD transposed).
 3. Switch on the PC and the supply voltage of the CLP100.
 4. Set the communication parameters of the PC (see Chapter 10.2.3, Page 48).

In the default setting the CLP100 communicates via the RS 232 interface with the host using the values listed in Table 5-4.

Parameter	Host interface value	Aux interface value
Data transmission rate	9,600 Bd	9,600 Bd
Data bit	8	8
Parity	None	None
Stop bit	1	1
Protocol	SICK: Sending start characters: STX Sending stop characters: ETX Repeat request: None Timeout: 50 ms	SICK: Sending start characters: STX Sending stop characters: ETX Repeat request: None Timeout: 50 ms

Table 5-4: Communication parameters of the host interface (default setting)

5.4.3 Wiring the auxiliary (terminal) interface

As an alternative the PC may be connected to the Aux interface which operates parallel to the host interface with the same communication parameter values. The Aux interface can be use e.g. to monitor the data traffic on the host interface.

Fig. 5-2 shows the wiring of the Aux interface.

Important The terminal interface is a TTL level interface.

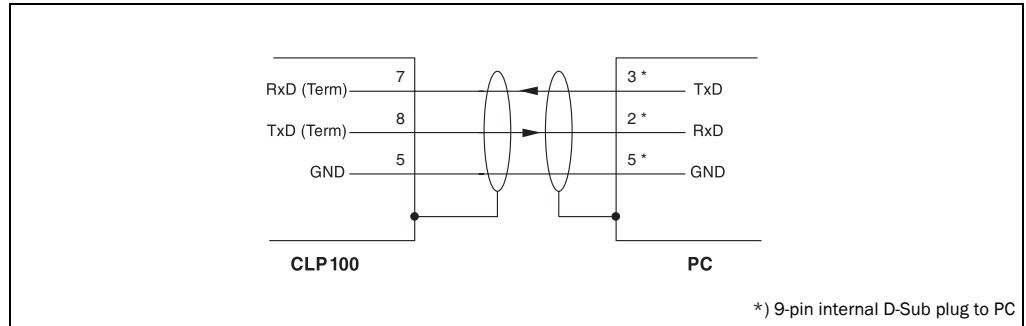


Fig. 5-2: Wiring the Aux interface (RS 232 TTL)

5.4.4 Wiring the "Sensor" switching input

If a reading process is to be triggered via an external sensor, connect the sensor to the "Sensor" switching input. This triggering type is selected as the default setting of the CLP100.

Fig. 5-3 shows the wiring of the "Sensor" switching input. Table 5-5 lists the characteristic data of this switching input.

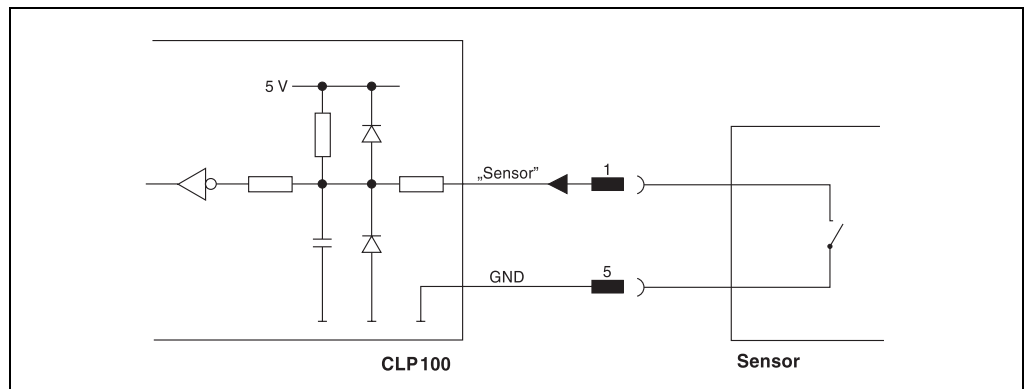


Fig. 5-3: Wiring of the "Sensor" switching input

➤ Connect the sensor as shown in Fig. 5-3.

Switching behaviour	Connecting GND to the input starts the read port of the CLP100 (low)	
Properties	Not electrically separated	
Electrical values	Low (Reading gate active): $0\text{ V} \leq V_s \leq 0.8\text{ V}$ $I \leq 1.5\text{ V } \mu\text{A}$	High (Reading gate inactive): $2.4\text{ V} \leq V_s \leq 5\text{ V}$ $I \leq 1.5\text{ V } \mu\text{A}$

Table 5-5: Characteristic data of the "Sensor" switching input

TIP The DEVICE CONFIGURATION tab card of the CLP Setup software can be used to modify the response time of the "Sensor" input (debouncing).

5.4.5 Wiring the "Result" switching output

The switching output can have various result functions assigned to it. If the corresponding event occurs during a reading process, the switching output becomes live for the selected pulse duration. Fig. 5-4 shows the wiring of the "Result" switching output. Table 5-6 lists the characteristic data of the switching output.

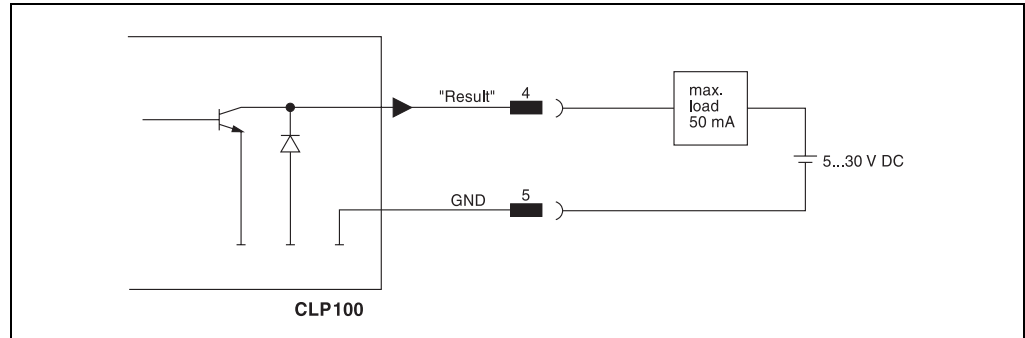


Fig. 5-4: Wiring of the "Result" switching output (NPN)

➤ Wire the switching output as described in Figure 5-4.

Switching behaviour	NPN switching against GND
Properties	Not electrically separated
Electrical values	$V_{out} = 5\text{ V} \leq V \leq 30\text{ V}$ $I_{out} = \leq 50\text{ mA}$

Table 5-6: Characteristic data of the "Result" switching output

Recommendation ➤ In order to check the switching functions wire the switching output to a load and measure the voltage with a high-voltage digital voltmeter. This avoids the display of incorrect voltage values and switching states.

TIP The DEVICE CONFIGURATION tab card of the CLP Setup software can be used to modify the function assignment, the pulse duration and the output instant of the signal.

6 Startup and configuration

Startup, adjustment, configuration and diagnosis are carried out via the CLP Setup configuration software. In normal reading operation the CLP100 operates fully automated.

6.1 Overview of the startup procedure

- Startup of the CLP100 with the default setting set by factory (Quick-Start).
- Installing the CLP Setup software ([Chapter 10.2, Page 46](#)).
- Connecting the PC to the CLP100 ([Chapter 5.4.2, Page 25](#)).
- In order for optimising the functionality of the CLP100, adjusting the CLP100 and configuring the CLP100 for the application.
- Checking correct functioning of CLP100 in automatic reading operation.

6.2 Quick-Start

1. Carry out the electrical installation in accordance with [Chapter 5, Page 23](#). A PC does not have to be connected if the CLP100 is operated with the default setting.
2. Switch on the supply voltage.
The LEDs of the CLP100 light up and are extinguished after the self-test has been completed successfully.
3. Present the bar code sample from [Fig. 6-1](#) to the CLP100 at a distance of approx. 35 mm.
4. Start the reading pulse: Cover the optical path of the sensor (close the switch).
Both LEDs on the rear light up.
5. End the reading pulse: Unmask the optical path of the sensor (open the switch).
If the reading has been successful, the red LED is extinguished, the green LED lights up.
The CLP100 is ready to operate with the default setting of our works.

The CLP100 can be switched off without the configuration data being lost, since no changes were carried out to the parameter set.



Fig. 6-1: Bar code sample (code 39, 0.35 mm (13.8 mil)), printing ratio 2:1)

The default setting shows [Table 6-1, Page 35](#).

6.3 Operating modes and output of the read result

When configuring the CLP100, it is possible to choose between the following operating modes:

- Reading mode
- Diagnostic mode
- Adjusting mode
- On-line test mode

In *reading mode* the CLP100 detects the presented bar codes and emits the read result at the end of the reading pulse parallel via the host and aux interface.

In *diagnosis mode* the quality of the bar code readings is judged. These are brought statistically into the read field of the CLP100 (no transport movement). The output is emitted via the host and aux interface. For details on the diagnosis mode refer to [Chapter 6.4.8, Page 33](#).

In *adjusting mode* the CLP100 is adjusted to the bar code (see [Chapter 4.4.2, Page 21](#)).

In the *on-line test mode* the CLP100 emits the read result only via the aux interface and not via the host interface.

When outputting the read result, it is possible to choose between the normal reading function and the code comparison function (matchcode). The matchcode function allows the comparison of the read bar codes with a code which is entered at the CLP100. It is possible to select between complete or partial matching of the codes.

6.4 Configuration

The CLP Setup configuration software or command strings optimise the CLP100 to reading conditions on site. Starting point for this is the factory default setting which can be adjusted to optimise the CLP100. The CLP Setup configuration software is used to create an application-specific parameter set which can be loaded permanently into the CLP100 and saved/archived as a configuration file (slp file) on the PC.

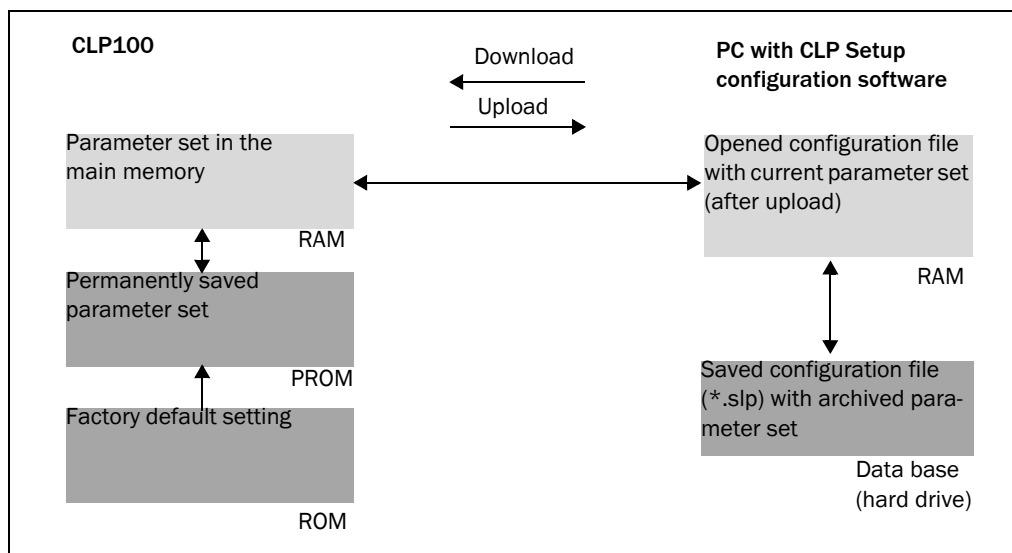


Fig. 6-2: Configuration with CLP Setup and storage of the parameter set


To this purpose a PC has to be connected and the CLP Setup has to be installed.

6.4.1 Transferring the parameter set between the CLP Setup and CLP100

In order to edit the current parameter set of the CLP100 it must first be copied from the CLP100 to the CLP Setup. This process is designated as **uploading**.

Changes to the parameter set carried out in the CLP Setup are not effective until they have been transferred to the CLP100. CLP Setup always copies the complete parameter set. Saving the parameters to the CLP100 is designated as **downloading**.


Uploading the parameter set from the CLP100

- Click on  in the CLP Setup toolbar.

CLP Setup copies the parameter set last saved in the CLP100 from the CLP100 into its database and displays its values in the tab cards.

If the CLP Setup software does not recognize the loaded parameters during uploading, a warning is emitted. Unknown parameters can be edited in the terminal emulator under observance of the conventions for command strings. These parameters are also taken into consideration when the parameter set is saved.

Downloading the parameter set to the CLP100

- Click on  in the CLP Setup toolbar.


The new parameter set is saved in the CLP100.

Saving the parameter set in the CLP Setup

1. Select the SAVE AS menu item in the FILE menu bar in order to save the modified parameter set as the new configuration file in the CLP Setup or to overwrite an existing file.
The SAVE CLP FILE dialog box is opened.
2. Enter the path and file name in the dialog box (extension of the file name: ".slp") and click on OK.
The new parameter set is saved in the CLP Setup.

6.4.2 Parameterize the CLP100 with command strings

The CLP100 can be parameterized for example by means of the terminal emulator by entering command strings. Parameters which are unknown to the CLP Setup can also be used. The command language of the CLP100 accesses the command interpreter of the device directly. [Fig. 6-3, Page 32](#) shows a view of the terminal emulator. A0 is entered as an example in the framed text field for entering commands. This input is repeated in the large output window. For a full description of the command language refer to [Table 10-4, Page 53](#).

1. Click on  in the CLP Setup toolbar.
The terminal emulator window opens.
2. Enter the command in the framed text field and press the Return key.
The command is transmitted to the CLP100.

Important The CLP100 does not transmit an answer, but reacts immediately to the command.

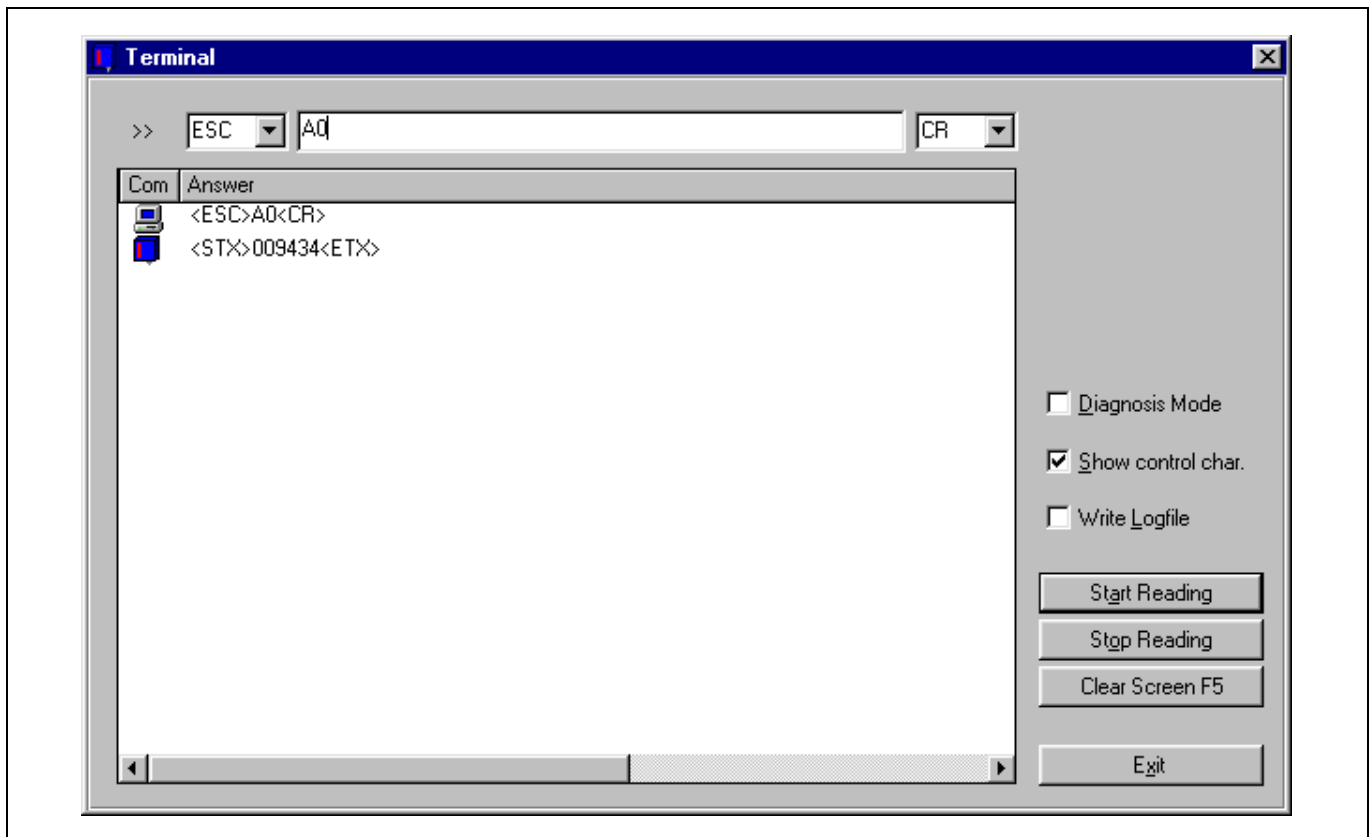


Fig. 6-3: Terminal emulator with input of a command string

6.4.3 Selecting reading mode

After being switched on the CLP100 carries out a self-test and then changes over to the reading mode (default setting). Reading mode can be selected as follows if the CLP100 is in another operating mode:

1. In the CLP Setup select the DEVICE CONFIGURATION tab card.
2. Click in the OPERATING MODE field and select READING MODE.
3. Carry out the download to CLP100.
The CLP100 is in reading mode.


6.4.4 Adjusting the reading pulse

In the CLP100 default setting the reading pulse (trigger) is supplied by an external sensor. Debouncing of the sensor and the type of reading pulse end (through a time window or a sensor signal) can be set by means of the CLP Setup software.

1. In the CLP Setup select the DEVICE CONFIGURATION tab card.
2. Select the settings in the READING PULSE or READING PULSE END field.
3. Carry out the download to CLP100.

6.4.5 Triggering the reading pulse

In its default setting the CLP100 receives the reading pulse (trigger) via an external sensor or a command string (software trigger). For test purposes, the reading pulse can also be triggered directly via the terminal emulator.

1. Click on  in the CLP Setup toolbar.
The terminal emulator window opens. The CLP100 is in reading mode.

2. Click on START READING.
3. Present the bar code.
4. Click on STOP READING.

The CLP100 outputs the read result in the window of the terminal emulator.

6.4.6 Setting the structure of the read result

In its default setting the CLP100 sends the data contents of the bar code to the host as the read result. In the default setting this data string is STX-/ETX-framed.

The structure of the data string can be selected by means of the HOST INTERFACE and READING CONFIGURATION tab cards.

1. In the CLP Setup select the READING CONFIGURATION tab card.
2. Click in the SEND PREFIX list box and select a prefix from the list (A-Z, 1-0).
3. Select the HOST INTERFACE tab card.
4. Click in the SEPARATOR list field and select a separator.
5. Carry out the download to CLP100.

The CLP100 operates with the new settings.

6.4.7 Setting the matchcode function

The matchcode function allows the comparison of the read bar codes with a code which is entered manually at the CLP100 or trained in automatically (matchcode).

1. In the CLP Setup select the DEVICE CONFIGURATION tab card.
2. Click in the ACTIVE box in the COMPARE CODE field.
3. Enter the code which is to be used for comparison in the MATCHCODE text field.
4. If only a part of the code has to agree, enter the partial code in the PARTIAL COMPARISON OF THE MATCHCODE text field, and complete the field with question marks or @ characters.
5. Selection the function of the switching output in the SWITCHING OUTPUT AT CODE COMPARISON field.
6. Carry out the download to CLP100.

The CLP100 outputs a result either at agreement of the read codes with the matchcode or at non-agreement.

6.4.8 Setting the diagnosis mode

In diagnosis mode the quality of the bar code readings is judged. These are brought statistically into the read field of the CLP100 (no transport movement). The CLP100 carries out 100 readings after the reading pulse and evaluates them.

The data string in the diagnosis mode is STX-/ETX-framed. The data string contains the bar code information (data) at the first place, followed by a slash and a three-digit identifier. The data string is followed by the combination of slash and identifier repeated thrice (a total of four identifiers separated by slashes):

<STX>Data/www/xxx/yyy/zzz<ETX>.

The maximum value of an identifier is 100. If the value is lower (one- or two-digit number), the leading blanks will be filled with spaces. If the DISPLAY CONTROL CODE function is activated, a space is displayed as <SPC>. The identifiers mean:

www = Number of successful readings ("Good reads")

xxx = Number of successful decoding processes (with misinterpretations)

- yyy = Number of successful indentifications of a start or stop character (depending on the scan direction)
- zzz = Number of readings carried out (the CLP100 carries out 100 readings each in the diagnosis mode)

Error-free reading and decoding of a bar code would thus have the following form:

```
<STX>Data/100/100/100/100<ETX>.
```

A reading with some failed decodings has, for example, the following form:

```
<STX>Data/<SPC>67/<SPC>67/100/100<ETX>.
```

If the CLP100 has only recognized the start character, it transfers a question mark instead of the data string:

```
<STX>?/<SPC><SPC>0/<SPC><SPC>0/100/100<ETX>.
```

Fig. 6-4 shows further examples of reading results in the diagnosis mode:

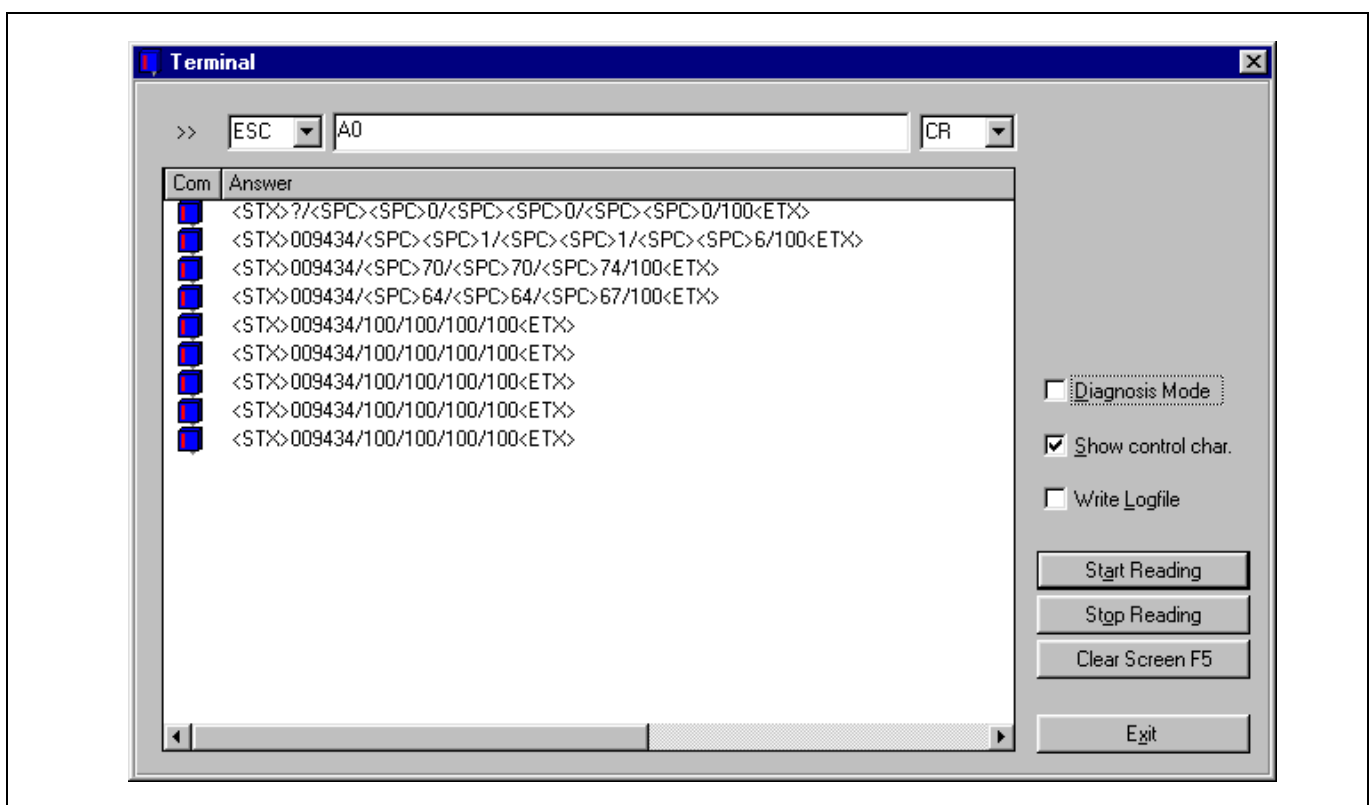



Fig. 6-4: Terminal emulator with reading results of the CLP100 in diagnosis mode

The diagnosis mode can be selected directly in the terminal emulation window or set via the tab cards:

- If the terminal emulator window is active: Click in the DIAGNOSTIC MODE box and present the bar code.
The reading process is started automatically. The CLP100 scans the bar code once per second.
- or -
- 1. If the terminal emulator window is not active: In the CLP Setup select the DEVICE CONFIGURATION tab card.
- 2. Click in the OPERATING MODE field and select DIAGNOSTIC MODE.
- 3. Carry out the download to CLP100.
The CLP100 is in diagnosis mode.

4. Click on  in the CLP Setup toolbar.
The terminal emulator window opens.
5. Click on START READING.
6. Present the bar code.
The CLP100 outputs the read result in the window of the terminal emulator.
7. In order to return to reading mode proceed as described in [Chapter 6.4.3, Page 32](#).

6.5 Default setting



[Table 6-1](#) shows an overview of the default setting of our works for the CLP100. The parameters in the default setting are selected so that the CLP100 can be used directly for many applications in this configuration. With the default setting no PC is required for starting up.

Parameter	Default setting
Active code type	Code 39
Code length	Free
Multiple reading	2
Number of codes	1
Reading direction	Both
Send start/stop characters	Not active
Check digit	None
Reading pulse generation	Active low (unchangable)
Switching output	Not active
Host interface	RS 232 (unchangable)
Protocol	Start characters STX, Stop characters ETX
Data transmission rate	9,600 Bd
Data format	8 data bits, no parity, 1 stop bit
Output instant	Immediately
No Read message	BR

Table 6-1: Default setting of the parameters of the CLP100

If the CLP100 is connected to a PC, the current parameters can be changed by using the CLP Setup software. The parameter set of the default setting is saved in the CLP Setup and in the CLP100 and can be re-activated at any time.

The complete default setting can be viewed by using the CLP Setup software and printed out, if required:

1. In order to save the current settings: Select the SAVE AS menu item in the FILE menu bar and enter the file name.
2. Click on  in the toolbar.
The default setting is loaded and is displayed in the tab cards.
3. Click on  in the toolbar.
The FILE PRINT dialog box is opened.
4. Enter the comment for the header of the output and click on OK.
The dialog box for the print settings is opened.
5. Enter the settings for printing and click on OK.
CLP Setup prints out the default settings.

6.6 Switching off the CLP100

1. If the parameter set was changed, download the parameter set to the CLP100 and save the parameter set as a configuration file in the CLP Setup.
2. Switch off the supply voltage.

The last parameter set saved in the CLP100 remains valid.

7 Maintenance

7.1 Maintenance during operation

The CLP100 operates maintenance free. No maintenance is required to keep this product in compliance with LED class 1.

NOTICE

Claims under the warranty rendered void!

Do not open the housing of the CLP100. If the device is opened, the SICK AG warranty shall not apply.

7.2 Cleaning the CLP100

Recommendation

In order to make use of the full optical reading capacity of the CLP100, the reading window should be checked regularly (e.g. weekly) for soiling. This is especially recommended when operating the device in harsh conditions (dust, abrasion, humidity).



CAUTION

LED radiation!

The illumination of the CLP100 operates with LEDs of LED class 1. Under normal and sensible conditions, the accessible radiation of the LEDs is not hazardous.

The entire area of the reading window acts as a LED outlet aperture.

Caution – use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

- Never look directly into the illumination.
- Do not open the housing.
(Opening the housing does not deactivate the LEDs by the reading pulse.)
- Always observe the latest valid version of laser protection regulations.

7.2.1 Cleaning the reading window

NOTICE

Damage to the reading window!

The CLP100 reading window is made of glass.

Scratches and streaks on the reading window impair the reading performance.

- Use a mild detergent without scouring agents.
- Avoid cloths or sponges which scratch.
- Clean the reading window carefully.

Important

Electrostatic charges cause dust particles to stick to the reading window. This effect can be combated by using anit-static SICK synthetic cleaner (no. 5600006) in combination with a SICK lens cloth (no. 4003353).

Cleaning the reading window:

- Use a clean, soft brush to free the reading window.
- If necessary, additionally clean the reading window with a clean, damp, lint-free cloth and a mild, anti-static window cleaning fluid.

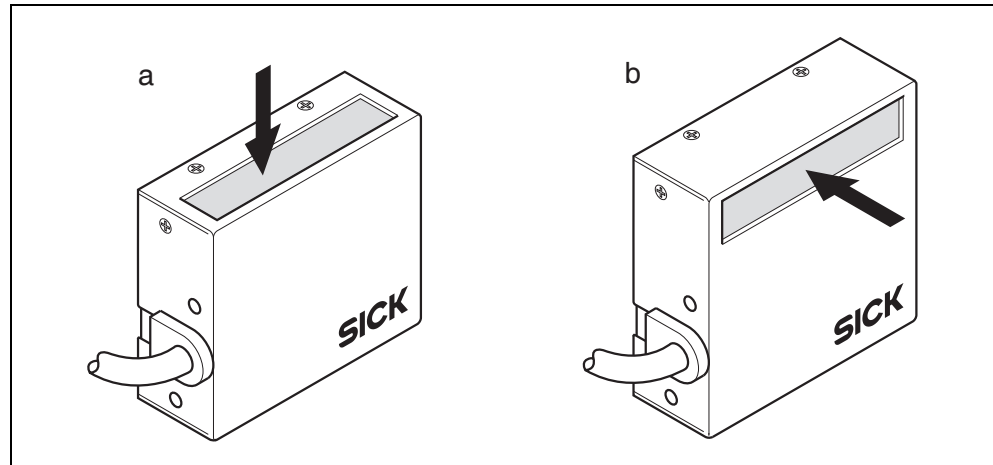


Fig. 7-1: Cleaning the reading window

If the reading window is scratched or damaged (cracked, broken), it must be replaced. Please contact the SICK Service.

7.2.2 Cleaning the housing

- If necessary, also clean the LEDs on the back side of the housing.

7.2.3 Cleaning further optical effective surfaces

If an external reading pulse generator with a sensor (e.g. photoelectric reflex switch) is used, make sure to clean the relevant optical surfaces regularly (e.g. weekly). Contamination on these surfaces can cause switching errors.

- In order to prevent incorrect switching behaviour, remove soiling from the optical effective surfaces of the external sensor.

7.3 Replacing a CLP100

An incorrect or damaged CLP100 has to be removed and replaced with either a new or a repaired CLP100.

NOTICE

Repairs to the CLP100 should only be carried out by qualified and authorised SICK AG service staff.

7.3.1 Removing the CLP100

1. Switch off the power supply to the CLP100.
2. Remove the cable plug of the CLP100 respectively remove the wires when using the variant with open cable end.
3. Mark the situation and alignment of the CLP100 on the holder or environment.
4. Remove the CLP100 from the holder.

7.3.2 Replacing the CLP100

1. Align and install the new or repaired CLP100.
To do so, observe any marks made previously on the holder or environment (see also [Chapter 4.4 Installation and adjustment of the device, Page 21](#)).
2. Reconnect the cable plug of the CLP100 respectively reconnect the wires when using the variant with open cable end.
3. Switch on the power supply to the CLP100.
The CLP100 starts with the factory default settings.
4. Establish communication to the CLP100 using the CLP Setup configuration software.
5. Transfer the configuration of the replaced device stored on the PC via download to the new CLP100 (see [Chapter 6.4.1 Transferring the parameter set between the CLP Setup and CLP100, Page 31](#)). The configuration can only be transferred between identical device types.
6. Check the behaviour of the CLP100 in the reading process.

7.4 Disposal

After removal from service dispose of unusable or irreparable devices in a manner which is not harmful to the environment. Observe the respective state regulations on waste disposal. At present, SICK AG does not take back devices which have become unusable or irreparable.

1. Remove the CLP100 housing.
2. Remove the electronic modules and connection cable.
3. Recycle the housing.
4. Dispose of electronic modules and connection cable as hazardous waste.

8 Troubleshooting

This chapter describes how errors at the CLP100 can be recognised and eliminated.

NOTICE

Claims under the warranty rendered void!

Do not open the housing of the CLP100. If the device is opened, the SICK AG warranty shall not apply.

8.1 Possible errors and faults

8.1.1 Installation faults

- CLP100 aligned unfavorably to the bar code (for example, reflections).
- Reading-pulse sensor positioned incorrectly

8.1.2 Faults during the electrical installation

- Interfaces of the CLP100 wired incorrectly

8.1.3 Parameterization errors

- Functions not adapted to the local conditions, for example, communication parameters of the host interface set incorrectly

8.1.4 Faults during operation

- Device fault (hardware/software)

8.2 Troubleshooting table

Aids during troubleshooting:

- These operating instructions
- Multimeter for measuring voltage and current

Fault	Possible cause	Check	Remedy
1. When the supply voltage is applied to the CLP100: The LEDs do not light up (LEDs must light up for three seconds after voltage is applied if the self-test is successful)	1.1 CLP100 without supply voltage 1.2 CLP100 has diagnosed a device fault during the self-test	1.1 Check the supply voltage 1.2 Switch the device off and on again. Do the LEDs light up?	1.1 Check the wiring and measure the supply voltage (DC 5 V ± 5 %) 1.2 If the LEDs do not light up, contact the SICK service (refer to Chapter 8.3, Page 42)
2. CLP100 cannot be started via the external sensor, Scan field of the CLP100 (red light) is not displayed or LEDs do not light up after an executed signal for reading	2.1 External sensor connected incorrectly 2.2 Photoelectric switch not aligned to the reflector or Optical path covered (light scanner or inductive sensor is not dampened) 2.3 CLP100 does not receive command string for pulsing via the host interface	2.1 Check the wiring of the external sensor 2.2 Check the external sensor for functionality and a free optical path 2.3 Check the data connection between the host and the CLP100. Check the command strings of the host computer	2.1 Measure the output signal of the external sensor and the input signal at the CLP100 (active low) 2.2 Re-align the external sensor 2.3 Carry out the connection in accordance with Chapter 5.4, Page 25 and observe the pin assignment. Carry out an upload in the CLP Setup. On the HOST INTERFACE tab card set the data format, protocol, start and stop characters, baud rate correctly. Carry out the download to the CLP100
3. Green LED does not light up after the end of the reading pulse (reading not successful)	3.1 No bar code in the reading area during the reading process 3.2 Scan field does not contact the bar code 3.3 Reading distance incorrect 3.4 Evaluation criteria for the code type set incorrectly 3.5 Reading angle under which the bar code appears is too large	3.1 Check the interval between the reading pulse and presence of the bar code in the reading area 3.2 Check the adjustment. Is the bar code in the middle of the scan field? 3.3 Check the reading distance 3.4 Check the code type and code length 3.5 Check the reading angle	3.1 Refer to <i>Item 2</i> 3.2 Readjust the CLP100 (refer to Chapter 4.4.2, Page 21) 3.3 Set the correct reading distance, but take the module width into consideration (refer to Chapter 10.3, Page 51) 3.4 Enter correct code type in CLP Setup. Carry out download to CLP100 3.5 Readjust the CLP100 while ensuring that the maximum reading angle is observed (refer to Fig. 4-4, Page 19)

Table 8-1: Troubleshooting table

Fault	Possible cause	Check	Remedy
–continued– 3. Green LED does not light up after the end of the reading pulse (reading not successful)	3.6 Fault due to reflection of the light at the bar code 3.7 Bar code quality is insufficient	3.6 Check the angle 3.7 Check the printing contrast, idle zones and print tolerances of the bar code	3.6 Readjust the CLP100 and tilt it relative to the vertical (refer to Fig. 4-5, Page 20) 3.7 Have the bar code checked (for example by the SICK service (refer to Chapter 8.3, Page 42))
4. CLP100 does not transfer read results after the end of the reading pulse	4.1 No reading pulse occurred 4.2 Data connection cable wired incorrectly 4.3 Voltage level incorrect 4.4 Host interface parameterized incorrectly	4.1 Do the LEDs light up after the reading pulse? 4.2 Check the wiring 4.3 Check the voltage level 4.4 Check the data format, protocol, start and stop characters	4.1 Refer to <i>Item 2</i> 4.2 Carry out the wiring in accordance with the pin assignment and the connection scheme 4.3 Correct the voltage level 4.4 Carry out an upload in the CLP Setup. On the HOST INTERFACE tab card set the data format, protocol, start and stop characters, baud rate correctly. Carry out the download to the CLP100

Table 8-1: Troubleshooting table (contd.)

8.3 SICK support

NOTICE

Repairs to the CLP100 should only be carried out by qualified and authorised SICK AG service staff.

If an error cannot be eliminated using the above measures, it is possible that the CLP100 is defective. The CLP100 cannot be repaired by the user, meaning that it is not possible to re-establish functions after a failure. However, the CLP100 can be rapidly replaced by the user. See [Chapter 7.3 Replacing a CLP100, Page 38](#).

If an error occurs which cannot be eliminated, please contact SICK Service:

- International: Competent SICK branch office or SICK subsidiary
 - For telephon numbers and e-mail addresses please see the *back page* of these operating instructions
 - For the postal address please visit www.sick.com.
- Only return devices after consultation with the SICK Service.

9 Technical data

9.1 Data sheet CLP100 bar code reader

Type	CLP100
Scanner design	CCD bar code reader
Light source	Visible red light ($\lambda = 630 \text{ nm}$)
LED class	Class 1 according to EN 60825-1/A2 (2001-03) and IEC 60825-1 AMD2 (2001-01)
Artificial light compatability	0 to 100,000 lux
Scanning/Decoding frequency	500 Hz
Reading distance/Resolution	30 to 40 mm: 0.15 mm (1.18 to 1.58 in 5.9 mil) 25 to 45 mm: 0.2 mm (0.99 to 1.77 in 7.9 mil) 25 to 45 mm: 0.25 mm (0.99 to 1.77 in 9.8 mil) 25 to 55 mm: 0.35 mm (0.99 to 2.17 in 13.8 mil) 25 to 55 mm: 0.5 mm (0.99 to 2.17 in 19.7 mil) 25 to 55 mm: 1 mm (0.99 to 2.17 in 39.5 mil)
Reading area width	80 mm (3.15 in) (at a reading distance of 40 mm (1.58 in))
Minimum resolution	0.15 mm (5.9 mil)
Code types	All common bar codes
Number of codes per reading pulse	Max. 10 codes
Code length	Max. 32 digits (depends on number of codes per reading pulse)
Optical indicators	Status display with two LEDs (red and green)
Data interfaces	2 x (RS 232), parallel operation (transmitting/monitoring)
Data transfer rate	1,200 to 19,200 Bd
Digital switching input	$V_{in} = \text{max. } 5 \text{ V}$, $I_{in} \leq 1,5 \mu\text{A}$
Digital switching output	$I_{out} = \text{max. } 50 \text{ mA}$
Electrical connection	Cable (0.9 m (2.95 ft)), with 9-pin D Sub plug or open end
Supply voltage	5 V DC $\pm 5 \%$ according to IEC 60364-4-41
Power consumption (reading operation)	350 mA
Power consumption (standby mode)	150 mA
Housing	Metal
Enclosure rating	IP 40
EMC test	According to EN 61000-6-2 (2001-10-01), 61000-6-3 (2001-10-01), 61000-6-3/A11 (2004-07-01)
Weight	Approx. 200 g (7.05 oz)
Temperature (ambient service/storage)	0 to +40 °C / -20 to +70 °C (+32 to 104 °F/ -4 to +158 °F)
Maximum relative humidity	30 to 85 %, non-condensing

Table 9-1: Technical specification of the CLP100

9.2 Reading field diagram

The reading area diagram shows the reading width as a ratio of the reading distance for various resolutions. Disturbing optical effects (distortions) which can occur when the distance is too great are taken into account when specifying the reading width.

The module width is the narrowest bar of a bar code which is still resolved.

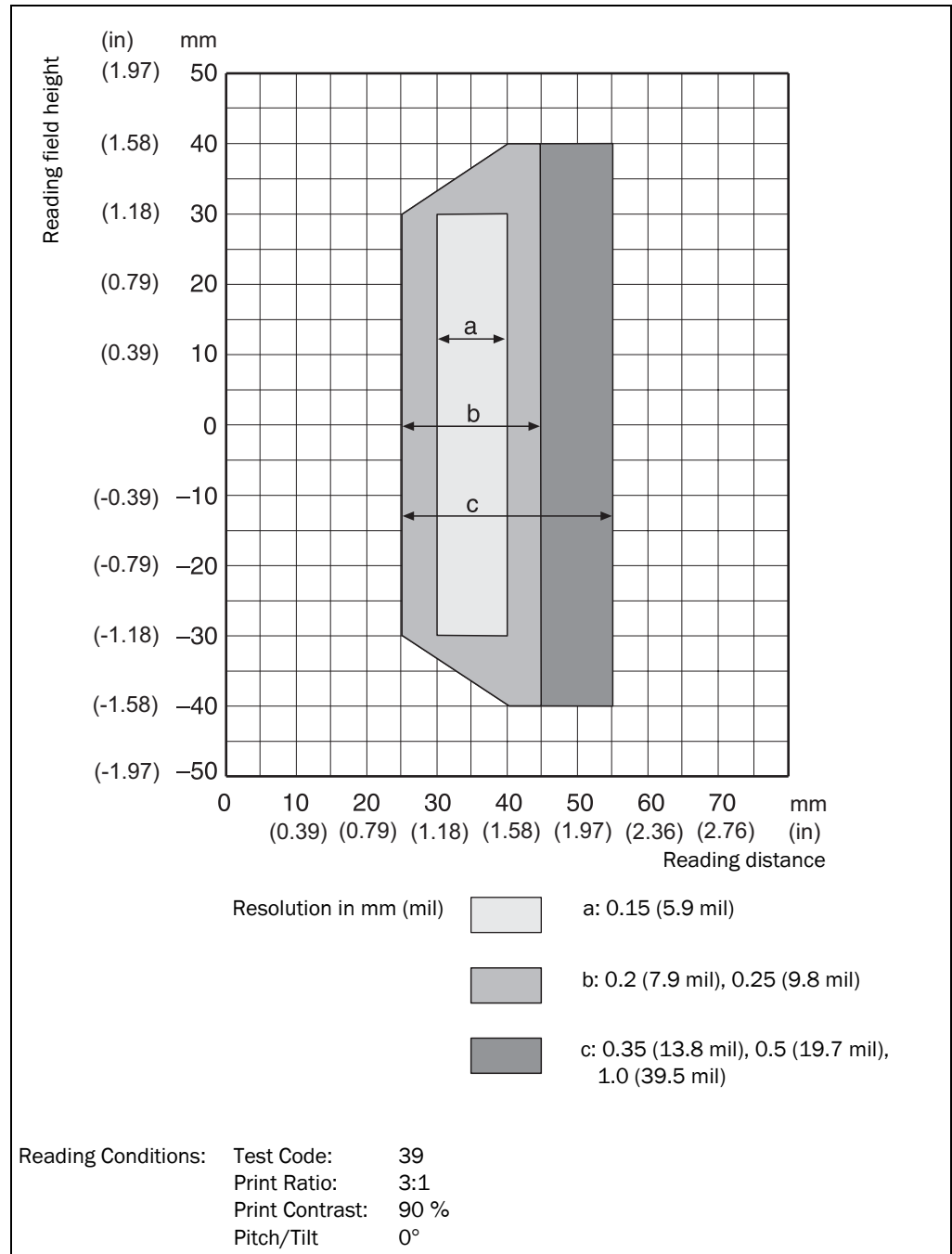


Fig. 9-1: Reading field diagram

9.3 Dimensional drawings

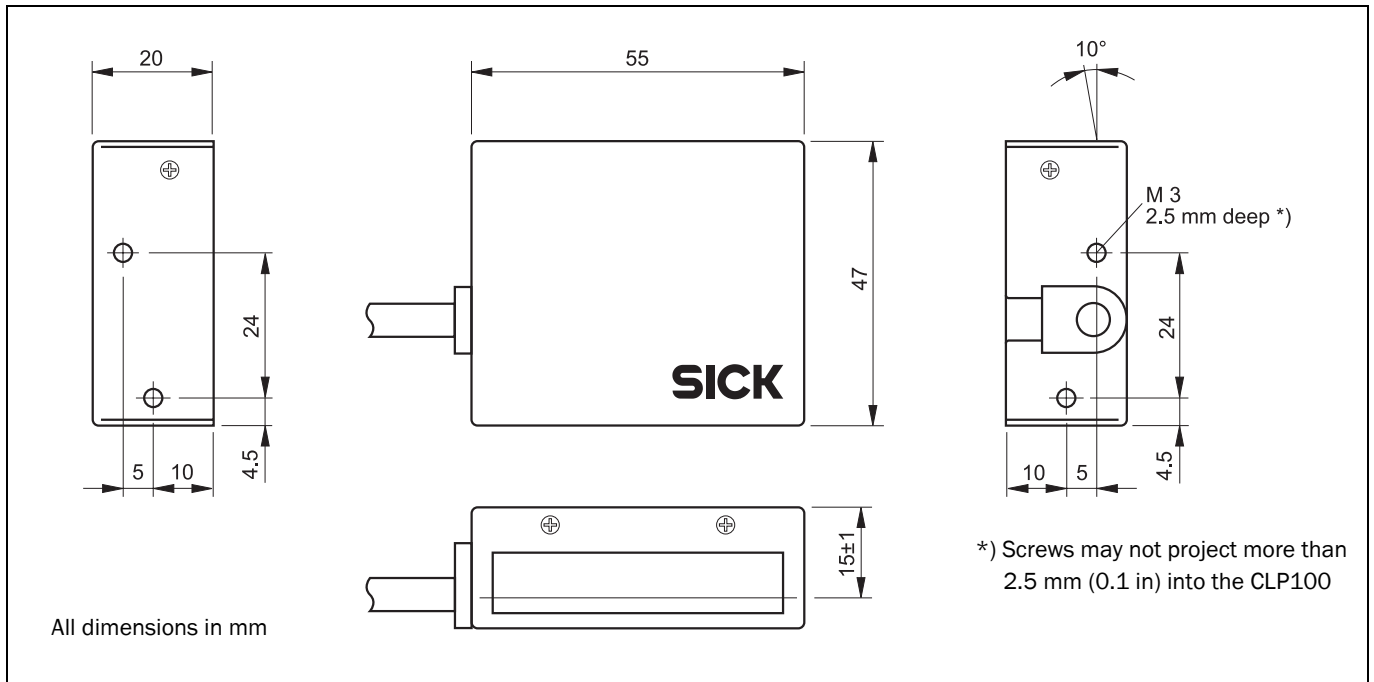


Fig. 9-2: Dimensions of the CLP100 with front end reading window

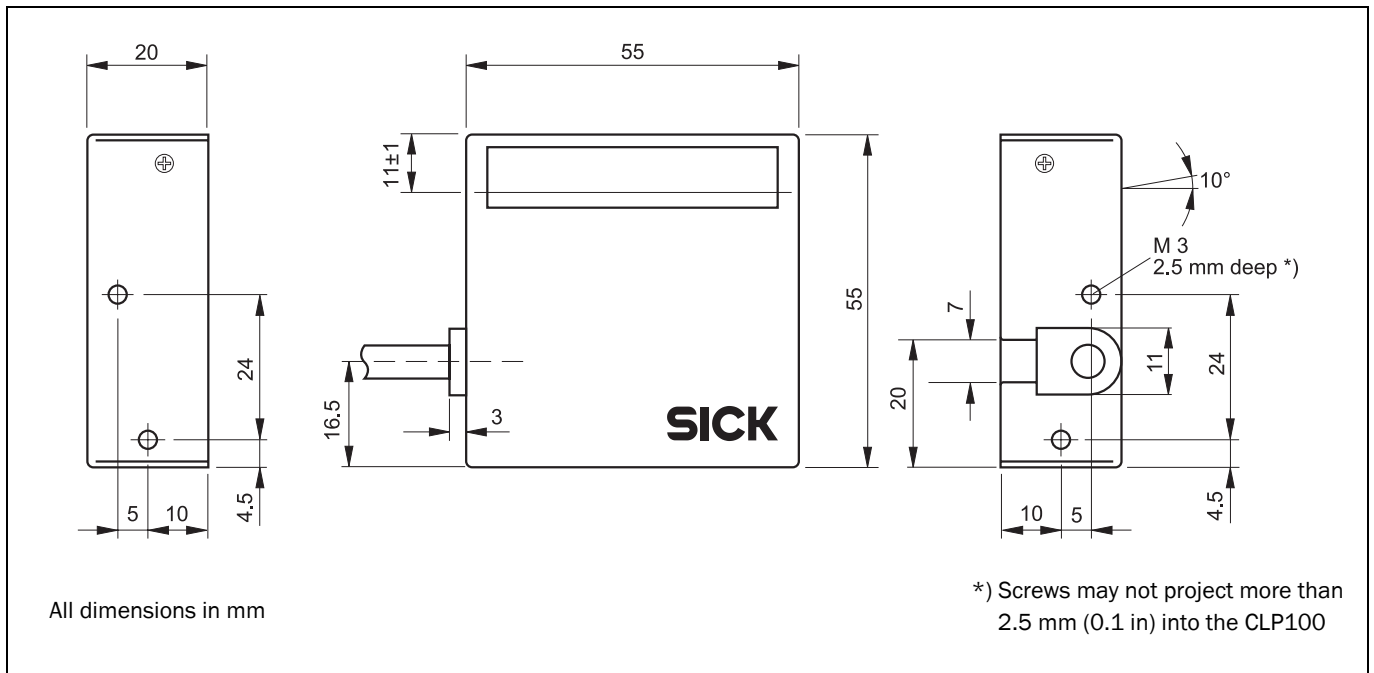


Fig. 9-3: Dimensions of the CLP100 with side reading window

mm	inch	mm	inch	mm	inch	mm	inch
3	0.12	7	0.28	15	0.59	24	0.95
4.5	0.18	10	0.39	16.5	0.65	47	1.85
5	0.20	11	0.43	20	0.79	55	2.17

Table 9-2: Conversion table for dimensions in the figures above (mm to inch)

10 Appendix

10.1 Appendix overview

- Installation and handling of the CLP Setup software
- Calculation of the number of scans
- Calculation of the code length of a bar code
- Command language for CLP100 bar code readers
- Copy of the EC Declaration of Conformity (page 1)

10.2 Installation and handling of the CLP Setup software

The scope of delivery of the CLP100 includes a CD-ROM ("Manuals & Software") with the CLP Setup software. A PC with the operating system Windows 95™/98™, Windows NT™, Windows 2000™ or Windows XP™ as well as an HTML browser, e.g. Internet Explorer™ is required in order to install and use the software. The memory requirement on the hard disk amounts to approx. 6.5 MB for the installation of CLP Setup and CLP Setup Help.

10.2.1 Preparing the installation

1. Have the CD ROM ("Manuals & Software") at hand.
2. Connect the PC to the host interface of the CLP100 (see [Chapter 5.4.2, Page 25](#)).
3. Switch on the supply voltage of the CLP100.
4. Switch on the PC and start Windows.

Important The following instructions describe how to install the software on Windows 95™. These instructions may differ depending on the operating system you are using (for example, administrator rights are required to install the software on Windows NT™).

10.2.2 Carrying out the installation

The installation can be carried out directly from the CD-ROM or after the software has been saved on your local hard disk.

During the installation of CLP Setup the installation program creates a main directory with subdirectories and the required links. CLP Setup can be removed completely from the PC by using the Uninstaller which is automatically installed as well.

First installation

1. Shut down all the applications running in Windows.
2. Insert the CD-ROM into the CD-ROM drive.
3. If the auto run function is enabled, the start page (table of contents) of the CD-ROM is automatically displayed in the your browser.
4. Select the SOFTWARE folder on top left.
5. Select CLP SET-UP SOFTWARE in the listing.
A table with CLP100 information is displayed.
6. Select DOWNLOAD under SOFTWARE FILE .
7. In the FILE DOWNLOAD dialog box select the option to install directly from the CD-ROM.
Confirm with OK.

- or -

Select the option to save the software locally on your local hard disk and confirm with OK.

In the FILE DOWNLOAD dialog box select the desired target directory on your hard disk.

The "CLPSetup.exe" file is then saved at this location.

Select OPEN in the dialog box to start the file.

8. The installation program starts and guides you through the installation with screen messages. The CLP Setup software and the CLP Setup Help online help are installed.
9. Observe the the latest information on the CLP Setup given in the Readme file.
10. Click on OK to confirm the final installation message.

The CLP Setup software and the CLP Setup Help online help are installed and ready for use.

Updating an installation

There are two possibilities of installing a new version of CLP Setup:

- Installation of the new version in addition to the old version
- or -
- Installation of the new version instead of the old version (overwriting)

Installation of the new version in addition to the old version

When the new version is installed in addition to the old version the new CLP Setup software is installed as described under *First installation*. When prompted for the target directory you have to enter a **new directory**. Both software versions are available parallel, but may not be started simultaneously. The configuration files of the old version can continue to be used in the new version.

Installation of the new version instead of the old version

When the new version is installed instead of the old one, the files of the old version have to be removed – with the exception of the configuration files "*.slp". The "*.slp" files contain the parameter sets of the CLP100.

The Uninstaller removes the program files. The Uninstaller can be used to remove either all the files (with the exception of the configuration files) or only selected files. The default setting is the complete removal (the configuration files are not removed). In the case of user-specific removal the files are listed and only the selected files are removed. When selecting files ensure that the main directory together with the "*.slp" files is not deleted.

1. Select the Uninstaller for CLP Setup in the start menu of Windows under PROGRAMS. The Uninstaller starts and guides you through the removal with screen messages.
2. Select the type of removal (complete or user-specific).
3. The new version of CLP Setup is installed as described under *First installation*. Select the same directory.

The new version of CLP Setup is installed. The configuration files of the old version can continue to be used.

10.2.3 Starting the CLP Setup software

The CLP Setup software starts with the following default setting:



Communication	COM 1, 9,600 Bd, 8 data bits, 1 stop bit, no parity
Linear measures	Metric
Language	English
Browser	Not assigned
Directory for files	"Data" (configuration files for CLP100)

Table 10-1: Default settings of CLP Setup

1. Switch on the PC and start Windows.
2. Select CLP Setup in the start menu.
The introductory dialog box is displayed after the identifier for the SICK software.
3. Click on OK.
CLP Setup checks whether a bar code reader is connected to the port "**COM 1**" of the PC and whether the values of the communication parameters between the bar code reader and the PC agree. If the values agree, CLP Setup enters CONNECTED in the top right-hand of the status bar.
The software loads the internal description of the bar code reader and the default setting of the parameters from the database and displays it in the tab cards. Then the software copies the last set saved permanently in the CLP100 from the CLP100.
Afterwards this is displayed in the tab cards.
The current parameter set can be edited in the tab cards.

Help in cases of problems

If the CLP Setup displays the message NO CONNECTION in the top right-hand of the status bar, the software could not establish a connection to the CLP100. This can have two causes. The CLP100 is not connected, or the communication parameters of the CLP100 and the PC do not agree.

1. Connect the PC to the host interface of the CLP100 as described in [Chapter 5.4.2, Page 25](#).
2. Click on .
The AUTO BAUD DETECT dialog box is displayed. CLP Setup checks whether a bar code reader is connected to the port "COM 1" of the PC and whether the values of the communication parameters between the bar code reader and the PC agree. If the values agree, the CLP Setup displays the values of the communication parameters.
3. If CLP Setup still cannot establish a connection, click on CANCEL and select the SERIAL INTERFACE menu item in the OPTIONS menu.
CLP Setup displays the current settings of the communication parameters.
4. Set the following communication parameters: **Connected COM port, 9,600 Bd, 8 data bits, 1 stop bit, no parity.**
5. Click on OK.
6. Click on .
The AUTO BAUD DETECT dialog box is displayed. CLP Setup attempts again to communicate with the CLP100. If this is successful, CLP Setup displays the values of the communication parameters between the bar code reader and the PC.
7. Click on OK.
The dialog box prompts you whether the parameters of the device are to be loaded.

8. In order to copy the current parameter set to the CLP Setup click on YES. CLP Setup displays CONNECTED. The current parameter set can be edited in the tab cards.

10.2.4 User interface

The user interface is largely self-explanatory. The online help describes how to use the user interface under HELP in the menu item PROGRAM INFORMATION. *Fig. 10-1* shows a view of the user interface.

The user interface consists of the following elements:

- Title bar displaying the program name (CLP Setup) and the current configuration file
- Menu bar with pull-down menus
- Toolbar with icons which trigger a function when clicked on
- Status bar (top right) with scanner selection field and status field for displaying the connection to the bar code reader
- 3 tab cards (READING CONFIGURATION, DEVICE CONFIGURATION, HOST INTERFACE). Further dialog boxes are opened in the tab cards, if necessary

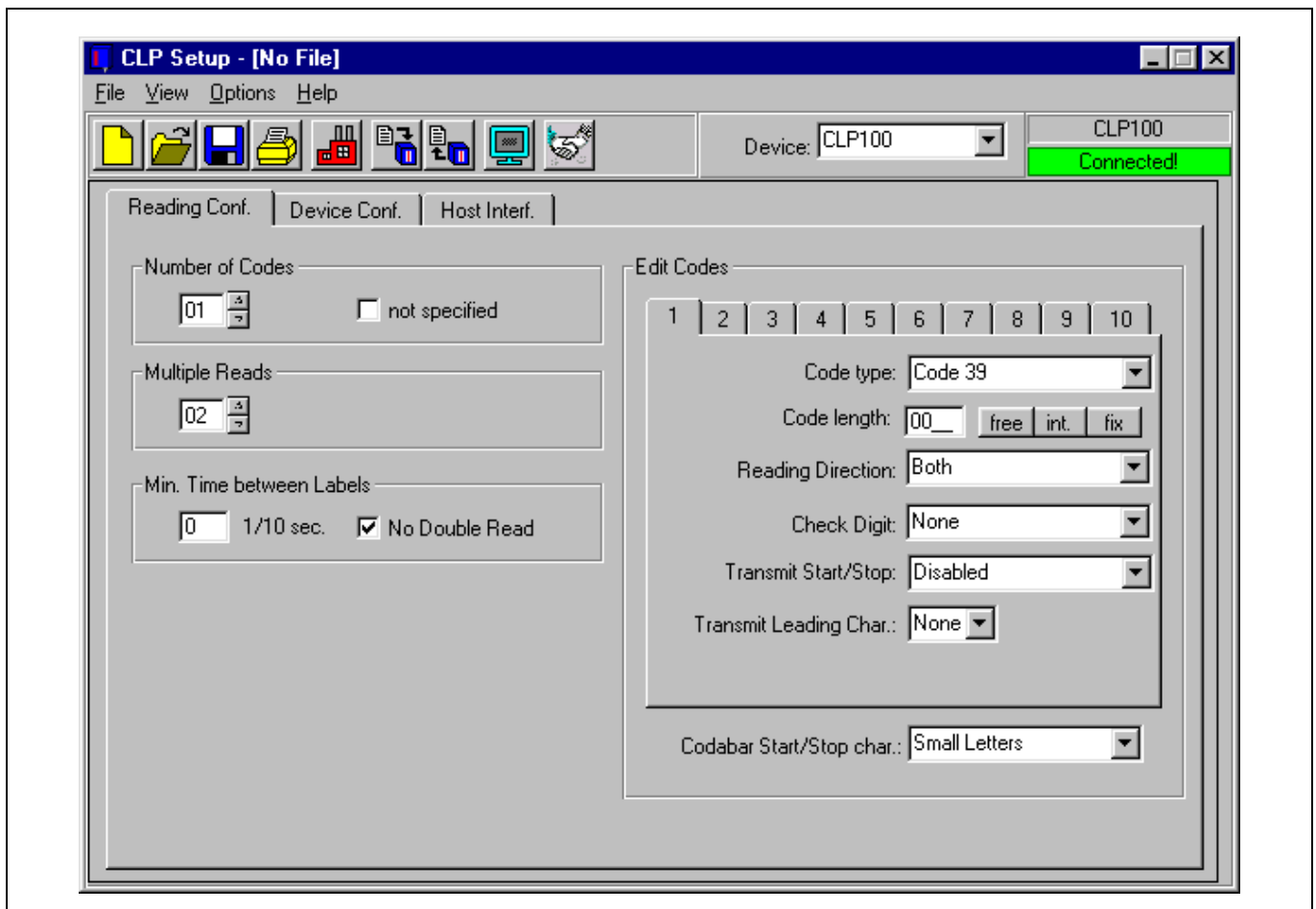


Fig. 10-1: User interface of the CLP Setup software

10.2.5 Functions

The CLP Setup software provides the following functions:

Group	Function
Communication	<ul style="list-style-type: none"> • Automatic communication attempt with the CLP100 when the program is started • AutoBaud detect for automatic serial communication establishment with the CLP100 • Selecting the COM port of the PC for adapting the data transfer parameters • Automatic software compatibility check in the CLP100
Display	<ul style="list-style-type: none"> • Selecting the display language • Selecting the units of measure • Displaying the last 10 configuration files that were processed
Operation	<ul style="list-style-type: none"> • Modifying the parameter/parameter values on the tabs • Online access to the CLP100 via a Terminal Emulator (selecting operating mode, configuring with commands, starting reading process) • Context-sensitive help via the [F1] key
Upload/Download	<ul style="list-style-type: none"> • Uploading and displaying parameter set stored in the CLP100 • Downloading and saving the changes to the parameter set in the CLP100
Administration	<ul style="list-style-type: none"> • Loading the default setting of the parameter set from the database of CLP Setup • Saving the changes to the parameter set as a configuration file "*.slp" • Automatic storage confirmation prompt when changes are made to the configuration file • Setting switches in the "dpmain.ini" file for starting the program • Starting program with SLP file as argument
Export	<ul style="list-style-type: none"> • Exporting the configuration files in RTF format
Printing	<ul style="list-style-type: none"> • Printing the configuration files

Table 10-2: Functions of the CLP Setup configuration software (overview)

10.2.6 Using the CLP Setup Help on-line help

The CLP Setup Help on-line help helps you in using the CLP Setup software. The help runs under an HTML browser (for example, Microsoft Internet-Explorer™). The help can be called up context-specifically for the parameter being edited and describes the function of the parameter and possible values for the parameter.

- Press [F1] key.
The browser window opens and the help topic is displayed.
- If the browser is not found, select CHOOSE BROWSER in the HELP menu and enter the path for the browser in the opened dialog box.
- In order to avoid multiple opening of the browser use the key combination [Alt]+ [Tab] or the Windows status bar to toggle between the CLP Setup and the CLP Setup Help.
- In order to call up the help overview click on the CONTENTS menu item under HELP in the menu bar of the CLP Setup.

In the upper horizontal frame it is possible to also click on a tab card. The parameters are then displayed in the left-hand vertical frame. These can be selected by clicking on them.

10.3 Calculation of the number of scans

The maximum possible number of scans for a bar code depends on the transporting speed v . Fig. 10-2 show one calculation example for the possible number of scans at ladder positionings of the bar code bars.

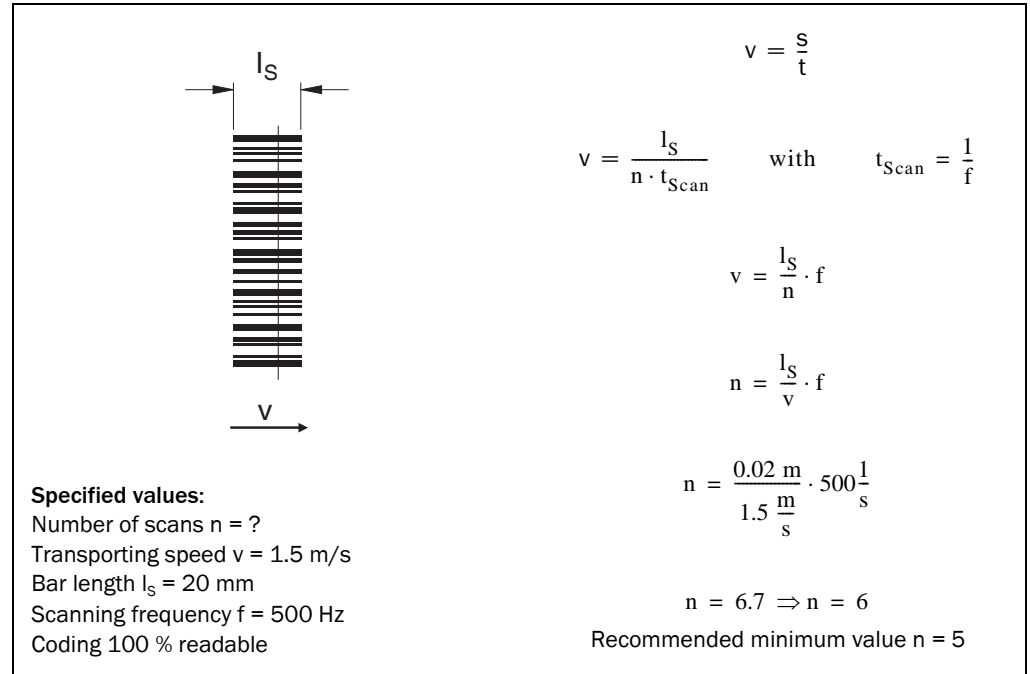


Fig. 10-2: Calculation example: Number of scans for ladder positioning of the bar code bars

Important Picket fence orientation of the bar code labels is only feasible in stand still situations or slow movement of the object.

10.4 Calculation of the code length of a bar code

The code length of a bar code corresponds to the number of used characters in the printing image including the check digits (if they exist). The fixed code length can be specified in the CLP Setup.

The code length can be determined by counting the bars and gaps if the code type of a bar code is known. The respective equation for calculation is shown in [Table 10-3](#).

1. Count the bars and possibly gaps as specified in [Table 10-3](#). Also count the start and stop characters.
2. Calculate the code length in accordance with the equation specified in the table.
3. Carry out the input in the CLP Setup as specified in Column 4 of [Table 10-3](#).

Code type	Count	Calculation of the code length ¹⁾²⁾	Input in the CLP Setup
Code 39	Number of bars	$l_{\text{Code}} = \frac{\text{Number} - 10}{5}$	Calculated code length
2/5 Interleaved	Number of wide elements (bars and gaps)	$l_{\text{Code}} = \frac{\text{Number} - 1}{2}$	Calculated code length
EAN	Not applicable	13 characters (normal version) 8 characters (short version)	activate 13-digit activate 8-digit
UPC	Not applicable	12 characters (UPC A, normal version) 8 characters (UPC E, short version)	Activate Version A Activate Version E
Codabar	Number of bars	$l_{\text{Code}} = \frac{\text{Number} - 8}{4}$	Calculated code length
Code 128 (character set A)	Number of bars	$l_{\text{Code}} = \frac{\text{Number} - 10}{3}$	Calculated code length
EAN 128	Number of bars	$l_{\text{Code}} = \frac{\text{Number} - 10}{3}$	Calculated code length
<p>1) Check digit optional for Code 39, 2/5 Interleaved, Codabar. Check digit always integrated in the bar code print at EAN, UPC, Code 128, EAN 128 in accordance with specification (is suppressed automatically at the output of the read result of the CLP100)</p> <p>2) With few exceptions each printed character corresponds to an ASCII character which has to be decoded. In the case of Code 39 extended, Code 128 and EAN 128 the number of characters in the data string of the CLP100 can exceed the number of characters in the printing image because it consists of several character sets.</p>			

Table 10-3: Auxiliary table for calculating the code length of a bar code

10.5 Command language for CLP100 bar code reader

Table 10-4 lists the commands of the command language for CLP100. The default settings of the respective parameters are printed in bold.

For sending host commandos to the CLP100 it is necessary to frame the data string with <ESC> and <CR>.

Example:

<ESC>U0B2<CR> (Meaning: enable lable no. 1, set to Codabar)

There may be not any blank between the characters.

Parameter	Character	Value
Number Of Codes	UAx	x: 0: FREE 1-10: 1 - 10 Labels to be read with one Sensor
Output On Good Read	UBx	x: 0 : AFTER SENSOR 1: AFTER READ
Label Number	Ux	x: 0: Label Number 1 ... 9: Label Number 10
Code Type	UxBy	y: 1 : CODE 39 2: Codabar 3: ITF 4: JAN (UPC) 5: ITF-B 7: CODE 128
Code Length	UxByNz	z: 0 : FREE 1-32: Specified Digits (1 - 32)
Reading Direction	UxByNzDa	a: 0 : NOT SPECIFIED 1: FORWARD 2: REVERSE
Check Digits	UxByNzDaCb	b: 0 : NO CHECK 1: SEND C/D 3: NOT SEND C/D
(Codabar Only)	UxByNzDaCb	b: 0: NO CHECK 1: SEND M16 2: SEND 7DR 3: NOT SEND M16 4: NOT SEND 7DR
Transmit Start/Stop	UxByNzDaCbSc	c: 0 : SEND 1: NOT SEND
Option (Code 128)	UxB7NzDaEd	d: 0 : NOT SEND 1: SEND THROUGH 2: SEND TRANSLATED
Transmit Leading Character	UxByNzDaCbScKe	e: 0 : NONE 2, "N": N = 0 - 9 (30h - 39h) & Upper Character
Host Interface	UHx	x: 0 : RS-232C
Baud Rate	UH0Fy	y: 0: 1,200 1: 2,400 3: 9,600 4: 19,200

Table 10-4: Command language for CLP bar code readers

Parameter	Character	Value
Data/Parity/Stop Bits	UH0Py	y: 0: 701 1: 702 2: 7E1 3: 7E2 4: 8N1 5: 8N2 6: 801 7: 802 8: 8E1 9: 8E2 10: 7N1 11: 7N2
Terminator	UH0Ty	y: 0: NONE 1: <SX>/<EX> 2: /<CR><LF> 3: /<CR> 4: <SX>/<EX><CR> 5: <EX>/<CR>
Cs Control	UH0Hy	y: 0: NO CONTROL 1: CONTROL
Error String	UH0Ry	y: 0: NOT SEND 1: BR 2: ? 3: <CAN> 4: ERROR
Result Output Time	UExx	xx: 00: HOLD 1-99: 10 - 990 ms 10: 100 ms One Shot
Result Function	UJx	x: 0: DISABLED 1: GOOD READ 2: NO READ
Result Output Timing	UFx	x: 0: AFTER READ 1: AFTER SENSOR OFF
Memory	Mx	x: 0: DEFAULT 1: RECALL N. V. MEMORY 2: WRITE N. V. MEMORY
Multiple Reads	Xxx	xx: 1-10: 1 - 10 Times 2: 2 Times
End Of Reading Interval	Yx	x: 0: GENERATED BY TRIGGER 1,nn: 01 - 99 BY TIMER
Debouncing Sensor	UYx	x: 0: 1 ms 1: 5 ms 2: 10 ms
Codabar Start/Stop Character	USx	x: 0: LOWER CASE 1: UPPER CASE
Separator	UTx	x: 0: NONE 1: & 2: 3: FS 4: GS 5: SP

Table 10-4: Command language for CLP bar code readers (contd.)

Parameter	Character	Value
LED Control	Ulx	x: 0: CCD ON (Red) & READING GATES ON (Green) 1: NO READ (Red) & GOOD READ (Green)
Minimum Time Between Labels	UDx	x: 0: NOT READ nn: 01-99 = Prohibition Time 10-990 ms
Code Comparison	UNx	x: 0: NO 1: YES
Sensor Input	Ax	x: 0: LEVEL 0,mm: EDGE mm s (mm = 1 - 60 ms) 1: OFF
Operation Mode	UCx	x: 0: READING MODE 1: DIAGNOSIS MODE 2: ONLINE TESTING MODE 3: ADJUSTMENT MODE
Result Output On Code Comparison	UQx	x: 0: ACTIVE HIGH ON READ & MATCH 1: ACTIVE HIGH ON READ & NO MATCH
Teach In Code Comparison	URx	x: 0: NO 1: YES
Read Out	Wx	x: 0: VERSION INFORMATION 1: SETUP OUTPUT 4: BAUD RATE/FRAME (1 STOP) 5: BAUD RATE/FRAME (2 STOP)

Table 10-4: Command language for CLP bar code readers (contd.)

Selection of a bar code (example):

2/5 ITF

6-digit

without check digit

Required command:

<STX>U0B3N6D0C0<CR>

10.6 EC Declaration of Conformity

10.6.1 Copy of the EC Declaration of Conformity

Fig. 10-3 shows a scaled down copy of the EC Declaration of conformity, page 1 for the CLP100 bar code reader.

- The complete EC Declaration of Conformity and the list of device versions and the standards met can be requested from SICK AG.

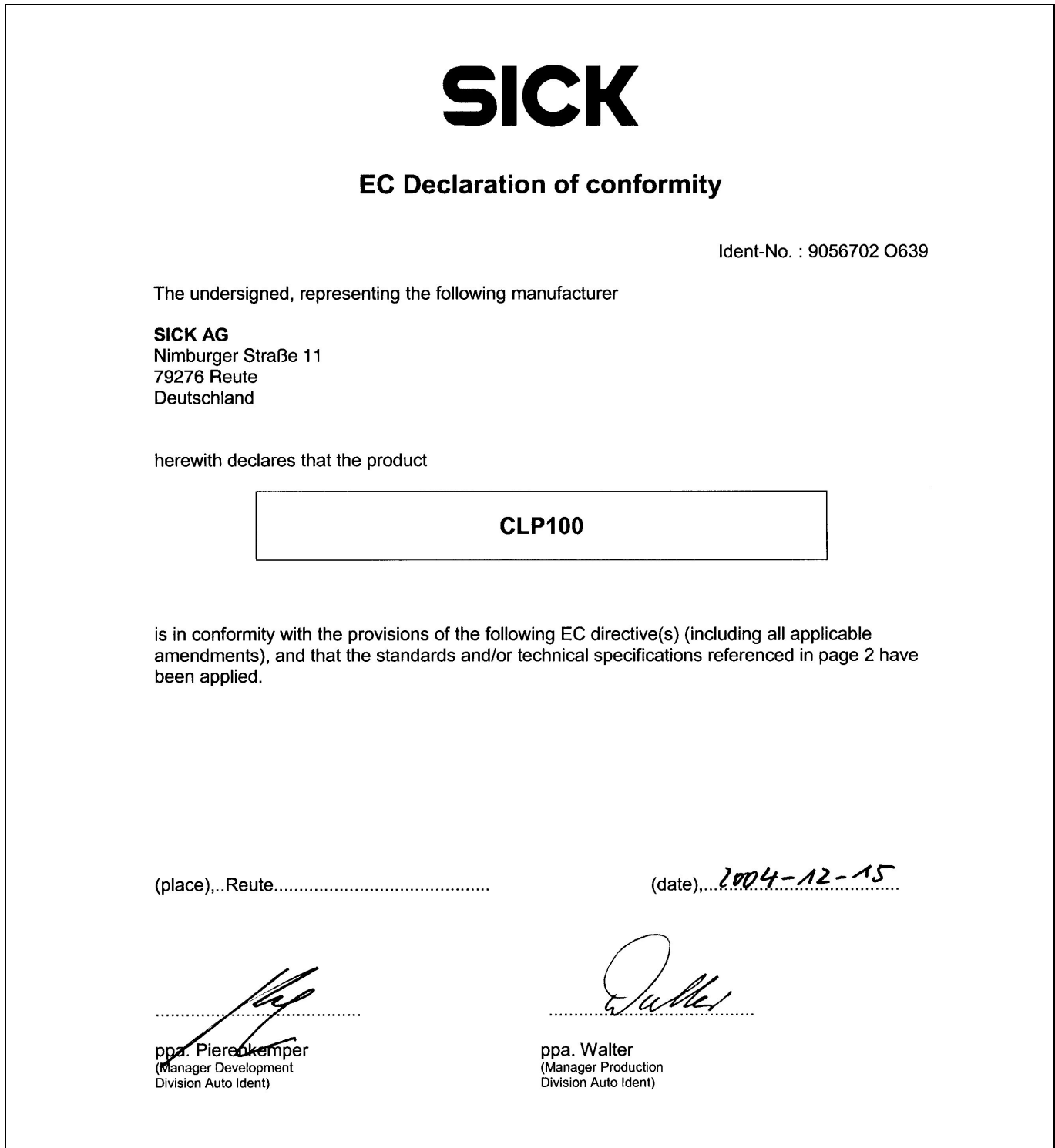


Fig. 10-3: Copy of the EC Declaration of of conformity, page 1 (scaled down in size)

Notes:

Australia

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