CLX490
Compact OMNI Scanner
for Bar Codes

Omni Line
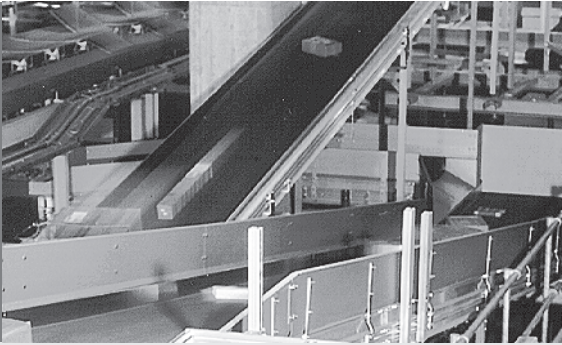
SICK
Sensor Intelligence.

Software versions

Software/Tool	Function	Version
CLX490	Firmware	V 5.0 RA32
CLV-Setup	Configuration software (windows-based)	V 4.4 QF16
CLV-Setup Help	Online help (HTML)	V 4.4 QF16

CLX490 Compact OMNI Scanner

Quick Finder

- **What is delivered with the device**

- **CAUTION!**

- **Mounting the device at the reading station**

- **Connecting the device**

- **Overview of the device and its functions**

- **Starting the device with the default settings**

- **Installing the "CLV-Setup" program**

- **Adapting the device to the reading application**

- **Troubleshooting**

- **Finding information**

Installation procedure (overview)

Reading pulses via switching input "Sensor" (default setting)

1. Check the delivery to make sure that none of the components is missing.

2. Mount the CLX at the reading station and align it with the object carrying the bar code.

3. Mount the AMV/S60 Connection Module.

4. Connect the CLX to the AMV/S60 Connection Module using the two cables no. 2020302. Alternatively, connect the device to the AMV/S60 via the external parameter memory no. 2020307.

5. Connect the reading pulse sensor to the "Sensor" switching input in the AMV/S60.

6. Connect the host to the host interface in the AMV/S60.
   Adapt the AMV/S60 to the host interface type of the CLX.

7. Switch on the power supply to the AMV/S60.
   The "Device Ready" LED lights up after the CLX has started.

   CLX with external parameter memory (in connector cover) connected:
   After the CLX has started, it copies the internal parameter set to the external parameter memory if the memory is empty. Then the "Read Result" LED lights up.

8. Switch on your PC and start Windows™ (minimum requirement: Windows 95™).

9. Install the "CLV-Setup" software and online CLV-Setup Help from the CD-ROM ("Manuals & Software") on your PC.

10. Connect the PC to the auxiliary interface of the CLX. To do so, connect the 3-core RS 232 data cable (null modem cable) (e. g. no. 2014054) to the "Service plug" in the AMV/S60.

11. Start the "CLV-Setup" program.
    CLV-Setup establishes communication with the CLX and uploads the parameter set. The parameters are then displayed on the tabs.

12. Carry out a test read using test bar codes (trigger the CLX accordingly).
    Display the reading result in the Terminal Emulator window of the "CLV-Setup" program.

13. Configure the CLX for the application using the settings on the tabs in CLV-Setup. Copy (download) the modified parameter set to the CLX temporarily.
    Do **not** switch off the power to the AMV/S60 (CLX)!

14. Test the application under realistic conditions.

15. Check whether the data is transmitted correctly between the CLX and host.

16. If necessary, correct and optimize the parameter values.
    Copy (download) the parameter set **permanently** to the CLX.

    CLX with external parameter memory (in connector cover) connected:
    Copy the modified parameter set to the external parameter memory when CLV-Setup asks you for confirmation.

17. Save the parameter set as a configuration file "*.scl" in the "CLV-Setup" program.

The CLX can then be operated with the **application-specific** settings.

Table of contents

Abbreviations

AMV/S	Connection Module with signal distribution/with additional power supply pack
BMV/S	Bus Connection module with signal distribution/with additional power supply
CLX	**C**ode-**L**eser **X**-Prinzip.
DC	**D**istance **C**onfiguration
DOF	**D**epth **O**f **F**ield
EEPROM	**E**lectrically **E**rasable **P**rogrammable **R**ead **O**nly **M**emory
FIFO	First in, first out
HTML	**H**yper **T**ext **M**arkup **L**anguage (page-description language on the internet)
LED	**L**ight **E**mitting **D**iode
LIFO	Last in, first out
MTBF	**M**ean **T**ime **B**etween **F**ailure
PLC	**P**rogrammable **L**ogic **C**ontroller
RAM	**R**amdom **A**cces **M**emory
ROM	**R**ead **O**nly **M**emory
RTF	**R**ich **T**ext **F**ormat (standard document format with format descriptions)
SMART	**S**ick **M**odular **A**dvanced **R**ecognition **T**echnology

Tables

Table 6-1: Extract CLX490: Default parameter settings 6-2
Table 6-2: Reading distances for default settings 6-4
Table 6-3: Guide: Parameterizing the autofocus mode (Part 1)... 6-9
Table 6-4: Guide: Parameterizing the autofocus function (Part 2) 6-9
Table 6-5: Guide: Parameterizing the event-controlled focus control 6-10
Table 6-6: Guide: Parameterizing the reading trigger source 6-11
Table 6-7: Guide: Parameterizing the laser timeout...6-11
Table 6-8: Guide: Parameterizing the separation of identical bar codes......................6-12
Table 6-9: "Monitor Host Interface" function..6-22
Table 8-1: Error messages output on the auxiliary interface... 8-2
Table 8-2: LED error messages for access to the external parameter memory........... 8-3
Table 8-3: For messages for problems accessing the external parameter
memory... 8-5
Table 8-4: Meaning of the ST error status in the reading result 8-7
Table 8-5: Troubleshooting: restoring operation (Reading mode).................................... 8-9
Table 8-6: Troubleshooting: reading trigger errors in Reading mode............................8-10
Table 8-7: Troubleshooting: result output errors in Reading mode 8-11
Table 8-8: Troubleshooting: errors in the result status output in Reading mode........8-13
Table 9-1: Technical specifications of the CLX490-0010.. 9-1
Table 9-2: Technical specifications of the CLX490-0011.. 9-2
Table 10-1: Reading conditions for specification diagrams 10-1
Table 10-2: External parameter memory variants...10-8
Table 10-3: CLX system messages 10-14
Table 10-4: Additional CLX system messages for the connected
parameter memory 10-14
Table 10-5: Default settings in CLV-Setup...10-18
Table 10-6: Formulas for calculating the code length of a bar code 10-28
Table 10-7: Communication parameters on the terminal/PC for the
auxiliary input 10-31
Table 10-8: Communication parameter settings for the SICK Hand-held
Scanner from the IT 38xx/46xx/48xx/58xx series.....................................10-31
Table 10-9: CLX variants 10-35
Table 10-10: Accessories: mounting accessories 10-35
Table 10-11: Accessories: connection modules..10-35
Table 10-12: Accessories: bus connection modules...10-36
Table 10-13: Accessories: cables and connector covers for the CLX
without heater 10-37
Table 10-14: Accessories: cables and connector covers for the CLX with heater 10-38
Table 10-15: Accessories: plug-in connections 10-38
Table 10-16: Supplementary documentation in English language 10-40

8009237/RB47/2007-08-03

Figures

     8009237/RB47/2007-08-03

1 Notes on this document

1.1 Purpose

This document is a guide to the operation of the CLX490 Compact OMNI Scanner with auto-focus in the following variations:

– CLX490-0010, resolution from 0.30 mm
– CLX490-0011, resolution from 0.30 mm, with heater

This document provides information on

- Mounting and connecting the device
- Startup
- Operating and configuring (parametrizing) the device
- Maintenance
- Exchanging the device without losing the parameter set
- Special applications and procedures

The CLX490 Compact OMNI Scanner with all its variants will in this manual be referred to as the "CLX", except where a distinction is necessary.

1.2 Target audience

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

1.2.1 Mounting, electrical installation, maintenance and replacement

Electricians and service technicians.

1.2.2 Startup, operation and configuration

Technicians and engineers.

1.3 Information content

This document contains all the information required to mount, install, and start up the CLX with the **factory default settings**.
A series of step-by-step instructions is provided for each of these activities.

Configuration of the CLX for **the application-specific reading situations** is carried out with the Windows-based PC software "CLV-Setup". Further assistance is also available in the form of the online help system CLV-Setup Help. The procedure for installing and operating the software is described in the appendix.

For further information on the design of the bar code scanner or on bar code technology in general, please contact the Division Auto Ident at SICK AG.
Internet address: **www.sick.com**.

1.4   Symbols

Some of the information in this document is marked specially so that you can access it quickly:

Warning!

Warnings are provided to prevent injury to operating personal or serious damage to the bar code scanners.

➢   Always read warnings carefully and observe them at all times.

Reference   Italics are used to refer to more detailed information elsewhere.

Note   Indicates special features or characteristics.

Explanation   Explanations provide background information on technical features.

Recommendation   Recommendations help you carry out certain procedures more effectively.

Tip   Tips explain settings in the user interface of the "CLV-Setup" program.

Default   Marks a section containing the factory defaults.

SCANNING FREQUENCY   This typeface is used to refer to a term in the "CLV-Setup" program.

     Icons refer to buttons in the "CLV-Setup" program.

"Host receive fault"   This typeface is used for messages output via the auxiliary interface of the CLX.

This symbol is used to mark sections that describe steps carried out with the "CLV-Setup" program.

This symbol refers to additional technical documentation.

➢   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.

⇨   Here you select a function of the "CLV-Setup" user interface.

2 Safety information

2.1 Authorized users

For the CLX to function correctly and safely, it must be mounted and operated by sufficiently qualified personnel.

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

The end user must be supplied with the operating instructions.
The end user must be provided with expert tuition and is advised to read the operating instructions.

The following qualifications are required for the various tasks involved:

2.1.1 Mounting and maintenance

- General technical training
- Knowledge of the standard guidelines relating to safety at the workplace

2.1.2 Electrical installation and replacement

- Practical training in electrical engineering
- Knowledge of the standard safety guidelines relating to electrical engineering
- Experience operating the devices in the relevant application (e. g. conveyor belt)

2.1.3 Startup, operation and configuration

- Experience operating the devices in the relevant application (e. g. conveyor belt)
- Knowledge of the hardware and software environment of the relevant application (e. g. conveyor belt)
- Basic understanding of Windows 95™/98™, Windows NT4.0™, Windows 2000™ or Windows XP™
- Ability to use an HTML browser (e. g. Internet Explorer™)
- Basic understanding of data transfer methods
- Basic understanding of bar code technology

2.2 Intended use

The CLX is designed to detect and decode bar codes automatically. It is mounted in a reading station and reads bar codes on objects positioned on a conveyor belt, for example. The CLX transfers the data content of the decoded bar codes via its host interface to a host for further processing.

As an option, the CLX can be used with other devices, e. g. CLV490, in an OMNI Portal System.

Note   Any warranty claims against SICK AG shall be deemed invalid in the case of other system use or system modifications, this includes modifications during installation and electrical installation, changes to the SICK software, or opening the device.

2.3   General safety instructions and protection measures

➢ Always read the general safety instructions carefully and observe them at all times. Please also observe the warnings in front of the operating instructions in each chapter of this document.

WARNING

Shock hazard!

Depending on the type of device, the AM**S**60 Connection Module (accessory) for the CLX is connected to a mains voltage of 230 V AC 50 Hz or 115 V AC 50 to 60 Hz.

➢ When working with electrical equipment, always follow the relevant safety specifications.

WARNING

Laser beam can cause blindness!

The CLX uses a class 2 red-light laser. Looking directly at the laser beam can seriously damage your eyesight.

The entire glass window acts as a laser outlet aperture.

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

➢ As with sunlight, never look directly into the laser beam.

➢ Do not direct the laser beam at the eyes of other persons.

➢ Mount and align the CLX490 in such a way to prevent the laser beam reflecting off mirrored surfaces.

➢ Do not open the housing.
   (Opening the housing does not deactivate the laser diode).

➢ Observe the laser protection specifications (latest version).

Laser power

The laser operates at a wave length of $\lambda = 650$ nm (visible red light). The power output at the reading window is max. 2.8 mW.
The emitted radiation is not dangerous to human skin.

The product is classified in laser class 2 (laser class II) in accordance with EN 60825-1, IEC 60825-1, and 21 CFR 1040.10 (for publication date, see the warning sign on the device).

Note   No maintenance required to keep this product in compliance with laser class II.

Laser warnings

The laser warning symbols (*Fig. 2-1*) can be found on the CLX at the following locations:

The laser warning symbol is positioned on the reading window. The GB/US laser warning is located on the side containing the electrical connections (see *Fig. 3-1, Page 3-3*.)

        8009237/RB47/2007-08-03

black-yellow signed on device:

LASER RADIATION - DO NOT STARE INTO BEAM
CLASS 2 LASER PRODUCT

Max. output radiation: 2.8 mW Peak,< 1.0 mW Average
Emitted wavelength: 650 nm
Pulse duration: 111 µs

IEC60825-1 AMD2:2001-01;EN 60825-1/A2:2001-03
Complies with 21CFR 1040.10 except for deviations
pursuant to Laser Notice No. 50, dated July 26, 2001

black-silver signed on device:

AVOID
EXPOSURE
LASER
RADIATION
EMITTED FROM
THIS APERTURE

CAUTION – Laser radiation when open
DO NOT STARE INTO BEAM

Fig. 2-1: Laser warning labels on the CLX

Note   A set of laser warnings in German/US English and French/US English is included in the delivery scope. The GB English/US English warnings can be pasted over with these if necessary.

If the CLX is installed in a machine/panel with the result that the laser warning labels are no longer visible, additional warnings in the same language (not included in the scope of delivery) must be provided on the machine beside the emergence aperture of the laser beam.

Internal protective circuits

The CLX is equipped with monitoring circuits that deactivate the laser diode in the event of a malfunction.

Activation and deactivation of the laser diode is controlled by the reading pulse trigger.

A timer (laser timeout) automatically deactivates the laser diode in Reading mode ("Sensor input" and "Serial interface" trigger mode) if the reading interval has not ended after 10 minutes (default setting). However, it does not end the reading interval. In this case, the CLX outputs the message

"Laser safety timeout"

on the auxiliary interface. The reading interval must be terminated by resetting the trigger signal. The laser diode is activated again by the next reading trigger.

The laser timeout can be set in the range of 1 min to 25 h or deactivated *(see Table 6-7, Page 6-11)*.

In the "Percentage Evaluation" mode as well as in the pulse mode "Free-running", in reading mode, the laser diode is constantly activated. In the pulse mode "Object Polling" the laser diode is activated due to the parameterized search/pause ratio.

Note   In Reading mode, the CLX carries out a measurement referencing at regular intervals. During referencing, it turns the laser diode on for a maximum of 10 seconds.

2.4   Quick stop and quick restart

2.4.1   Stopping the CLX

➢   Switch off the power supply or remove the cables of the CLX from the connection
     module.

This can result in loss of the following (at the most):

•   The application-specific parameter set, if it was stored **temporarily** in the CLX

•   The last reading result

•   Daily operating data
     (operating hours counter, number of reading intervals, Good Read count, No Read
     count, maximum duration trigger, minimum duration trigger, matchcode 1 count, match-
     code 2 count, no match count)

2.4.2   Restarting the CLX

➢   Switch on the power supply or reattach the cables of the CLX490 to the connection
     module.
     The CLX resumes operation with the parameter set that was **last stored permanently**
     and reset the daily operating data.

2.5   Environmental information

The CLX is designed to cause minimum impact on the environment. It does not contain any
silicone-based materials on the housing surface and, therefore, does not represent any
problems for paint sprayers in paint shops, for example.

2.5.1   Power requirements

The power requirements depend on the variants:

•   The CLX490 Compact OMNI Scanner has a typical power consumption of 11 W and
     max. 16 W

•   The CLX490 Compact OMNI Scanner equipped with an integrated heater has a typical
     power consumption of 75 W and max. 90 W

 The values are given for devices with disconnected switching outputs.

2.5.2   Disposal after removal from service

Always dispose irreparable devices in a manner that is not harmful to the environment and
in accordance with the applicable national waste disposal regulations. The CLX can be sep-
arated into recyclable secondary raw materials and special-category waste (electronic
scrap).
See also *Chapter 7.4 Disposal, Page 7-3*.
SICK AG currently does not accept delivery of unusable or irreparable devices.

3   Product description

3.1   Design

3.1.1   Scope of delivery

The CLX is supplied with the following in the **packing**:

- an information sheet (notes on device) with terminal diagram and Quick Start instructions
- an additional set of Class 2 laser warning labels (self-adhesive) in German/US English and French/US English
- CD-ROM (no. 2029112) with
  - "CLV-Setup" program for Windows™ and the "CLV-Setup Help" online help system (HTML files)
  - "CLV Connect" PC software (HTML files showing terminal diagrams)
  - CLX490 Operating Instructions in English and German as PDF edition as well as additional publications (connections module, other SICK bar code scanners)
  - freely available "Acrobat Reader" PC software for reading PDF files

Note   The latest versions of all the current publications/programs on the CD-ROM can also be downloaded from **www.sick.com**.

Depending on the number of **copies ordered**, the delivery includes (**optional**):

- CLX490 Operating Instructions in English and/or German (printed edition)

Chapter 10.12 Ordering information, Page 10-35 contains an overview of the available accessories, connection modules, cables, and connectors, as well as sensors for generating the reading pulse.

3.1.2   Variants

The CLX is currently available in the following variants:

Type (red light)	Part. no.	Scanning method	Resolution	Heater
CLX490-0010	1019318	CLX490 Compact OMNI Scanner	from 0.30 mm	no
CLX490-0011	1019319	CLX490 Compact OMNI Scanner	from 0.30 mm	yes

Tab. 3-1:   CLX variants

3.1.3   System requirements

CLX without heater   The following are required to start up and operate the CLX without heater:

1. A SICK Connection Module to provide the power supply and connect the data and function interfaces.

    Available types:

    - For connecting **one** CLX:
      AMV60-011 (no. 1017134) for 18 to 30 V DC, enclosure rating max. IP 54
      AMS60-013 (no. 1017139) for 230 V AC 50 Hz/24 V DC,
      enclosure rating max. IP 54
      AMS60-012 (no. 1017140) for 115 V AC 50/60 Hz/24 V DC,
      enclosure rating max. IP 54
      AMV100-011 (no. 6021105) for 18 to 30 V DC, enclosure rating max. IP 65

8009237/RB47/2007-08-03   **3-1**

— For connecting **two** CLX:

AMV30-071 (no. 1017391) for 18 to 30 V DC, enclosure rating max. IP 54

AMV200-011 (no. 6021106) for 18 to 30 V DC, enclosure rating max. IP 65

– or –

Alternatively, a non-SICK Power pack with a voltage output of **18 to 30 V DC** (functional extra-low voltage pursuant to IEC 364-4-41) and a minimum power output of **20 W**.

Cable no. 2020264 (3 m) with 15-pin D Sub HD connector and one open end for connecting the CLX to the non-SICK Power pack (supply voltage).

2. The following operating voltages/power output values:

— AMV60-011: 18 to 30 V DC (to IEC 364-4-41), min. 20 W

— AMV30-071: 18 to 30 V DC (to IEC 364-4-41), min. 40 W

— AMV100-011: 18 to 30 V DC (to IEC 364-4-41), min. 20 W

— AMV200-011: 18 to 30 V DC (to IEC 364-4-41), min. 40 W

— AMS60-013: 230 V AC ±10 % 50 Hz

— AMS60-012: 115 V AC ±10 % 50 to 60 Hz

3. Fitting cables see *Chapter 5.2.2 Prefabricated cables (overview), Page 5-2*.

4. Appropriate incremental transmitter for tracking.

5. With external clock pulse supply via the "Sensor" switching input: a suitable reading pulse sensor for signaling an object with a bar code, e.g. a photoelectric reflex switch.

6. With object distance detection via the "IN 0 to IN 4" switching inputs: suitable sensors for multi-stage dynamic focus control, e. g. photoelectric reflex switches.

7. A higher-level computer (host) with a data interface of type RS 422/485 or RS 232.

8. A PC (min. Pentium II, 350 MHz, 64 MB RAM, CD drive, a serial port (COM x), mouse (recommended)) with Windows 95™/98™, Windows NT™, Windows 2000™ or Windows XP™.

9. A 3-core RS 232 data cable (null modem cable) with two 9-pin D Sub sockets for connecting the PC to the auxiliary interface of the CLX in the connection module, e. g. no. 2014054. Pin 2 (RxD) and Pin 3 (TxD) are crossed.

10. An HTML browser, e. g. Internet Explorer™, for using the online help system CLV-Setup Help.

11. The appropriate bus connection module BMV/BMH10 (available on request) for connecting the CLX to the Interbus-S, Profibus DP, Device Net or the Ethernet.

12. For connection of the CLX to the CAN bus: the operating instructions "Using the CAN interface" (no. 8009180, English version)

CLX with heater   The following are required to start up and operate the CLX with heater:

1. A SICK Connection Module from the **AMV100** or **AMV200** series to provide the power supply and connect the data and function interfaces.

Available types:

— For connecting one CLX: AMV100-011 (no. 6021105) for 24 V DC, max. IP 65

— For connecting two CLXs: AMV200-011 (no. 6021106) for 24 V DC, max. IP 65

– or –

Alternatively, a non-SICK Power pack with a voltage output of 24 V DC +20 %/−10 % (functional extra-low voltage pursuant to IEC 364-4-41) and a minimum power output of **100 W**.

Cable no. 2020264 (3 m) with 15-pin D Sub HD connector and one open end for connecting the CLX to the non-SICK Power pack (supply voltage).

2. The following operating voltages/power output values:
   – AMV100-011: 24 V DC +20 %/−10 % (pursuant to IEC 364-4-41), min. 100 W
   – AMV200-011: 24 V DC +20 %/−10 % (pursuant to IEC 364-4-41), min. 200 W
3. See *pos. 3* under CLX **without** heater

3.1.4 Design

Legend

❶ Reading window

❷ Laser warning label

❸ Mark for counting direction for the reading angle

❹ Blind hole thread M6, 7 mm deep, for securing the device

❺ Drilled hole, Ø 3.6 mm, 6 mm deep

❻ Blind hole thread M4, 10 mm deep, for the connector cover

❼ "Host/Term" connector 15-pin D Sub HD plug

❽ "I/O" connector, 15-pin D Sub HD socket

❾ LED (status indicators)

Fig. 3-1: Design of the CLX

8009237/RB47/2007-08-03 **3-3**
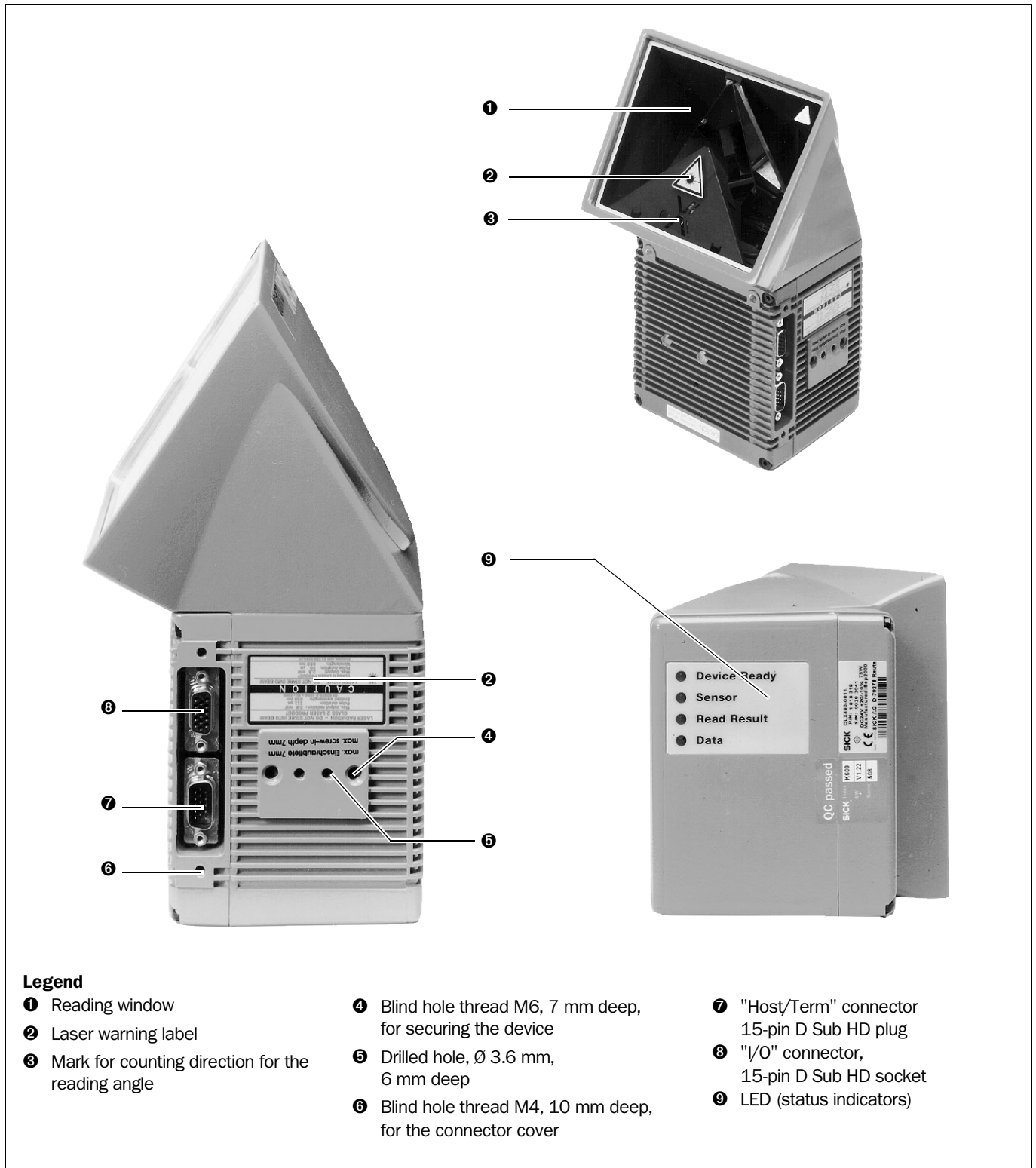
3.2   Method of operation

The CLX first scans the bar code with a folded scan line (resulting in a cross) and then de-codes it. The data is forwarded via the main data interface (serial host interface) to a host/ PC for further processing. An overview of the CLX functions is provided in *Fig. 3-2*.
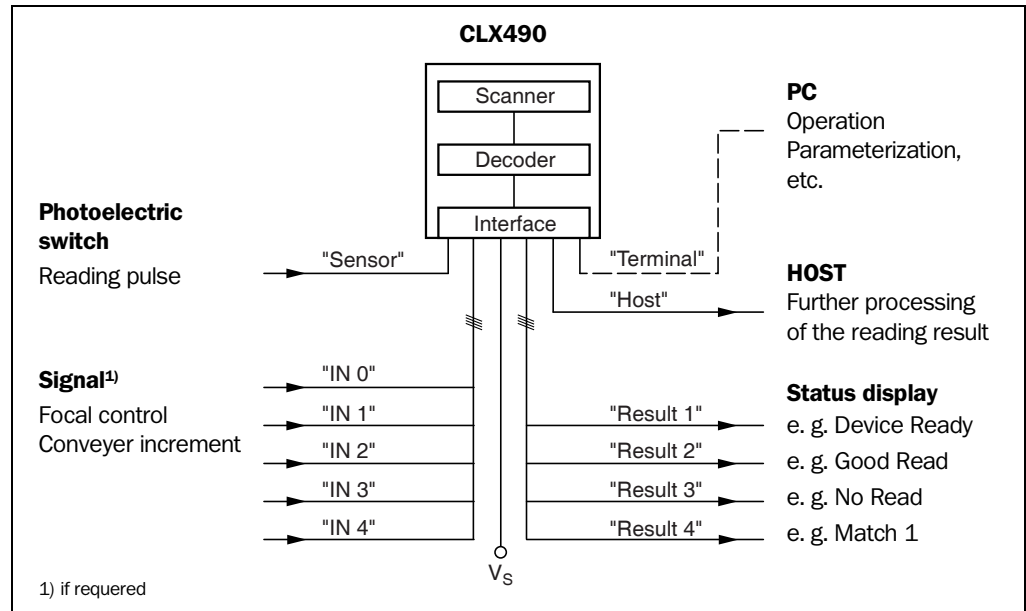
Fig. 3-2:   Block diagram: CLX functions

The CLX is equipped with two decoders:

- The SMART decoder (**S**ICK **M**odular **A**dvanced **R**ecognition **T**echnology) for decoding bar codes with small code height, bar codes that are dirty or damaged, as well as bar codes that are tilted excessively (azimuth angle)

- The tried-and-tested standard decoder of the CLV series

The CLX derives useful diagnosis data from the reading process and can transfer it also to the host. It also records operating data that can be interrogated at any time. The quality of the read can be checked in percentage evaluation mode.

To start the reading process when an object is located in the reading field, the CLX requires a suitable trigger. This opens an internal time window ("reading interval") in the CLX. In the default configuration, this trigger is supplied by an external reading pulse sensor. Alternative trigger sources include free-running mode or a command via the host interface (for more complex applications: OTC trigger).

With small object distances (object distance < reading gate length) the bar code has to be allocated to the right object with the help of the internal tracking of the CLX.

The current operating status is indicated by four LEDs.

If the trigger is supplied externally, the "Sensor" switching input instructs the CLX to start the reading process. The five "IN 0 to IN 4" switching inputs switch the focus position in response to certain events, as an alternative to the autofocus function. The "IN 4" input can also be assigned to special functions. The four "Result 1 to Result 4" switching outputs can be assigned to different functions alternativly for displaying the result status and also control external devices, such as a PLC.

The CLX is operated and configured via the auxiliary interface (serial auxiliary interface) using the CLV-Setup software or via the host interface/auxiliary interface using command strings.

System, warning, and error messages help you configure the device and locate the source of errors during startup and reading mode.

3.2.1 Autofocus function

The autofocus function enables the CLX to detect the distance of an object without the need for external sensors, and then adjust the focus position automatically. In order to do so, the CLX measures the object distance in its reading field in front of the reading window and internally creates a distance profile. Following this, it positions the focus on the object.

3 operating modes are provided for various applications:

- *Minimum distance:* the CLX focuses on the minimum distance in the distance profile and ignores the background in the reading field. Application: with unobstructed view of the object without any surrounding objects protruding into the reading plane.
  One object with bar code(s) only is inside the reading field during one reading pulse.

- *Differential background:* the distance profile of the reading field background is programmed (teach-in) in the CLX without any objects present. The CLX focuses on the object which it recognizes by comparing the object with the background. Application: with unobstructed view of the object restricted by other objects that protrude into the reading plane.
  One object with barcode(s) only is inside the reading field during one reading pulse.

- *Differential background and tracking:* if several objects with different distances are positioned in the reading field at the same time (distance conflict), the CLX focuses on the object that is nearest to but has not exceed its internal focus switchover point.
  Application: in OTS operation (applications with tracking by the OMNI Tracking Controller OTC 400), or stand alone in internal tracking mode.

The distance profile of the background can also be displayed in the "CLV-Setup" program. The reading field is defined by the autofocus range. The park setting of the focus position, from which the device focuses for each read, can be specified in addition to a time and/or position-related delay (timeout or hysteresis). If necessary, an offset can be defined for the focus position to be set by the measurement. The depth of field, which radiates in the direction of the scan line and is caused by the V-principle of the beam deflection, is optimized as a result (*Fig. 3-3*).

Measured distance

Optimum focus position:
measured distance plus offset for maximum
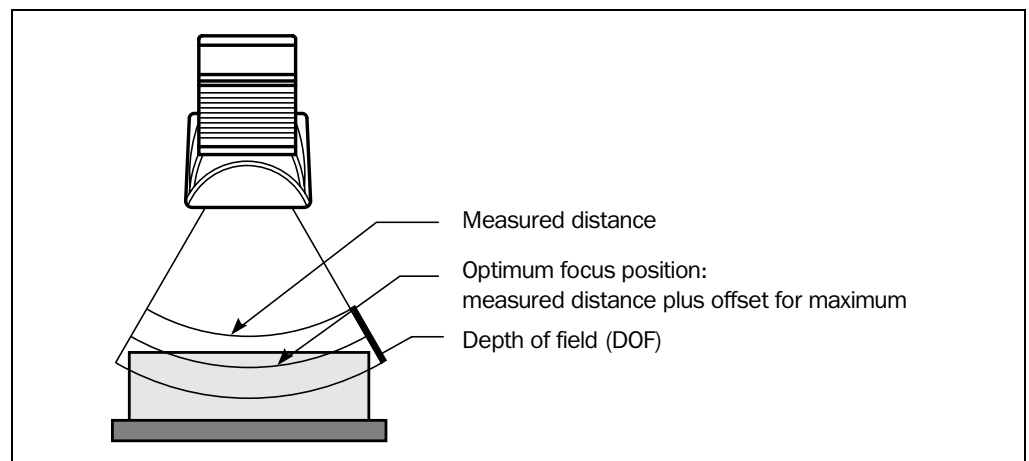
Depth of field (DOF)

Fig. 3-3: Optimization the depth of field for the object

8009237/RB47/2007-08-03 **3-5**

3.2.2   Event-controlled dynamic focus control

As an alternative to the autofocus function, the CLX can switch its focus position in response to certain events and thus dynamically cover a large reading range. A maximum of eight reading ranges can be defined as distance configurations for this purpose and approached consecutively in reading mode (see *Fig. 3-4*).
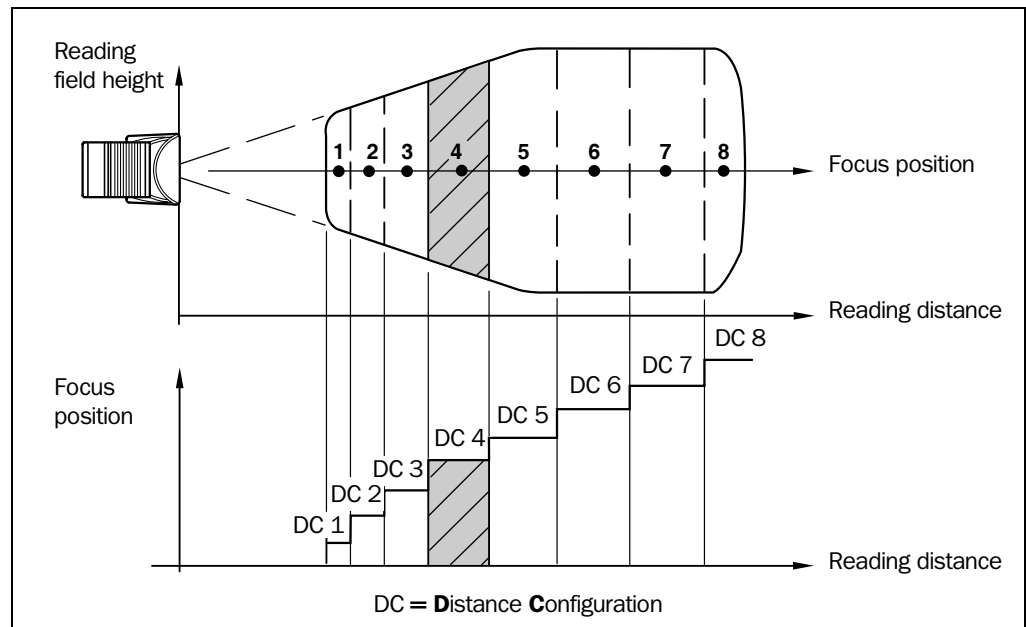
Fig. 3-4:   Dynamic focus control: classification of the reading range in distance configurations

The switch over takes place in response to changes in the object distance (with reads from above: object height detection). The trigger source for the switchover is a signal combination at the "IN 0 to IN 4" switching inputs, a command on the host interface/auxiliary interface or the integrated timer (e. g. for search mode). The distance configurations are assigned to the swichover sequence by means of a programmable assignment table. The object distance measurement of the autofocus function can additionally be used to define the distance configurations.

3.2.3   Additional components

Heater

The CLX can be permanently equipped with a heater for applications involving temperatures up to max. –30 °C (e. g. in a freezer).

The design, technical data, and power-up behavior of the CLX are described in *Chapter 10.4 Optional heating, Page 10-12*.

External parameter memory

The external parameter memory is located in a connector cover which, when mounted, covers the two electrical terminals on the CLX (IP 65). The parameter memory saves you time when a CLX is replaced locally by providing a copy of the current parameter set. In other words, you do not have to configure the new device.

For information on applications and operating procedures, see *Chapter 10.3 Installing and operating the external parameter memory, Page 10-8*.

                     8009237/RB47/2007-08-03

3.3   Indicators and control elements

3.3.1   Control elements

The CLX is operated and configured via the auxiliary interface using the CLV-Setup program or using command strings sent via the host interface/auxiliary interface. A variety of parameter options allow you to adapt the device to a wide range of applications.

The following can be defined:

- The configuration of the code types
- The read, evaluation, and output properties
- The communication parameters of the host interface
- The structure of the data output string for Good Read and No Read on the host interface
- The function of the auxiliary interface

Chapter 10.6 Installing and operating the "CLV-Setup" program, Page 10-15 describes the procedure for installing the "CLV-Setup" program and explains how to use it. The parametrization (configuration) procedure is explained in *Chapter 6.4 Configuring (parameterization) the CLX, Page 6-4*.

3.3.2   Function of the LEDs

Four LEDs indicate the operating status, activity of the laser diode, reading result status, and data transfer on the host interface. The LEDs are located on the rear of the device (*Fig. 3-5*).

If the optional external parameter memory is connected, the LEDs also indicate whether the memory was successfully accessed.

Fig. 3-5:   LEDs

The meaning of the LEDs in the various operating modes/functions is shown in *Table 3-2, Page 3-8* and *Table 3-3, Page 3-9*.

CLX without external parameter memory

Operating mode	LED	Display	Function
Start	**Device Ready**	*Green*	• Lights up after power-up if the self-test was successful Subsequent behavior depends on selected start option **Start option: Start with external Parameters (default)** • Lights up constantly (CLX has loaded internal parameter set) **Start option: Start with internal Parameters:** • Lights up constantly (CLX has loaded internal parameter set) **Start option: Start with Copy Intern -> Extern:** • Blinks constantly together with the "Read Result" LED[1] (CLX has loaded internal parameter set)
	Read Result	*Green*	**Start option: Start with Copy Intern -> Extern:** • Blinks constantly together with the "Device Ready" LED[1]
Reading mode	**Device Ready**	*Green*	• Lights up constantly • Extinguishes with new operating mode/function
	Sensor	*Green*	• Lights up if reading diode is active (The laser diode is activated/deactivated by reading pulse) • Lights up constantly in Free-running mode, since laser diode is always active
	Read Result	Green	LED is linked to the "Result 2" switching output and indicates the selected result status for the defined pulse duration of the output. • Lights up after a successful read (default: Good Read) • Lights up if the match code comparison is active, the bar code read matches the specified match code(s) and the corresponding result status output is selected for the "Result 2" output
	Data	Yellow	• Flickers when the CLX transfers data to the host on the host interface
Percentage evaluation	**Sensor**	*Green*	• Lights up constantly, as Free-running mode is active
	Read Result	*Green*	Behavior depends on the reading quality: • Extinguishes if reading rate < 30 % • Blinks twice a second if reading rate 30 % to 70 % • Blinks five times a second if reading rate 70 % to 90 % • Lights up constantly if reading rate > 90 %

1) Set the start option to Start with the internal Parameters on the Device Configuration tab in the "CLV-Setup" program. Download to CLX!

Table 3-2: Meaning of LEDs: CLX without external parameter memory

                      8009237/RB47/2007-08-03

CLX with external parameter memory connected

Operating mode	LED	Display	Function

Start	Device Ready	*Green*	• Lights up after power-up if the self-test was successful
			
			Subsequent behavior depends on selected start option:
			Start option: START WITH EXTERNAL PARAMETERS (default):
			• **Blinks for approx. 10 s before lighting up constantly**
			  (CLX has loaded the parameter set from the external parameter memory and starts reading mode straight away)
			• Blinks for approx. 10 s together with the "Read Result" LED, then lights up constantly.
			  (CLX has loaded the parameter set from the external parameter memory with **tolerated errors**[1] and starts reading mode straight away)
			• Lights up constantly
			  (CLX could not find an external parameter memory and loads the internal parameter set instead)
			• Blinks constantly together with the "Read Result" LED[2]
			  (The external parameter memory contains the parameter set for another CLX type, or is corrupt.)
			  CLX has loaded the internal parameter set. It starts Reading mode but does not output data over the host interface)
			
			Start option: START WITH INTERNAL PARAMETERS:
			• Lights up constantly (CLX has loaded internal parameter set)
			
			Start option: START WITH COPY INTERN -> EXTERN:
			• **Blinks alternately with the "Read Result" LED for approx. 10 s before lighting up constantly**
			  (CLX has successfully copied the internal parameter set to the external memory and has reset the start option to START WITH EXTERNAL PARAMETERS)
			  CLX has loaded the internal parameter set.
			• Blinks constantly together with the "Read Result" LED[2]
			  (The external parameter memory is either not connected or corrupt, or the parameter set is too large to be copied).
			  CLX has loaded the internal parameter set.

	Read Result	*Green*	**Start option: START WITH EXTERNAL PARAMETERS (Default):** • Blinks for approx. 10 s together with "Device Ready" LED[1] (see above) or • Blinks constantly together with the "Device Ready" LED[2] (see above) **Start option: START WITH COPY INTERN -> EXTERN:** • Blinks alternately with "Device Ready" LED for approx. 10 s (see above) or • Blinks constantly together with the "Device Ready" LED[2] (see above)
Reading mode	Device Ready	*Green*	• Lights up constantly • Extinguishes with new operating mode/function
	Sensor	*Green*	• Lights up if reading diode active. (The laser diode is activated/deactivated by the reading pulse) • Lights up constantly in Free-running mode, since the laser diode is constantly active
	Read Result	*Green*	LED is linked to the "Result 2" output and indicates the selected result status for the defined pulse duration of the output. • Lights up after a successful read (default: Good Read) • Lights up if the match code comparison is active, the bar code read matches the specified match code(s) and the corresponding result output is selected for the "Result 2" output

1) We recommend that you check the parameter set manually, e. g. by printing out the entire configuration. For troubleshooting, see also *Chapter 8.3.2 LED error messages for the external parameter memory, Page 8-3*
2) Stops blinking when you switch from Reading mode to Parameterization mode

Table 3-3: Meaning of LEDs: CLX with external parameter memory

Operating mode	LED	Display	Function
Reading mode (contd.)	**Data**	*Yellow*	• Flickers when the CLX transmits data to the host over the host interface
Percentage **evaluation**	**Sensor**	*Green*	• Lights up constantly, since Free-running mode is active
	Read Result	*Green*	Behavior dependent on the reading quality: • Extinguishes if reading rate < 30 % • Blinks twice a second if reading rate 30 % to 70 % • Blinks five times a second if reading rate 70 % to 90 % • Lights up constantly if reading rate > 90 %

Table 3-3: Meaning of LEDs: CLX with external parameter memory (contd.)

4   Installation

4.1   Installation sequence

- Change the language version of the laser warning label (if necessary)
- Select the mounting location for the CLX
- Align the CLX with the bar code and mount the CLX
- Mount the AMV/S60 Connection Module
- Connect the CLX to the AMV/S60 Connection Module
- Adjust the CLX so that it is in line with the bar code
- Mount the reading pulse sensor for external triggering the reading pulse
- Optionally: Mount incremental transmitter (for the internal tracking mode)
- Option with event-controlled dynamic focus control:
  mount the sensors for detecting the object distance

Note   **Don't open the device. The warranty will be forfeited if the device is opened.**

4.2   Preparations

4.2.1   Required components

- CLX490 Compact OMNI Scanner

4.2.2   Required accessories

- SICK mounting bracket for the CLX:
  depending on the order, angle bracket no. 2022996, or quick-clamping device
  no. 2016110 with securing material for the CLX

– or –

Alternatively, if the bracket is supplied by the user:

  – Stable mounting device that allows the alignment of the CLX to be varied in the x and y
    axes. The weight of the CLX is approx. 2 kg.
  – 2 screws M6 for the CLX. The screw length depends on the wall thickness of the
    bracket used. Depth of engagement in **CLX max. 7 mm** from housing surface.
- AMV/S60 Connection Module (not included in the scope of supply of the CLX)
- Reading pulse sensor for external reading pulse triggering, e. g. photoelectric reflex
  switch/ photoelectric proximity switch (not included in the scope of supply of the CLX)
- Option with event-controlled dynamic focus control: sensors for detecting the object
  distance, e. g. photoelectric reflex switches/photoelectric proximity switches (not
  included in the scope of supply of the CLX)

4.2.3   Required auxiliary parts

- 2 screws M6 for securing the SICK mounting bracket to the base. The screw length
  depends on the wall thickness of the base.
- Set of laser warning labels (if necessary)
- Tool
- Measuring tape (up to 2,000 mm)
- Protractor

4.2.4   Replacing the laser warning label

If necessary, replace the GB English/US English laser warning label with the required language (*Fig. 4-1*).

The device is delivered with a set of laser warnings in:

- German/US English laser warning and
- French/US English laser warning

See also *Chapter 2.3 General safety instructions and protection measures, Page 2-2*.
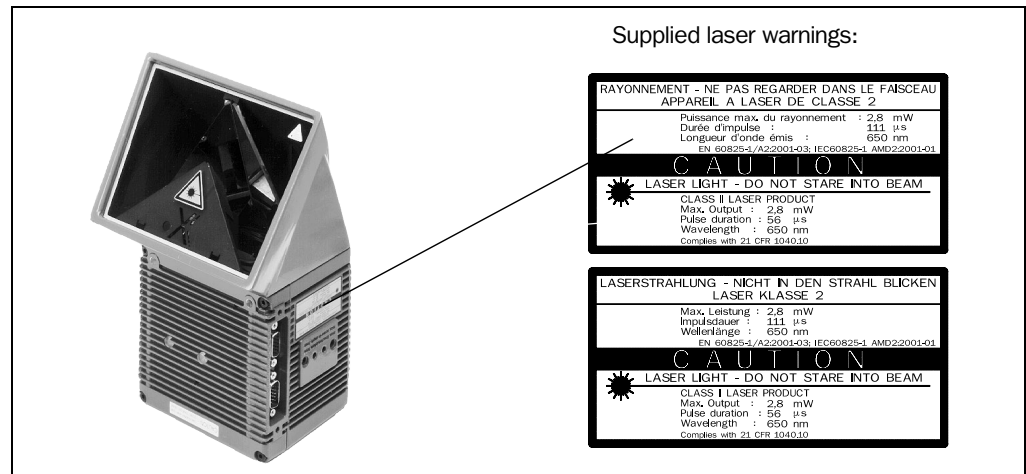
Fig. 4-1:   Replacing the laser warning labels

4.2.5   Selecting the mounting location

When you select the mounting location, the distance between the CLX and the host and between the CLX and the bar code are important.

Distance between the CLX and the host

The CLX can be mounted at a maximum distance of 1,200 m from the host without a connection to the SICK network or a bus. In practice, however, the distance depends on the physical configuration of the host interface and the data transfer rate (see *Table 5-7, Page 5-8*).

Distance between the CLX and the AMV/S60 Connection Module

The AMV/S60 Connection Module should not be located further than 10 m from the CLX, since the "CLV-Setup" program on the PC accesses the auxiliary interface (RS 232) of the CLX via this module.

4.2.6 Mounting accessories

The CLX is secured in position using the two tapped blind holes (M6) above the electrial connections. *Fig. 4-2* shows the location of the threads near the CLX.

The dimensions of the CLX housing are shown in *Fig. 9-1, Page 9-2*.
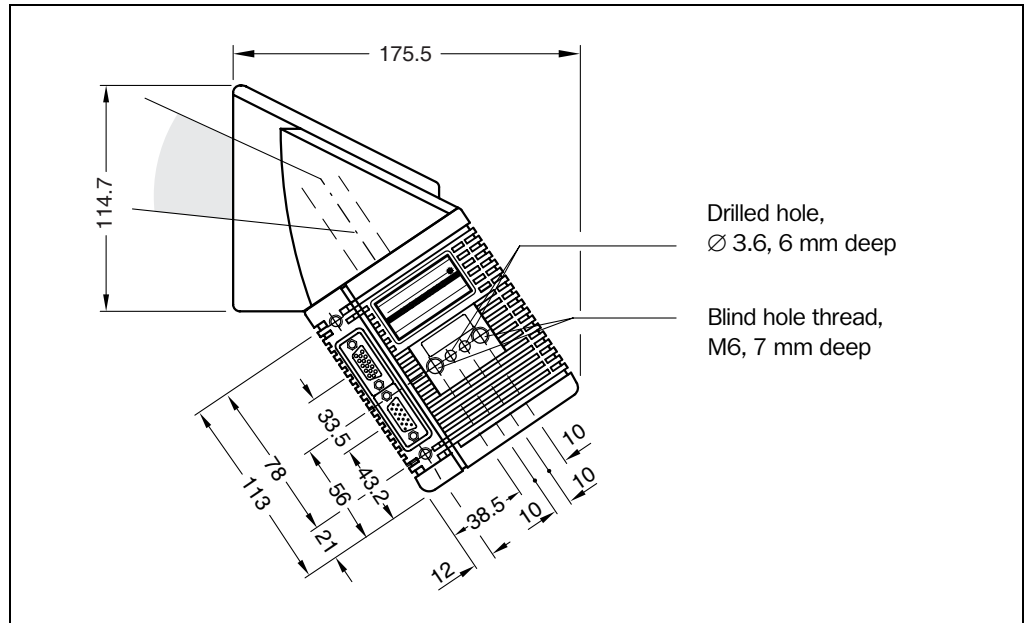
Fig. 4-2: Position of the securing threads on the CLX

The CLX can be mounted using the SICK bracket:

- Angle bracket no 2022996.
- Quick-clamping device no. 2016110

The brackets are designed to support the mounting of the CLX to horizontal and vertical surface. *Fig. 4-3* shows two mounting examples for angle bracket no. 2022996.
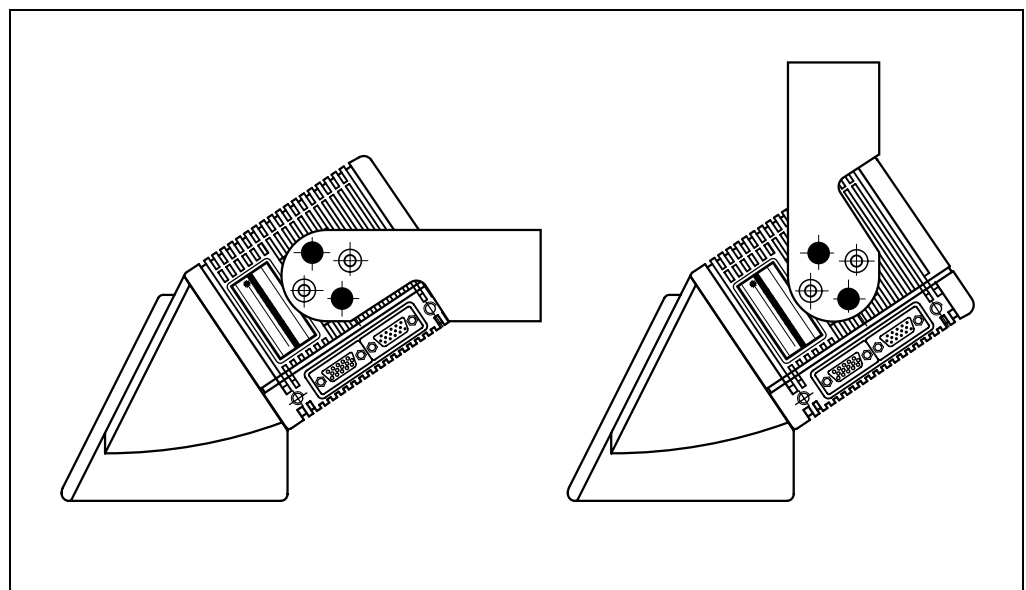
Fig. 4-3: Mounting possibilities of the CLX with angle bracket no. 2022996

The dimensions of the angle bracket is shown in *Chapter 10.13 Dimensioned drawings of the accessories, Page 10-39*.

4.2.7 Distance between the CLX and the object

Basic alignment between the CLX and bar code

The CLX is used for reading omnidirectionally oriented bar codes on the lateral or upper sides of objects. *Fig. 4-4* shows the basic alignment of the CLX.

Reading distance to the object

The distance between the reading window of the CLX and the object must not exceed the technical limits. The height of the reading field is shown as a function of the reading distance for various resolutions (module widths) in *Chapter 10.2.2 Reading performance data CLX490 Compact OMNI Scanner, Page 10-2*.

Fig. 4-4 shows the definition of the reading distance "a" (radial measured) from the reading window.
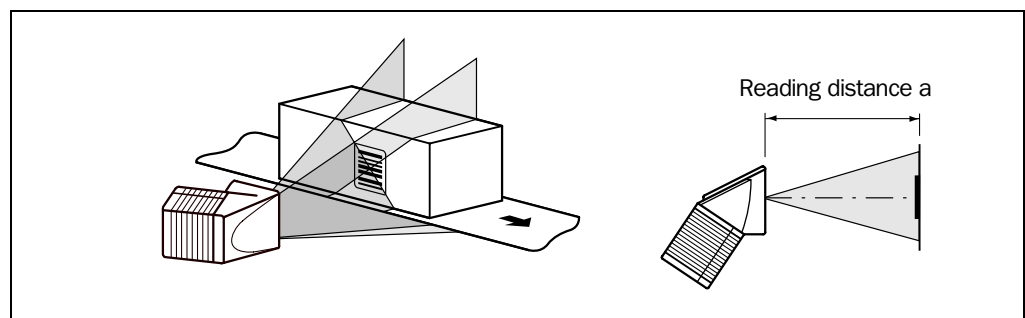
Fig. 4-4:   Definition of the reading distance a to bar code and convoyer direction

Due to the X-principle of beam deflection, the reading field height (for evaluating the useful length of the scan line) depends on the readling distance.

Angular alignment of the CLX

All possible reading angles that can occur between the scan line and the bar code must be taken into consideration (*Fig. 4-5* and *Table 4-1*).
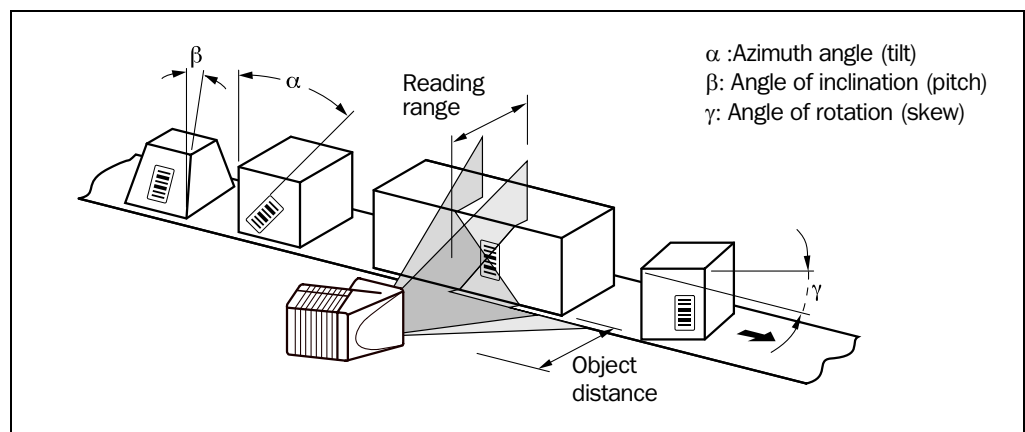
Fig. 4-5:   Reading angles between the scan line and the bar code

Angle	Limit value
Tilt α (azimuth)	Omnidirectional
Pitch β	Max. 45°
Skew γ	Max. 45°

Table 4-1: Permissible reading angles between the scan lines and bar code

Note   If reading from the front, mount the CLX above the conveyor belt in such a way against the conveying direction that the scan line hits the object under a skew of approx. 10°.

4.2.8   Count direction of the reading angle RA

Explanation   The CLX can scan and decode several bar codes with each read. In doing so, it determines the specific local reading diagnosis data for each bar code the reading angle (RA value) of the center of the bar code within the scan.

Fig. 4-6 shows the count direction of the reading angle. The count direction of the reading angle is marked by a cross in the reading window.

By determining this data, the device can separate identical bar codes.
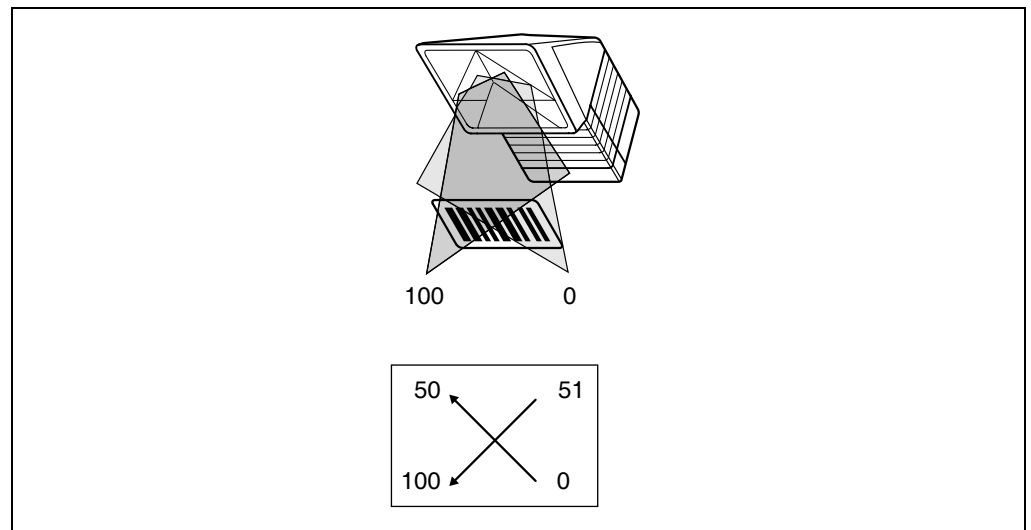
Fig. 4-6:   Count direction of the reading angle RA in the scan line

Tip   In the default setting, the CLX does not output the "RA" value in the reading result on the host interface. If this is required to evaluate the result in the host, the values can be included in the "Code-Info/Separator" block of the output string using the "CLV-Setup" program.

Configuring the Code-Info/Separator:

1. Choose the DATA STRINGS tab.
2. Click the CODE-INFO/SEPARATOR field.
   The EDIT PARAMETER TFS dialog box is displayed.
3. In the list field, click the RA parameter.
   RA then appears in the top line.
4. Confirm your selections with OK.
5. Download the data to the CLX by clicking 🖳 in the toolbar.
   The DOWNLOAD PARAMETERS dialog box is then displayed.
6. The CLX490 outputs the RA value on the host interface for each bar code in the reading result. The values are displayed as a 3-digit number in the associated "Code-Info/Separator" block.

4.3   Mounting and adjusting the device

4.3.1   Mounting the CLX

1. Prepare the base for mounting the bracket as described in *Chapter 4.2.2 Required accessories, Page 4-1*.

2. Place the object containing the bar code within the reading field of the CLX (in the position at which it is to be read) with the conveyor belt switched off.

3. Allign the CLX reading window in parallel to bar code surface. Consider the positioning of the CLX in relation to the conveyor direction (see *Fig. 4-4, Page 4-4*).
    All of the possible reading angles must be taken into consideration (see *Fig. 4-5, Page 4-4*).

4. If it is relevant for the evaluation, note the count direction of the reading angle (see *Fig. 4-6, Page 4-5*).

5. Mount the CLX bracket on the base.

Risk of damage to the device!

The maximum depth of engagement of the two blind hole threads M6 is 7 mm.
Longer screws will damage the device.

➢   Use screws with the correct length.

ATTENTION

6. Screw the screws M6 through the bracket into the blind hole threads of the CLX.

7. Tighten the screws slightly.

8. Adjust the CLX as described below.

4.3.2   Adjusting the CLX

The CLX can be adjusted in Percentage Evaluation mode. In this mode, the CLX displays the quality of the bar code reads that enter the CLX reading field statically (the object is not moved on the conveyor belt). In the Free-running mode the CLX performs 100 scans and evaluates the reading quality statistically. It then outputs the reading results every 2 s on the auxiliary interface.

Note   In default setting, the CLX operates in the autofocus mode "Minimum distance". As a result, the CLX focuses on the object that is nearest in Percentage Evaluation mode. The view on the object with the scan line must be unobstructed, i. e. any other objects must not protude into the autofocus space. If they do so, the autofocus mode "Differential background" must be selected. Alternatively a fixed focus position can be set.

The behavior of the "Read Result" LED also indicates the reading quality.

–   The LED is extinguished if reading quality is $<$ 30 %

–   The LED flashes twice per second if the reading quality is 30 % to 70 %

–   The LED flashes five times per second if the reading quality is 70 % to 90 %

–   The LED is lit continuously if the reading quality is $>$ 90 %

The scanning frequency in the default setting is 800 Hz.

1. Connect the CLX to the AMV/S60 Connection Module and switch on the power supply (see *Chapter 5.5.3 Connecting the supply voltage, Page 5-13*).
    After it has started, the CLX confirms that the self-test was successfuly and switches to reading mode ("Device Ready" LED lights up).

2. Connect the PC to the auxiliary interface of CLX. To do so, connect a 3-core RS 232 data cable (null modem cable) to the internal 9-pin "Service" plug of the AMV/S60 (see *Chapter 5.5.6 Connecting the PC, Page 5-15*).

3. Start Windows and the "CLV-Setup" program (see *Chapter 10.6.3 Starting CLV-Setup, Page 10-18*).

Choosing the standard decoder:

4. Choose the CODE CONFIGURATION tab.

5. Click the STANDARD option in the DECODER section.

6. Download the settings to the CLX.
   To do so, click the STANDARD option again with the right mouse button and choose DOWNLOAD PARAMETER in the context menu.
   CLV-Setup copies the parameter to the CLX temporarily.
   The CLX then operates with the standard decoder (until the CLX is switched off).

Activating Percentage Evaluation mode:

7. From the VIEW menu, choose PERCENTAGE EVALUATION.
   The dialog box for entering the distance configuration appears.

8. Click the relevant distance configuration for the reading distance:
   – with autofocus mode the distance configuration no. 1
   – with event-controlled dynamic focus control the distance configuration that matches the reading distance of the object (default: no. 1, focus position F = 1,200 mm).

9. Confirm the dialog box with OK.
   The Terminal Emulator is launched and displays the reading result continuously (see *Chapter 6.5.2 Percentage evaluation, Page 6-17*).
   Monitor the **reading quality (%)** during each of the subsequent steps!

Fine adjustment:

10. Align the CLX in such a way that the angle between the scan line and the bars on the bar code CLX is almost 90°.

11. To avoid interfering reflections, align the CLX reading window in parallel to the bar code surface. Consider the positioning of the CLX in relation to the convoyer direction (see *Fig. 4-4, Page 4-4*).

12. If necessary, align the intersecting point of folded scanline exactly with the bar code.

13. Move objects carrying bar codes into the CLX reading field manually under realistic conditions and check the reading result. If the objects are aligned randomly, or if the bar code is located at different positions (angles), ensure that the limit values of the permissible reading angles are not exceeded.

14. Adjust the CLX in such a way that the good read rate is between **70 to 100 %**.
    With event-controlled dynamic focus control, for each defined reading range (distance configuration), check the selected focus position and correct the parameter settings if necessary (see *Chapter 6.4.3 Guide to parameterization menu, Page 6-8*).

15. Tighten the screws on the CLX.

The CLX is aligned with the bar code.

4.4   Mounting the external components

4.4.1   Mounting the AMV/S60 Connection Module

1.   Mount the AMV/S60 Connection Module near the CLX.
   The distance between the AMV/S60 and CLX should not exceed max. 10 m.

2.   Mount the AMV/S60 in such a way that accessed to the open device is always possible.
   The auxiliary interface of the CLX is accessed via the internal "Service" plug.

Detailed information on the mounting and electrical installation procedures is provided in the Operating Instructions for the "*AMV/S60 Connection Module*" (order no. 8008296).

4.4.2   Mounting the external reading pulse sensor

If the CLX is triggered by an external reading pulse sensor, the sensor must be mounted in the vicinity of the CLX. The "Sensor" switching input is selected as the default trigger source for this trigger type. The default debounce time of the input is 30 ms.

Depending on the application, you may need to mount the sensor in such a way that bar codes on objects of different sizes can be read completely during the reading interval. The exact position fo the external sensor in relation to the scanner can be seen in *Fig. 10-3* to *Fig. 10-5* onwards page *10-4*.

Note   In default setting, the CLX operates in the autofocus mode "Minimum distance". As a result, the CLX focuses on the object that is nearest. The view on the object with the scan line must be unobstructed, i. e. any other objects must not protude into the autofocus space. If they do so, the autofocus mode "Differential background" must be selected. Alternatively a fixed focus position can be set.

1.   Mount the reading pulse sensor.

2.   Connect the reading pulse sensor to the "Sensor" switching input of the CLX via the AMV/S60 Connection Module (see *Chapter 5.5.7 Connecting the switching inputs, Page 5-16*).

3.   Connect the CLX to the AMV/S60 Connection Module and switch on the power supply to the module (see *Chapter 5.5.3 Connecting the supply voltage, Page 5-13*).
   After it has started, the CLX confirms that the self-test was successfull and switches to Reading mode ("Device Ready" LED lights up).

4.   Connect the PC to the auxiliary interface of CLX. To do so, connect a 3-core RS 232 data cable (null modem cable) to the internal 9-pin "Service" plug of the AMV/S60 (see *Chapter 5.5.6 Connecting the PC, Page 5-15*).

5.   Start Windows and the "CLV-Setup" program (see *Chapter 10.6.3 Starting CLV-Setup, Page 10-18*).

6.   From the VIEW menu, choose READING MODE.
   The Terminal Emulator is launched. The CLX is in Reading mode (default: SMART/Standard Decoder).
   Monitor the reading result during each of the subsequent steps!

7.   Move objects with bar codes into the CLX reading field manually under realistic conditions and check whether the reading result and trigger pulse are correct.

8.   Repeat the procedure with the conveyor switched on. Check whether the reading procedure is synchronized with the objects.

Parameterizing an external sensor as a trigger source:

These settings are not required if the CLX is operated with the default configuration.

1. Choose the DEVICE CONFIGURATION tab.

2. In the section READING TRIGGER SOURCE click the option SENSOR INPUT (ACTIV HIGH).

3. Download the settings to the CLX by clicking 🖥 in the toolbar.
   The DOWNLOAD PARAMETERS dialog box is then displayed.

4. Confirm the dialog box by choosing PERMANENT.
   The CLX operates with the "Sensor" switching input as an external trigger source. The reading pulse starts when the input is energized (high).

4.4.3 Mounting the sensors for detecting the object distance

If the dynamic focus control function of the CLX is triggered by external sensors, suitable sensors must be mounted in the vicinity of the CLX. *Fig. 4-7* shows an example of a read operation from above. The sensors must be arranged in such a way that all of the potential object heights are classified uniquely and overlapping reading ranges occur that can be formed with the depths of field of the CLX. A maximum of five switching inputs are available for this purpose. A max. of 32 switching states for 8 distance configurations (reading ranges) can be implemented using the internal assignment table (combinations). Photoelectric reflex switches, for example, can be used to detect the object distance. In the default setting, all five "IN 0 to IN 4" switching inputs are selected for dynamic focus control.
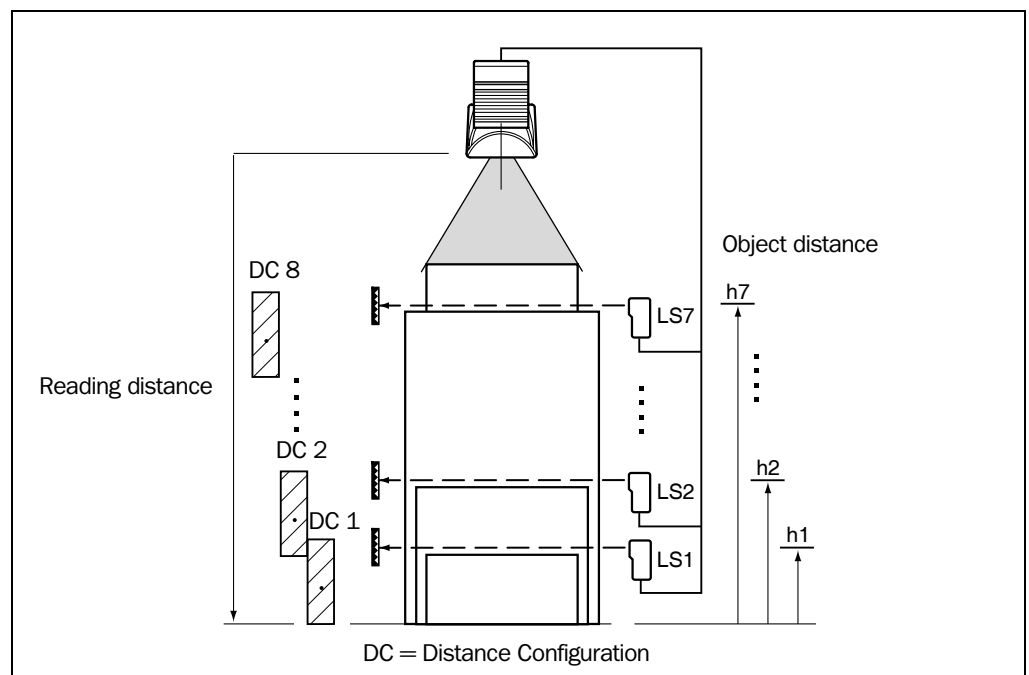
Fig. 4-7:   Mounting example for object distance detection

1. The depths of field of the CLX for the bar code resolution in question is shown in the graph in *Chapter 10.2.2 Reading performance data CLX490 Compact OMNI Scanner, Page 10-2*. Find and note suitable focus positions for overlapping reading ranges.

2. Mount distance sensors (e. g. photoelectric reflex switches) one above the other in a row at the mounting location to measure the object distance (see also assignment *Table 5-20, Page 5-18*). It is advisable to mount these distance sensors opposite the direction of motion of the conveyor belt at approx. 100 mm in front of the reading pulse sensor.

3. Connect the distance sensors to the "IN 0 to IN 4" switching inputs on the CLX via the AMV/S60 Connection Module (see *Chapter 5.5.7 Connecting the switching inputs, Page 5-16*).

4. Set the focus positions for the required reading ranges on the READING CONFIGURATION tab in the CLV-Setup program. To do so, choose the INPUTS/SERIAL option in the drop down list of the FOCUS CONTROL section.

5. Click the DISTANCE CONFIGURATION button and edit the required entries in the dialog box that is then displayed (default: Focus position F 1 up to F 8 = 1,200 mm).

6. As described in *Chapter 4.3.2 Adjusting the CLX, Page 4-6*, choose the standard decoder.

7. Perform a temporarily download to the CLX.

8. Start Percentage Evaluation mode

9. Check the reading quality in all distance configurations while the conveyor bel stationary.

10. Then check the distance detection function in Reading mode under realistic conditions. To do so, monitor the reading result in the Terminal Emulator as described in *Chapter 4.4.2 Mounting the external reading pulse sensor, Page 4-8*.

11. If the distance detection function operates correctly, reset the decoder to the SMART/ STANDARD option and perform a permanently download to the CLX.

Note   The CLX can switch between a maximum of 8 distance ranges for slow search runs using the integrated timer reversal points. The CLX can be switched between a maximum of 8 distance ranges synchronously to the reading process using command strings.

4.5   Dismantling the device

1. Switch off the power supply to the AMV/S60 Connection Module.

2. Undo the screws for the cable connections on the CLX and disconnect the cables.

   With mounted external parameter memory (in connector cover)(optional):
   Undo both screws and remove the cover.

3. Unscrew the CLX from the mounting device.

When removing the device from service for the last time, please dispose of it in an environmentally-friendly manner, as described in *Chapter 7.4 Disposal, Page 7-3*.

5 Electrical installation

5.1 Installation sequence

- Connect the CLX to a SICK Connection Module from the series AMV/S, BMV/BMH10 or BMS20, or using a customer-specific wiring configuration
- Connect the data and function interfaces of the CLX in the module
- Connect the PC to the Connection Module (at the auxiliary interface on the CLX)
- Connect the power supply to the Connection Module

5.1.1 SICK Connection Modules (overview)

CLX Type	Temperature range	Connection module	Purpose	see chapter
CLX **without** heater	0 to +40 °C	AM**V**60	– Connecting **one** CLX – Operating voltage 18 to 30 V DC – Enclosure rating IP 30, max. IP 54	5.2.3
		AM**S**60	– Connecting **one** CLX – Operating voltage 230 V AC (115 V)/24 V DC – Enclosure rating IP 30, max. IP 54	5.2.3
		AMV100	– Connecting **one** CLX – Operating voltage 18 to 30 V DC – Enclosure rating IP 52, with connector cover max. IP 65	5.2.3
		BMV/BMH10 Profibus-DP	– Connecting **one** CLX to the Profibus-DP – Operating voltage 20 to 30 V DC – Enclosure rating IP 52, with connector cover max. IP 65	5.2.4
		BMS20 Interbus-S	– Connecting **one** CLX to the Interbus-S – Operating voltage 24 V DC – Enclosure rating max. IP 54	5.2.4
		AMV30-071	– Connecting **two** CLX – Operating voltage 18 to 30 V DC – Enclosure rating IP 30, max. IP 54	5.2.3
		AMV200	– Connecting **two** CLX – Operating voltage 18 to 30 V DC – Enclosure rating IP 52, with connector cover max. IP 65	5.2.3
CLX **with** heater	−30 to +35 °C	AMV100	– Connecting **one** CLX – Operating voltage 24 V DC +20%/−10% – Enclosure rating IP 52, with connector cover max. IP 65	5.2.5
		AMV200	– Connecting **two** CLX – Operating voltage 24 V DC +20%/−10% – Enclosure rating IP 52, with connector cover max. IP 65	5.2.3

Table 5-1: Connection Modules for the CLX

5.2   Electrical connections and cables

The electrical connections on the CLX consist of two 15-pin D Sub HD connections on the housing, one plug, and one socket.

These connections are used to route the following interfaces:

- Three serial data interfaces (host interface, CAN interface 1 and 2 as well as auxiliary interface)
- Six switching inputs (external reading pulse and multifunctional inputs)
- Four switching outputs (for result status function, for connecting to a PLC for example)
- Power supply

5.2.1   Wire cross-sections

CLX without heater:

➢ All connections must be wired with copper cables with a minimum wire diameter of 0.15 mm^2!

CLX with heater:

➢ Connect the power supply terminals (Pin 1/Pin 5) using copper wires with a minimum cross-section of 0.75 mm^2 at a maximum length of 10 m!

5.2.2   Prefabricated cables (overview)

CLX Type	Temperature range	Connection module	Optional cables	Length	Type
CLX **without** heater	0 to +40 °C	AMV/S60	2 x No. 2020302 or 1 x No. 2020307	3 m 3 m	Connecting cable (plug/socket) Ext. parameter memory with 2 cables (plug/socket)
		BMV/BMH10 Profibus-DP	1 x No. 2020307 or 1 x No. 2021298	3 m 3 m	Ext. parameter memory with 2 cables (plug/socket) Connector cover to connector cover
		AMV30-071	2 x No. 2020302 or 1 x No. 2020307	3 m 3 m	Connecting cable (plug/socket) Ext. parameter memory with 2 cables (plug/socket)
		BMS20 Interbus-S	1 x No. 2020264 + 1 x No. 2020265 or 1 x No. 2020308	3 m 3m 3m	Connecting cable with plug/open end Connecting cable with plug/socket Ext. parameter memory with 2 cables (plug/open end)
		Non-SICK Power pack	1 x No. 2020303 + 1 x No. 2020264 or 1 x No. 2020981 or 1 x No. 2021267	3 m 3 m 3 m 3 m	Connecting cable with socket/open end Connecting cable with plug/open end Ext. parameter memory with 2 cables (open ends) Connector cover with 2 cables (open ends)
CLX **with** heater	− 30 to +35 °C	AMV100	1 x No. 2021298 or 1 x No. 2021689	3 m 3 m	Connector cover to connector cover Ext. parameter memory to connector cover
		AMV200	2 x No. 2021298 or 2 x No. 2021689	3 m 3 m	Connector cover to connector cover Ext. parameter memory to connector cover
		Non-SICK Power pack	1 x No. 2021267	3 m	Connector cover with 2 cables (open ends)

Table 5-2: Cables for connecting the CLX

For technical data on the cables, see *Chapter 10.12.5 Cables, external parameter memories and plug cover, Page 10-37.*

5.2.3   Connections/cables for the AMV/S Connection Module

The AMV/S Connection Module is suitable for connecting the CLX to peripherals (distribution function) and the power supply. The module can be used to establish a connection to the host (point-to-point) or integrate the device in a SICK network or daisy-chain configuration (pass-through or master/slave configuration). The module is available in several variants (see *Table 5-1, Page 5-1*).

Fig. 5-1 shows the connection principle of the AMV/S60 for one CLX.
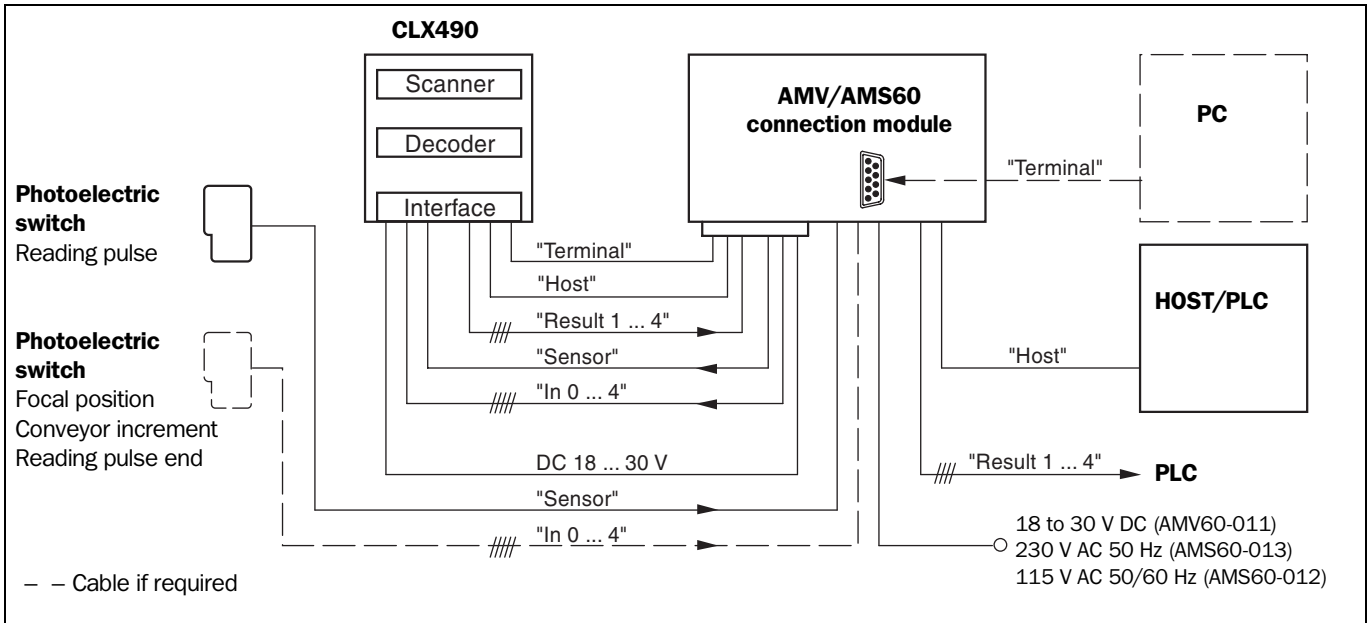
Fig. 5-1:   Block diagram: Connection of the CLX to the AMV/S60 connection module

Connecting the CLX to the AMV/S

Two cables no. 2020302 are required to connect the CLX to the AMV/S. Alternatively, the device can be connected via the external parameter memory no. 2020307.
See *Chapter 5.2.5 Connections/cables for the external parameter memory (connection to AMV/S or BMV10/BMS20), Page 5-4*.

a) CLX without heater:

Connection modules: AMV/S60 and AMV30-071.
The cables no. 2020302 can be extended to 10 m (auxiliary interface: RS 232!).

b) CLX with heater:

Connection modules: AMV100 and AMV200.
The cables no. 2020302 must **not** be extended!
If longer cables are required, the entire power supply system (Pin 1/Pin 5) must be connected with a wire cross-section of at least 0.75 mm^2 with a maximum length of 10 m.

Recommendation   Use the cable no. 2021298 (with two connector covers, length 3 m).

The procedures for connecting and configuring the AMV/S Connection Modules are described in the following documentation:

- Operating Instructions for the "*AMV/S60 Connection Module*" (no. 8008296)
- Operating Instructions for the "*AMV30-071 Connection Module*" (no. 8008648)
- Operating Instructions for the "*AMV100/200 Connection Module*" (no. 8008879)

5.2.4   Connections/cables for the Bus Connection Modules BMV10 and BMS20

The BMV10 Bus Connection Module (depending on the model) is used to connect a CLX to the Profibus-DP or to the DeviceNet for use in industrial applications. The BMS20 Bus Connection Module enables the CLX to be integrated in the Interbus-S.

Connecting the CLX to the BMV10/BMS20

BMV10: two cables no. 2020302 are required.
BMS20: the cables no. 2020265 and no. 2020264 are required.

Alternatively, via external parameter memory no. 2020307 (see *Chapter 5.2.5 Connections/cables for the external parameter memory (connection to AMV/S or BMV10/ BMS20)).*

a) CLX without heater:

Connection modules: BMV 10and BMS20.
The cables no. 2020302 can be extended to 10 m for CLX without a heater (host and auxiliary interface: RS-232!).

b) CLX with heater:

Connection module: BMV10.
The BMV10 may only be used if it is mounted outside the refrigeration area (temperature range 0 to +40 °C).

The cables no. 2020302 must **not** be extended. If longer cables are required, the entire power supply system (Pin 1/Pin 5) must be connected with a wire cross-section of at least 0.75 mm^2 at a maximum of 10 m.

Recommendation   Use the cable no. 2021298 (with two connector covers, length 3 m).

The BMS 20 is not suitable for powering CLX with heater!

The procedures for connecting and configuring the Bus Connection Modules are described in the following documentation:

*   Operating Instructions for the "*BMV/BMH10 Bus Connection Module for Profibus DP*" (no. 8008825)
*   Operating Instructions for the "*BMV/BMH10 Bus Connection Module for DeviceNet*" (no. 8008972)
*   Technical Information for the "*BMS20 Bus Connection Module for Interbus-S*" (no. 8007546)

5.2.5   Connections/cables for the external parameter memory (connection to AMV/S or BMV10/BMS20)

The external parameter memory (external accessory) is located in a connector cover with 15-pin D Sub HD plug connections. The cover covers the terminals on the CLX so that the enclosure rating IP 65 is achieved.

The connector cover with the external parameter memory is prefabricated with two cables, each 3 m in length, and is available with four different cable ends:

*   with two 15-pin D Sub HD connections (pin assignment identical to that of the CLX terminals), no. 2020307
*   with a connector cover, no. 2021689
*   with two open cable ends, no. 2020981
*   with one 9-pin D Sub cable connector and one open end, no. 2020308

5-4   8009237/RB47/2007-08-03

Connecting the CLX with external parameter memory

a) CLX without heater:

Connection Modules: AMV/S60, AMV30-071, BMV10

➢ Cover the connections on the CLX with the connector cover (parameter memory), no. 2020307. Connect the plug/socket on the cables ("Host/Term" and " I/O" connections) with the appropriate connections on the AMV/S or BMV10.

Connection Module: BMS20

➢ Cover the connections on the CLX with the connector cover (parameter memory) no. 2020308. Connect the 9-pin plug ("Host/Term" connection) to the socket on the BMS20. Connect the wires of the free cable end ("I/O" terminal) to the terminal strips in the BMS20.

Recommendation   Use the external parameter memory no. 2020981 (open cable ends) for connecting the device to non-SICK Power packs/wiring configurations.

b) CLX with heater:

Connection Module: AMV100/200

➢ AMV100: Cover the connections on the CLX with the connector cover (parameter memory), no. 2021689, labeled "SCANNER". Connect the other connector covers, labeled "HOST", to the corresponding connections on the AMV100.

➢ AMV200: see AMV100, proceed in the same way with the second CLX.

5.2.6 Connections/cables for the IP 65 connector cover (connection to AMV100/200 or BMV10)

The connector cover (optional accessory) with 15-pin D Sub HD plug connections is used to cover the terminals on the CLX so that the enclosure rating IP 65 is provided.

The connector cover is prefabricated with two cables, each of 3 m in length, and is available with two different cable ends:

• with one additional connector cover at the other end (pins assignment identical to that of the CLX terminals), no. 2021298

• with two open cable ends, no. 2021267

CLX with heater:

Both connector cover variants can be used with temperatures up to max. −50 °C if the CLX is stationary and the cables are not moved. If the cables are moved due to changes in the position of the CLX, the temperature must not drop below max. −40 °C.

Recommendation   Use the external parameter memory no. 2020267 (open cable ends) for connecting the device to non-SICK Power packs/wiring configurations.

8009237/RB47/2007-08-03   **5-5**

5.3   Connector pin assignment

5.3.1   Terminals on the CLX

Device plug: "Host/Term" connection

Pin	Signal	Function
1[1)]	V_S	Supply voltage
2	RxD (RS 232), Auxiliary	Auxiliary interface (receiver)
3	TxD (RS 232), Auxiliary	Auxiliary interface (transmitter)
4	Term (RS 422/485)	Termination host interface
5	GND	Ground
6	RD+ (RS 422/485), Host	Host interface (receiver+)
7	RD− (RS 422/485), Host RxD (RS 232), Host	Host interface (receiver−)
8	TD+ (RS 422/485), Host	Host interface (sender+)
9	TD− (RS 422/485), Host TxD (RS 232), Host	Host interface (sender−)
10	CAN H	CAN Bus interface 1 (IN/OUT)
11	Reserved	–
12	CAN2 H	CAN Bus interface 2 (IN/OUT)
13	CAN2 L	CAN Bus interface 2 (IN/OUT)
14	Reserved	–
15	CAN L	CAN Bus interface 1 (IN/OUT)
Housing	–	Shield

1) Pin 1 is jumpered with Pin 1 of the "I/O" connection in the CLX

Table 5-3: Pin assignment of the 15-pin D Sub HD "Host/Term" plug

Device socket: "I/O" connection
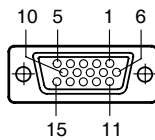
Pin	Signal	Function
1[1)]	V_S	Supply voltage
2	N 1	Switching input (trigger for focus control)
3	Sensor	Switching input (external reading pulse)
4	Result 1	Switching output, variable function
5	GND	Ground
6	IN 0	Switching input (trigger for focus control)
7	IN 2	Switching input (trigger for focus control)
8	Result 2	Switching output, variable function
9	INGND	Common ground for all inputs
10	Result 3	Switching output, variable function
11	IN 3	Switching input, variable function
12	IN 4	Switching input, variable function
13	I2C SDA	I2C Bus (for external parameter memory)
14	I2C SCL	I2C Bus (for external parameter memory)
15	Result 4	Switching output, variable function
Housing	–	Shield

1) Pin 1 is jumpered with Pin 1 of the "Host/Term" connection in the CLX

Table 5-4: Pin assignment of the 15-pin D Sub HD "I/O" socket

                       8009237/RB47/2007-08-03

5.3.2 External parameter memory no. 2020307/2021689 (optional accessory) connector cover no. 2021298 (optional accessory)

Cable plug: "Host/Term" connection

Pin	Signal	Function
1[1]	V_S	Supply voltage
2	RxD (RS 232), Auxiliary	Auxiliary interface (receiver)
3	TxD (RS 232), Auxiliary	Auxiliary interface (transmitter)
4	Term (RS 422/485)	Termination host interface
5	GND	Ground
6	RD+ (RS 422/485), Host	Host interface (receiver+)
7	RD– (RS 422/485), Host RxD (RS 232), Host	Host interface (receiver–)
8	TD+ (RS 422/485), Host	Host interface (sender+)
9	TD– (RS 422/485), Host TxD (RS 232), Host	Host interface (sender–)
10	CAN H[2]	CAN Bus interface 1 (IN/OUT)
11	Reserved	–
12	CAN2 H[2]	CAN Bus interface 2 (IN/OUT)
13	CAN2 L[2]	CAN Bus interface 2 (IN/OUT)
14	Reserved	–
15	CAN L[2]	CAN Bus interface 1 (IN/OUT)
Housing	–	Shield
1) Pin 1 is jumpered with Pin 1 of the "I/O" connection in the CLX 2) not when using cable no. 2021689, no. 2021298 and no. 2021267		

Table 5-5: Pin assignment of the 15-pin D Sub HD "Host/Term" cable plug

Cable socket: "I/O" connection
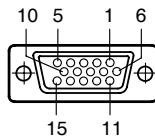
Pin	Signal	Function
1[1]	V_S	Supply voltage
2	IN 1	Switching input (trigger for focus control)
3	Sensor	Switching input (external reading pulse)
4	Result 1	Switching output, variable function
5	GND	Ground
6	IN 0	Switching input (trigger for focus control)
7	IN 2	Switching input (trigger for focus control)
8	Result 2	Switching output, variable function
9	INGND	Common ground for all inputs
10	Result 3	Switching output, variable function
11	IN 3	Switching input, variable function
12	IN 4	Switching input, variable function
13	I2C SDA[2]	I2C Bus (for external parameter memory)
14	I2C SCL[2]	I2C Bus (for external parameter memory)
15	Result 4	Switching output, variable function
Housing	–	Shield
1) Pin 1 is jumpered with Pin 1 of the "Host/Term" connection in the CLX 2) not connected		

Table 5-6: Pin assignment of the 15-pin D Sub HD "I/O" cable socket

5.4 Preparations for electrical installation

5.4.1 Requirements for the host interface

The host interface of the CLX can be operated as an RS 422/485 or an RS 232 interface. *Table 5-7* shows the recommended maximum cable lengths as a function of the selected data transfer rate.

Interface type	Transfer rate	Distance from host
RS 232	up to 19,200 bd 38,400 to57,600 bd	max. 10 m max. 3 m
RS 422/485[1]	max. 38,400 bd max. 57,600 bd	max. 1,200 m max. 500 m
1) with suitable line termination according to specifications		

Table 5-7: Maximum cable lengths between the CLX and host

➢ To prevent interference, do not lay the cables parallel with power supply and motor cables over long distances, e. g. in cable ducts.

5.4.2 Supply voltage

The CLX requires a supply voltage of 18 to 30 V DC for operation without a heater and 24 V DC +20 %/−10 % for operation with a heater (functional extra-low voltage in accordance with IEC 364-4-41). The functional extra-low voltage can be generated by using a safety transformer pursuant to IEC 742.

The power consumption of the individual types is as follows:

Type	Voltage	Heater	Power consumption[1]	Connection Modules
CLX490-0010	18 to 30 V DC	no	11 W (typ.)/ max. 16 W	AMV/S60 or AMV30-071 or BMV/BMH10 or BMS20
CLX490-0011	24 V DC +20 %/−10 %	yes	75 W (typ.)/ max. 90 W	AMV100/200
1) Switching outputs not connected				

Table 5-8: Power consumption of the CLX

Power-up delay

The selected device number (default: 1) affects the power-up delay of the device. This is useful if a large number of CLX (e. g. in the SICK network) are to be supplied from one power source. *Table 5-9* contains a list of the available intervals.

Device number GN	Power-up delay	Device number GN	Power-up delay
1; 11; 21; 31	0 ms	6; 16; 26	2,000 ms
2; 12; 22	400 ms	7; 17; 27	2,400 ms
3; 13; 23	800 ms	8; 18; 28	2,800 ms
4; 14; 24	1,200 ms	9; 19; 29	3,200 ms
5; 15; 25	1,600 ms	10; 20; 30	3,600 ms

Table 5-9: Power-up delay as a function of the device number GN

Tip The device number can be selected on the DEVICE CONFIGURATION tab in the "CLV-Setup" program.

5.4.3 Non-SICK Power supply unit/connections without the Connection Module

Power output

If a non-SICK Power supply unit is used instead of the AMS60, it must be capable of providing the following voltage and power values:

- for CLX without heater: 18 to 30 V DC, min. 20 W continuous power output
- for CLX with heater: 24 V DC +20 %/−10 %, min. 100 W

The non-Sick Power supply unit must provide the functional extra-low voltage in accordance with IEC 364-4-41.
The output circuit must be reliably electrically isolated from the input circuit. To do so, use a safety isolating transformer pursuant to IEC 742.

Wire cross-section

The wire cross-section for the power supply (Pin 1/Pin 5) should be at least 0.15 mm^2, or 0.75 mm^2 for CLX with heater, with a max. length of 10 m.

a) Connecting the CLX without a connector cover/external parameter memory

The two cables no. 2020303 and no. 2020264 with open cable end on one side are required to connect the CLX. The wire color assignments are shown in *Table 5-10* and *Table 5-11, Page 5-10*. The cables must not be extended for CLX with heater.

Connection cable no. 2020203 ("Host/Term" connection)

15-pin D Sub HD socket and open cable end.
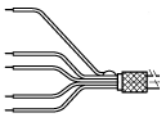
Pin	Signal	Wire color
1[1]	V$_S$	Red
2	RxD (RS 232), Auxiliary	White
3	TxD (RS 232), Auxiliary	Brown
4	Term (RS 422/485)	Violet
5	GND	Blue
6	RD+ (RS 422/485), Host	Green
7	RD− (RS 422/485), Host RxD (RS 232), Host	Yellow
8	TD+ (RS 422/485), Host	Grey
9	TD− (RS 422/485), Host TxD (RS 232), Host	Pink
10	CAN H	Grey-pink
11	Reserved	Red-blue
12	CAN2 H	White-green
13	CAN2 L	Brown-green
14	Reserved	White-yellow
15	CAN L	Yellow-brown
–	Shield	Orange

1) Pin 1 is jumpered with Pin 1 of the "I/O" connection in the CLX

Table 5-10: Wire color assignment of the cable no. 2020303

Connection cable no. 2020264 ("I/0" connection)

15-pin D Sub HD plug and open cable end
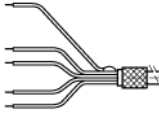
Pin	Signal	Wire color
1[1)]	V_S	Red
2	IN 1	White
3	Sensor	Brown
4	Result 1	Violet
5	GND	Blue
6	IN 0	Green
7	IN 2	Yellow
8	Result 2	Grey
9	INGND	Black
10	Result 3	Grey-pink
11	IN 3	Red-blue
12	IN 4	White-green
13	I2C SDA	Brown-green
14	I2C SCL	White-yellow
15	Result 4	Yellow-brown
–	Shield	Orange
1) Pin 1 is jumpered with Pin 1 of the "Host/Term" connection in the CLX		

Table 5-11: Wire color assignment of the cable no. 2020264

b) Connecting the CLX with external parameter memory no. 2020981

CLX without heater:

➢ Cover the "Host/Term" and "I/O" connections on the CLX with the connector cover (parameter memory) no. 2020981. Connect the free cable ends accordingly. The wire color assignments are shown in *Table 5-12* and *Table 5-13*.

CLX with heater:

Available on request.

                   8009237/RB47/2007-08-03

Cable 1 ("Host/Term" connection)

15-pin D Sub HD socket in the connector cover and open cable end
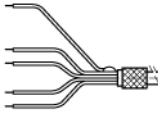
Pin	Signal	Wire color
1 [1]	V_S	Red and pink
2	RxD (RS 232), Auxiliary	White
3	TxD (RS 232), Auxiliary	Brown
4	Term (RS 422/485)	Violet
5	GND	Blue and grey-brown
6	RD+ (RS 422/485), Host	Green
7	RD– (RS 422/485), Host RxD (RS 232), Host	Yellow
8	TD+ (RS 422/485), Host	Grey
9	TD– (RS 422/485), Host TxD (RS 232), Host	Black
10	CAN H	Grey-pink
11	Reserved	Red-blue
12	CAN2 H	White-green
13	CAN2 L	Brown-green
14	Reserved	White-yellow
15	CAN L	Yellow-brown
–	Shield	Orange
1) Pin 1 is jumpered with Pin 1 of the" I/O" connection in the CLX		

Table 5-12: Wire color assignment of cable 1 for external parameter memory no. 2020981

Cable 2 ("I/O" connection)

15-pin D Sub HD plug in the connector cover and open cable end
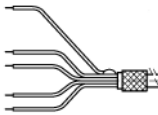
Pin	Signal	Wire color
1 [1]	V_S	Red and pink
2	IN 1	White
3	Sensor	Brown
4	Result 1	Violet
5	GND	Blue and grey-brown
6	IN 0	Green
7	IN 2	Yellow
8	Result 2	Grey
9	INGND	Black
10	Result 3	Grey-pink
11	IN 3	Red-blue
12	IN 4	White-green
13	I2C SDA	–
14	I2C SCL	–
15	Result 4	Yellow-brown
–	Shield	Orange
1) Pin 1 is jumpered with Pin 1 of the "Host/Term" connection in the CLX		

Table 5-13: Wire color assignment of cable 2 for external parameter memory no. 2020981

c) Connections with connector cover no. 2021267

➤ Cover the "Host/Term" and "I/O" connections on the CLX with the connector cover no. 2020267 and connect the free cable ends accordingly. The wire color assignments are shown in *Table 5-14* and *Table 5-15*.

CLX with heater:

The connector cover can be used with temperatures up to max. –50 °C if the CLX is stationary and the cables are not moved. If the cables are moved due to changes in the position of the CLX, the temperature must not drop below max. –40 °C.

Cable 1 (power supply)

15-pin D Sub HD socket in the connector cover and open cable end
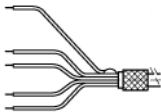
Pin	Plug cover	Signal	Wire color
1	Socket	V_S	Red
5	Socket	GND	Black

Table 5-14: Wire color assignment cable 1 for connector cover no. 2021267

Cable 2 (data and function interfaces)

15-pin D Sub HD socket/plug in the connector cover and open cable end
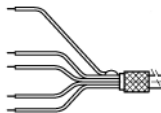
Pin	Plug cover	Signal	Wire color
2	Plug	IN 1	White
3	Plug	Sensor	Brown
4	Plug	Result 1	Green
6	Plug	IN 0	Yellow
7	Plug	IN 2	Grey
8	Plug	Result 2	Pink
9	Plug	INGND	Blue
10	Plug	Result 3	Red
11	Plug	IN 3	Black
12	Plug	IN 4	Violet
15	Plug	Result 4	Grey-pink
2	Socket	RxD (RS 232), Auxiliary	Red-blue
3	Socket	TxD (RS 232), Auxiliary	White-green
4	Socket	Term (RS 422/485)	Brown-green
6	Socket	RD+ (RS 422/485), Host	White-yellow
7	Socket	RD– (RS 422/485), Host RxD (RS 232), Host	Yellow-brown
8	Socket	TD+ (RS 422/485), Host	White-grey
9	Socket	TD– (RS 422/485), Host TxD (RS 232), Host	Grey-brown
–	–	Shield	Orange

Table 5-15: Wire color assignment cable 2 for connector cover no. 2021267

5.5　　Electrical installation procedur

5.5.1　　Individual steps

- Connect the power supply
- Connect the host interface
- Connect the PC (connect the auxiliary interface)
- Connect the "Sensor" and "IN 0 to IN 4" switching inputs
- Connect the "Result 1 to Result 4" switching outputs

5.5.2　　Tools

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

5.5.3　　Connecting the supply voltage

a) SICK AMV/S and BMV10 Connection Modules

If the CLX is powered via the SICK Connection Modules, the supply voltage does not have to be wired separately.

Connecting the CLX without external parameter memory:

1. Make sure that the power supply to the Connection Module is switched off.
2. Connect the "Host/Term" and "I/O" connections on the CLX to the corresponding connections on the Connection Module using two cables no. 2020302 and secure them tightly on both sides.

Connecting the CLX with external parameter memory:

1. Mount the connector cover with the external parameter memory no. 2020307 on the "Host/Term" and "I/O" connections of the CLX and screw it tightly into position.
2. Connect the two free plug connections on the cables to the corresponding connections on the Connection Module and secure them tightly.

The data and function interfaces of the CLX are connected to the Connection Module.

b) Power supply via non-SICK Power pack

Connecting the CLX without external parameter memory:

1. Connect the cable socket on cable no. 2020303 on the "Host/Term" connection and screw it tightly into position.
2. Connect the cable plug on the cable no. 2020264 to the "I/O" connection and screw it tightly into position.
3. Connect the power supply to the red wire (Pin 1, V_s) and blue wire (Pin 5, GND) on cable no. 2020303. *See also Table 5-10, Page 5-9*

Connecting the CLX with external parameter memory:

1. Connect the "Host/Term" and "I/O" connections on the CLX to the corresponding connections on the Connection Module using two cables no. 2020981 and secure them tightly on both sides.
2. Connect the power supply to the red/pink wire (Pin 1, VS) and the blue/grey-brown wire (Pin 5, GND) of cable 1. See also *Table 5-12, Page 5-11.*

The CLX is connected to the supply voltage.

8009237/RB47/2007-08-03　　　　　　**5-13**

5.5.4   Connecting the host interface
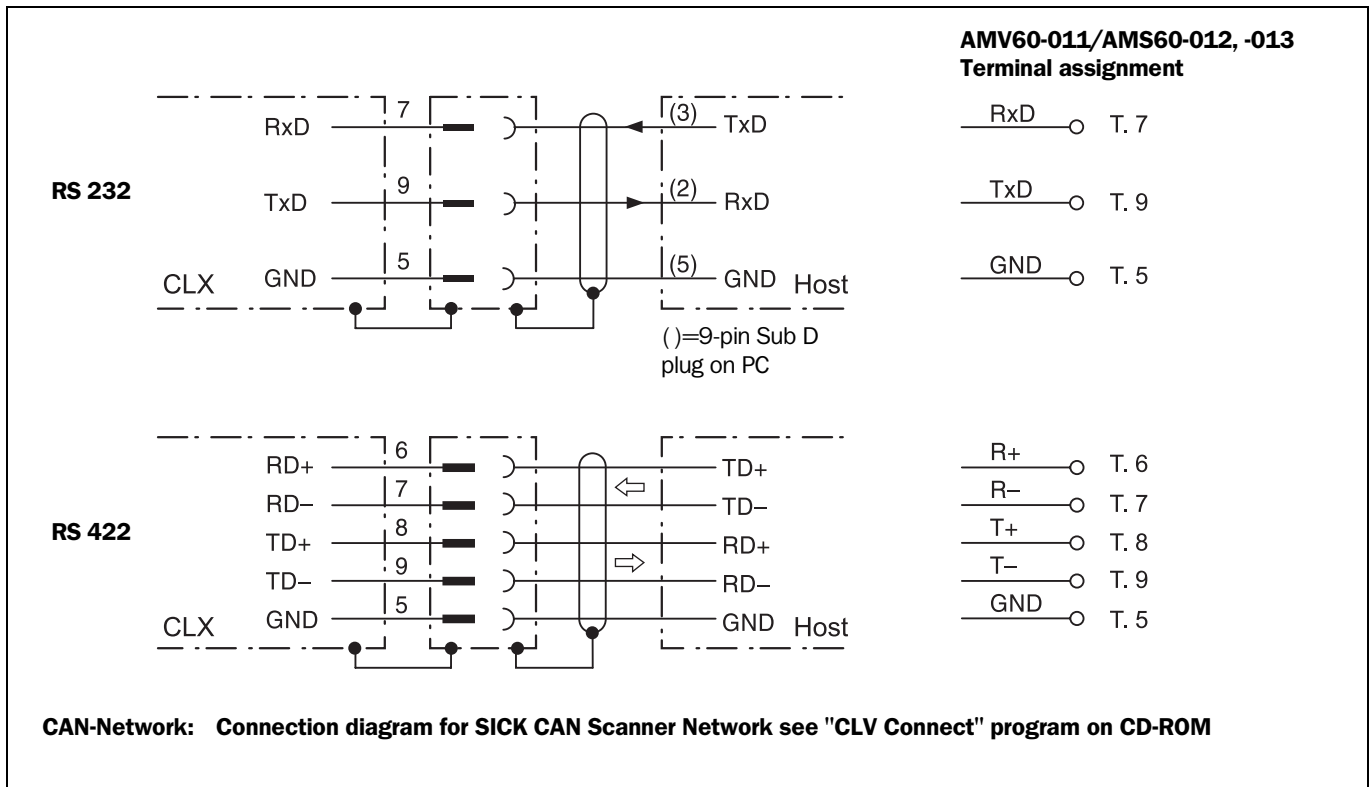
Fig. 5-2:   Connecting the host interface

Risk of damage to the interface module!

Electrical components in the CLX may be damaged if the host interface is connected incorrectly. This also applies when the host interface connections are changed in the Connection Modules (configuration).

➤ Connect the host interface as shown in *Fig. 5-2*.

➤ Check the connections carefully before you switch on the CLX.

➤ Connect the host interface on the CLX to the host using shielded cables (EMC requirements). Ensure that the maximum cable lengths are not exceeded (see *Table 5-7, Page 5-8*).

Default   In the default setting, the CLX communicates with the host via the host interface using the values shown in *Table 5-16*.

Parameter	Value
Physical design	RS 422/485
Data transfer rate	9.600 bd
Data bits	8
Parity	None
Stop bits	1
Protocol	SICK (start character: STX, stop character: ETX, no request for repeat: none, timeout: 50 ms)

Table 5-16: Communication parameters for the host interface (default setting)

For connecting the host interface via the AMV/S60 Connection Module, see the Operating Instructions for the "*AMV/S60 Connection Module*" (no. 8008296).

Terminating the RS 422 interface

The interface can be terminated in the Connection Module. See "*Operating Instructions for the AMV/S60, AMV30-071, AMV100/200*", or "*BMS20 Connection Modules*".

Activating the RS 232 interface:

The RS 232 interface can be activated with the CLV-Setup program:

1. Choose the HOST INTERFACE tab.
2. Choose the RS 232 option from the HARDWARE drop-down list under DATA FORMAT.
3. Download the data to the CLX by clicking 🖥 in the toolbar.
   The DOWNLOAD PARAMETERS dialog box is displayed.
4. Confirm the dialog box by choosing PERMANENT.
   The CLX uses the RS 232 version of the host interface.

Tip The communication parameters can be changed, if necessary, on the HOST INTERFACE tab. To do so, change the values under DATA FORMAT and INTERFACE PROTOCOL.

5.5.5 Connecting the CAN interface

For information on the connection and parameterization of the CLX for use in a SICK scanner network or in a CANopen network, see the Operating Instructions "*Using the CAN interface*" *(no. 8009180, English version)*

5.5.6 Connecting the PC

The CLX is operated and configured with the PC-based "CLV-Setup" program. In order to do so, you must connect the device to the PC via the auxiliary interface (auxiliary interface). Unlike the host interface, the auxiliary interface has a permanent data format and a fixed data transfer rate. *Fig. 5-3* shows how the auxiliary interface is connected. The cable length should not be more than 10 m.
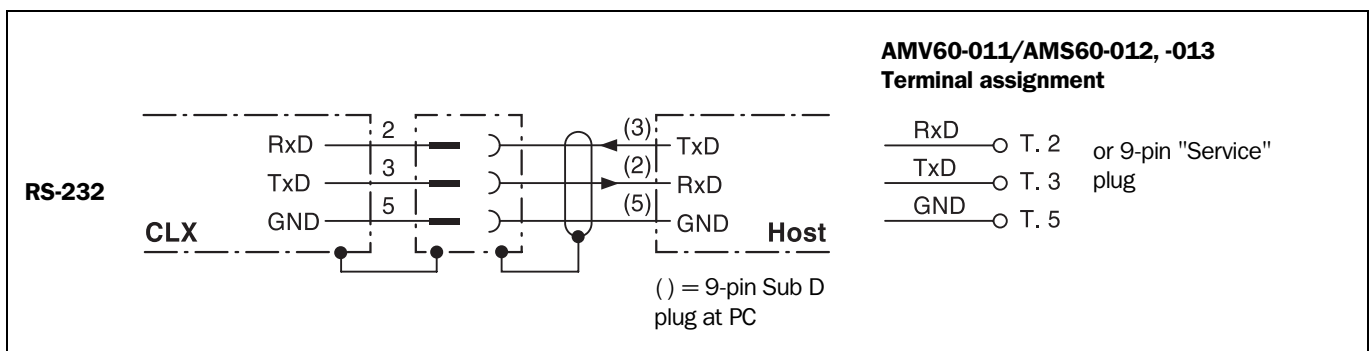
Fig. 5-3: Connecting the auxiliary interface

1. Switch off the PC and power supply to the SICK Connection Module.
2. Connect the PC to the internal, 9-pin "Aux" plug on the Connection Module.
   To do so, use a 3-core RS 232 data cable (null modem cable), e. g. no. 2014054 (RxD and TxD crossed).
   – or –

   Without the SICK Connection Module:
   Connect the PC as shown in *Fig. 5-3*.

3. Switch on the PC and power supply to the SICK Connection Module.

4. Set the communication parameters (see *Chapter 10.6.3 Starting CLV-Setup, Page 10-18).*

Tip In the default configuration, the auxiliary interface outputs the reading result in reading diagnosis mode.

You can change the operating mode to MONITOR HOST INTERFACE, to MONITOR HOST INTERFACE 2 or AUXILIARY INPUT on the AUXILIARY INTERFACE tab in the "CLV-Setup" program.

5.5.7   Connecting the switching inputs

"Sensor" switching input

If a reading procedure is to be triggered on the CLX by an external sensor, the reading pulse sensor must be connected to the "Sensor" switching input. This trigger type is selected in the default setting of the CLX. *Fig. 5-4* shows the connections for the "Sensor" switching input. *Table 5-17* contains the characteristic data for this input.

V_S= +18 to +30 V DC for CLX without heater, 24 V DC +20 % /−10 % for CLX with heater
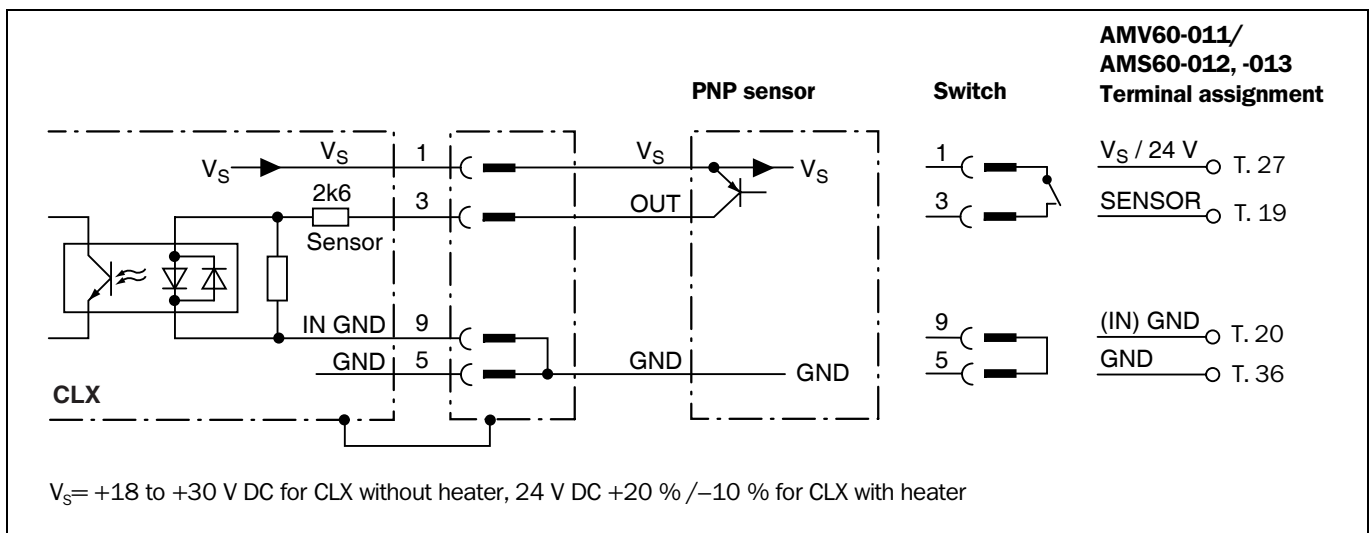
Fig. 5-4:   Connections of the "Sensor" switching input

➢ Connect the reading pulse sensor as shown in *Fig. 5-4.*

Switching mode	Current at the input starts the reading interval on the CLX. (default: active high, debouncing: max. 30 ms (standard))
Properties	− optodecoupled, non-interchangeable − can be connected to PNP output on a sensor
Electrical values	Low: −30 V $\leq V_{in} \leq$ +2 V High: +7 V $\leq V_{in} \leq$ +13 V

Table 5-17: Characteristic data of the "Sensor" switching input

Tip You can change the switching mode (polarity, debouncing, response for first pulse after power-up) of the "SENSOR" switching input on the DEVICE CONFIGURATION tab in the CLV-Setup program.

➢ Click the READING TRIGGER PARAMETERS button.
Enter the values in the dialog box displayed.

For connecting the host interface via the AMV/S60 Connection Module, see the Operating Instructions for the "*AMV/S60 Connection Module*" (no. 8008296).

Note An external pulse is not required for Percentage Evaluation mode.

"IN 0 to IN 4" switching inputs

If the Autofocus function is not used and the CLXs dynamic focus control function is to be triggered by external sensors, the sensors are connected to the five "IN 0 to IN 4" inputs. Together with the internal assignment table, these can be used to configure a maximum of 32 switching states for up to 8 distance configurations. The dynamic focus control function is selected for all inputs by default.

Additional function IN 4:

The "IN 4" input can alternatively be used as an input for a belt increment signal or for the reading pulse end. In this case, a maximum of 16 switching statuses can be used for dynamic focus control.

Fig. 5-5 shows the connections for the "IN 0 to IN 4" switching inputs. *Table 5-18* shows the pin assignment on the CLX and the terminal assignment in the AMV/S 60. *Table 5-19, Page 5-18* contains the characteristic data for these inputs. *Table 5-20, Page 5-18* shows the input combinations based on the distance configurations.

V_S= +18 to +30 V DC for CLX without heater, 24 V DC +20 % /−10 % for CLX with heater

Pin and terminal assignment for **IN X** see *Table 5-18*
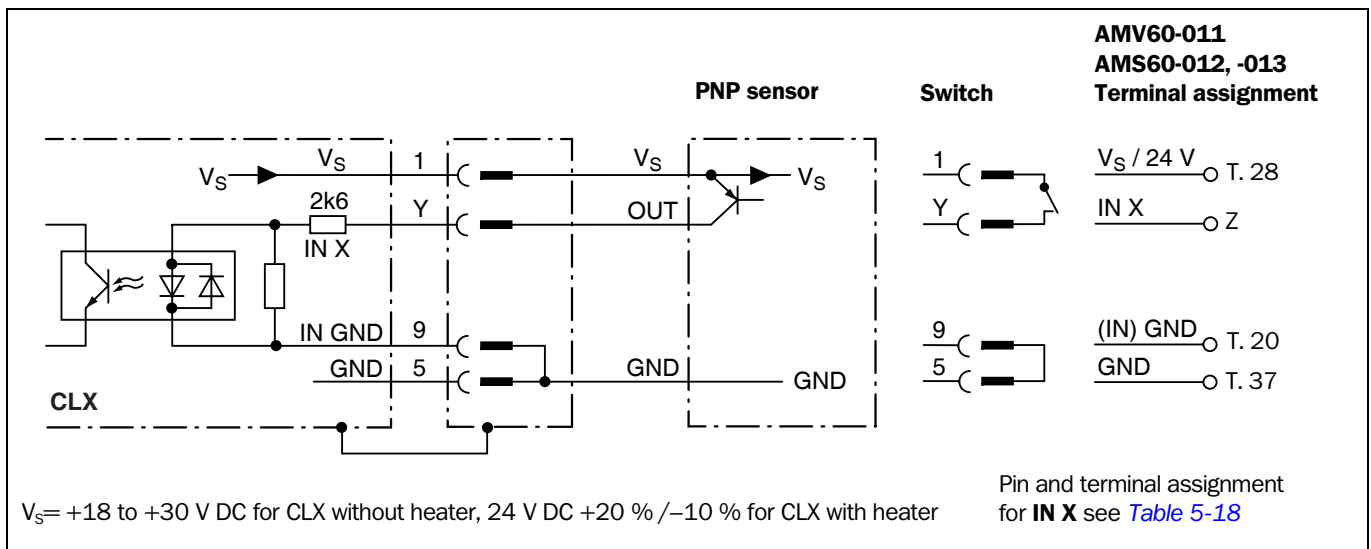
Fig. 5-5:   Connections of the "IN 0 to IN 4" switching inputs

Input IN X	CLX "I/O" connection Pin Y	AMV/S60 Terminal Z
N 0	Pin 6	T. 22
N 1	Pin 2	T. 23
N 2	Pin 7	T. 24
N 3	Pin 11	T. 25
N 4	Pin 12	T. 26

Table 5-18: Pin and terminal assignment for "IN 0 to IN 4" switching inputs

➤   Connect the sensors as shown in *Fig. 5-5*.

For connecting the host interface via the AMV/S60 Connection Module, see the Operating Instructions for the "*AMV/S60 Connection Module*" (no. 8008296).

Function	Trigger source for dynamic focus control "IN 4" alternative: – belt increment input – Reading puls end (Active High) – Reading puls end (Active Low) Default setting "IN 4": dynamic focus control
Switching mode	Active when input energized (high)
Properties	– Optodecoupled, non-interchangeable – Can be connected to PNP output on a sensor
Electrical values	Low: $-30\ V \leq V_I \leq +2\ V$ High: $+7\ V \leq V_I \leq +13\ V$

Table 5-19: Characteristic data of the "IN 0 to N 4" switching inputs

Switching inputs		Content Assignment Table– Distance Config.[2]	
Logic state[1] "IN 4 to IN 0" inputs	Assignment table index	Default setting	Example: Photoelectric switches (bright switching)
0 0 0 0 0	N 1	DC 1	DC 6
0 0 0 0 1	N 2	DC 2	DC 5
0 0 0 1 0	N 3	DC 3	DC 4
0 0 0 1 1	N 4	DC 4	DC 4
0 0 1 0 0	N 5	DC 5	DC 3
0 0 1 0 1	N 6	DC 6	DC 3
0 0 1 1 0	N 7	DC 7	DC 3
0 0 1 1 1	N 8	DC 8	DC 3
0 1 0 0 0	N 9	DC 8	DC 2
0 1 0 0 1	N 10	DC 8	DC 2
0 1 0 1 0	N 11	DC 8	DC 2
0 1 0 1 1	N 12	DC 8	DC 2
0 1 1 0 0	N 13	DC 8	DC 2
0 1 1 0 1	N 14	DC 8	DC 2
0 1 1 1 0	N 15	DC 8	DC 2
0 1 1 1 1	N 16	DC 8	DC 2
1 0 0 0 0	N 17	DC 8	DC 1
1 0 0 0 1	N 18	DC 8	DC 1
1 0 0 1 0	N 19	DC 8	DC 1
1 0 0 1 1	N 20	DC 8	DC 1
1 0 1 0 0	N 21	DC 8	DC 1
1 0 1 0 1	N 22	DC 8	DC 1
1 0 1 1 0	N 23	DC 8	DC 1
1 0 1 1 1	N 24	DC 8	DC 1
1 1 0 0 0	N 25	DC 8	DC 1
1 1 0 0 1	N 26	DC 8	DC 1
1 1 0 1 0	N 27	DC 8	DC 1
1 1 0 1 1	N 28	DC 8	DC 1
1 1 1 0 0	N 29	DC 8	DC 1
1 1 1 0 1	N 30	DC 8	DC 1
1 1 1 1 0	N 31	DC 8	DC 1
1 1 1 1 1	N 32	DC 8	DC 1
1) 1 = energized (active); 0 = deenergized (inactive)			
2) Distance configuration (DC): data record for focus position			

Table 5-20: Dynamic focus control: switching inputs/distance configuration assignment table

5-18   8009237/RB47/2007-08-03

Parameter settings of switching inputs		Effects
"IN 3"	**"IN 4"**	
Focus control[1]	Focus control[1]	"IN 3" switches the focus position in combination with "IN 0" to "IN 2" and "IN 4"
Focus control[1]	Increment counter	"IN 4" receives increment signals "IN 3" switches the focus position in combination with "IN 0" to "IN 2"
Focus control[1]	End of reading interval	"IN 4" triggers the end of reading interval "IN 3" switches the focus position in combination with "IN 0" to "IN 2"
1) depending on the assignment table		

Table 5-21: Combination of the functions of the "IN 0" to "IN 4" switching inputs

Tip The function assigned to the "IN 4" input can be modified on the DEVICE CONFIGURATION tab in the CLV-Setup program.

➢ Click the FUNCTION IN 4 drop-down list and choose the required function.
Perform a download to the CLX.

5.5.8 Connecting the "Result 1 to Result 2" switching outputs

The four switching outputs can be assigned different functions for outputting result statuses independently of each other. If the assigned event occurs during the reading procedure, the corresponding switching output becomes live at the end of the reading pulse for the selected pulse duration. The pulse duration can be set individually for each output.

The "Read Result" LED is linked to the "Result 2" output and lights up in Reading mode for the selected pulse duration and function of the result status display (default: Good Read, 100 ms).

Fig. 5-6 shows the connections for the "Result 1 to Result 4" switching outputs.
Table 5-22 shows the pin assignment on the CLX and the terminal assignment in the AMV/S 60. *Table 5-23, Page 5-20* contains the characteristic data for these outputs. The four outputs have the same characteristic data.

V_S= +18 to +30 V DC for CLX without heater,
24 V DC +20 %/−10 % for CLX with heater

**AMV60-011/
AMS60-012, -013
Terminal assignment**

Pin and terminal assignment
for **Result X** see *Table 5-22*

**Pulse duration
depending
on setting:**
– 10 ms to 900 ms
– 100 ms to 9,900 ms
– 00: static
(to the end of next
reading pulse)
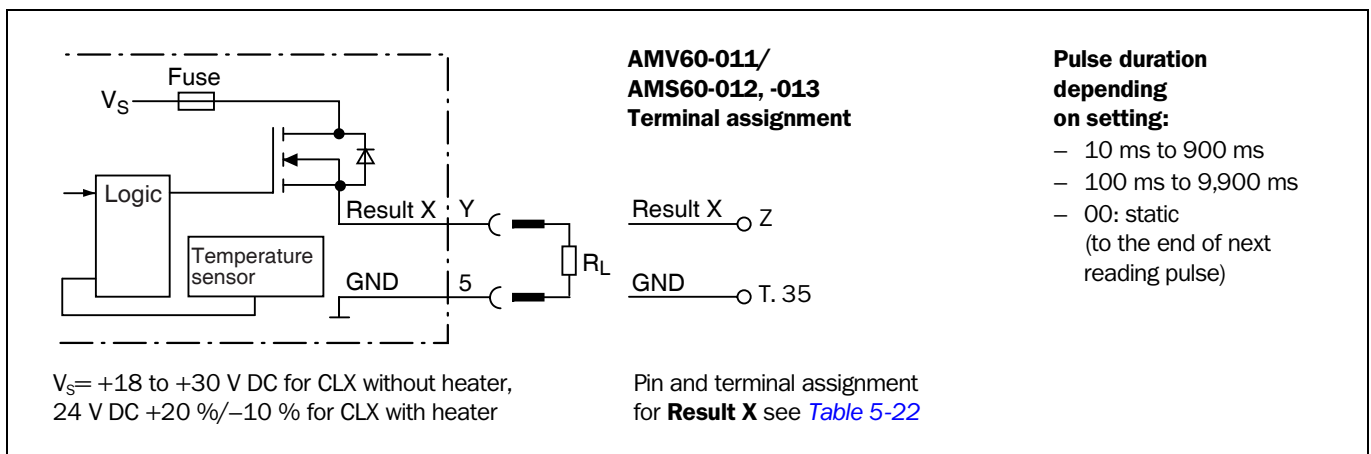
Fig. 5-6: Connections of the "Result 1 to Result 4" switching outputs

Output Result X	CLX "I/O" connection Pin Y	AMV/S60 Terminal Z
Result 1	Pin 4	T. 31
Result 2	Pin 8	T. 32
Result 3	Pin 10	T. 33
Result 4	Pin 15	T. 34

Table 5-22: Pin and terminal assignment for "Result 1 to Result 4" switching outputs

➢ Connect the outputs as shown in *Fig. 5-6*.

Switching mode	PNP-switching with respect to the supply voltage V_S
Properties	The current in the event of a short-circuit is limited to 0.7 A
Function assignment (default)	Result 1: Device Ready (static), polarity: not inverted Result 2: Good Read (100 ms), polarity: not inverted Result 3: No Read (100 ms), polarity: not inverted Result 4: Match 1 (100 ms), polarity: not inverted
Electrical values	$0\ V \leq V_{outr} \leq 30\ V$ Guaranteed: $V_{out} \leq V_S - 1.3\ V$ with $I_{out} \leq 100\ mA$ $I_{out} \leq 100\ mA$

Table 5-23: Characteristic data of the "Result 1 to Result 4" switching outputs

Note   If the "Device Ready" function is chosen, the CLX outputs a static pulse in Reading mode.

For connecting the host interface via the AMV/S60 Connection Module, see the Operating Instructions for the "*AMV/S60 Connection Module*" (no. 8008296).

Tip   The output function, pulse duration (timer), and polarity of the signals can be changed on the DEVICE CONFIGURATION tab in the "CLV-Setup" program.

➢ Click the RESULT OUTPUT PARAMETERS button and enter the values in the dialog box displayed.
Perform a download to the CLX.

Recommondation   ➢ To check the switching functions using a high-impedance digital voltmeter, connect a load to the outputs to prevent incorrect voltage values/switching statuses from being displayed.

        8009237/RB47/2007-08-03

6   Operation

6.1   Overview of steps for starting up the CLX

- Start up the CLX with the factory default settings (quick start).
  With this configuration, the CLX can be operated without being connected to a PC.
- Connect the PC (see *Chapter 5.5.6 Connecting the PC, Page 5-15*) and install the CLV-Setup program (see *Chapter 10.6 Installing and operating the "CLV-Setup" program, Page 10-15*).
- Configure the CLX for the desired application.

6.2   Default settings

Table 6-1 contains an overview of the factory default settings for the CLX. The default parameters are such that the CLX can be put into operation either straight away or following a few minor adjustments. A PC does not need to be connected to start up the CLX with the default settings.

The default settings are stored permanently both in the ROM of the CLX and in the CLV-Setup database. They can be loaded to the RAM of the CLX at any time and displayed in the tabs of the CLV-Setup program.

Displaying and printing out a complete set of default settings in CLV-Setup:

1. To save the current settings in the parameter set:
   Choose FILE and SAVE AS, and enter a file name in the dialog box that appears.
   CLV-Setup saves the current settings in a configuration file with the extension "*.scl".
2. Click 🏭 in the toolbar.
   CLV-Setup loads the default settings from its internal database and displays them in the tabs.
3. Click 🖨 in the toolbar.
   The PRINT FILE dialog box is displayed.
4. If desired, a comment can be entered in the input field for the header of the printout.
   Confirm the entry with OK.
   The PRINT dialog box for configuring the printer then is displayed.
5. Make the appropriate entries in the dialog box and confirm these with OK.

CLV-Setup prints out the complete set of default settings in the form of a table. The header contains the company and user names that were entered during the CLV-Setup installation routine.

6.2.1 Default settings of the CLX490

Parameter	Default setting
Decoder	SMART/standard
Active codes types	Code 39, 2/5 Interleaved, Code 128
Code length	Freely assignable (2/5 Interleaved: interval 4 to 50 characters)
Start/stop ratio	Automatic
No. of multiple reads	3
Min./max. no. codes	1
Scanning frequency	800 Hz
Distance measurement	Active
Background	Default (2,200 mm along entire distance profile)
Autofocus mode	Minimum distance
Range	400 to 1,800 mm
Focus control trigger	Autofocus, switchover immediately (synchronously)
Reading pulse source	Start: "Sensor" switching input (active: high); end: "Sensor" switching input
"IN 0 to IN 4" switching inputs	Focus position changeover (without meaning for autofocus function)
"Sensor" switching input	Start and end of reading pulse (level: active high), debouncing 20 to 30 ms
Switching outputs	Not inverted; pulse duration: 100 ms
Status output function	Result 1: Device Ready (static); Result 2: Good Read; Result 3: No Read; Result 4: Match 1
CLX arrangement	Stand-alone
Read result output	Host interface
Device number	1
Start option	Load the parameter set of the external parameter memory
Host interface (type)	RS 422/485
Protocol	NAK; start character: STX, stop character: ETX
Transmission rate	9,600 bd
Data format	8 data bits, no parity, 1 stop bit
Output format	Good Read: Header: blank, Code-Info/Separator: blank, Splitter: blank, Terminator: blank Reading data on No Read: output: yes, contents: Code-Info/Separator and Error string Error string: NOREAD
Output sorting	In accordance with reading angle
Output time	Read result: end of the read interval Code-Info/Separator: after code
Test string	Not activated
Auxiliary interface	RS 232, 9,600 bd, 8 data bits, no parity, 1 stop bit (values cannot be changed)
Function	Reading diagnosis

Table 6-1: Extract CLX490: Default parameter settings

6.3 Quick start

A PC does not need to be connected when the CLX is operated with the factory default settings. Code 39, 2/5 Interleaved, and Code 128 are the default code types enabled (free code lenght, 2/5 Interleaved: interval 4 to 50 characters).

6.3.1 Switching the CLX on for the first time with the factory default settings

1. Connect the CLX to the AMV/S60 Connection Module using the two cables no. 2020302.

2. Connect the reading pulse sensor (e. g. photoelectric reflex switch, switch) to the "Sensor" switching input of the CLX via the AMV/S60 (see *Chapter 5.5.7 Connecting the switching inputs, Page 5-16*).

3. Switch on the power supply of the AMV/S60.
   The CLX starts. The "Device Ready" LED lights up.
   The "Result 1" ("Device Ready") output switches.

   CLX with external parameter memory connected (default: Start with ext. parameters):
   If an external parameter memory in the connector cover containing a corresponding parameter set is connected to the CLX, the "Device Ready" LED blinks for 10 s when the device starts up correctly and then lights up constantly. If the external parameter memory in the connector cover is empty, the CLX copies its parameter set to the external parameter memory. Then the "Device Ready" LED lights up. The CLX is ready for operation.

4. Start the reading pulse: block the light path of the photoelectric switch or close the switch. The "Laser On" LED lights up. The CLX switches the laser diode on and the red scan line appears as a cross.

5. Present the bar code pattern (*Fig. 6-1*) to the CLX at the reading distance specified in *Table 6-2, Page 6-4*.
   The scan line must not hit any object in a distance closer to the CLX than the represented bar code (default setting: autofocus mode "Minimum distance").

6. Align the bar code in such a way that the red scan line is almost at a 90° angle to the bars.

7. End the reading pulse: unblock the light path of the photoelectric switch or open the switch. The "Laser On" LED is extinguished. The CLX switches the laser diode off.
   The CLX confirms that the bar code was read successfully (the "Result" LED lights up for 100 ms). The "Result 2" ("Good Read") output is switched for a duration of 100 ms.

The CLX can now be operated with the factory default settings. The device can be switched off without the configuration data being lost as no changes have been made to the parameter set.

Fig. 6-1:   Bar code pattern (Code 39; module width 0.35 mm; Print ratio 2:1)

Device type	Reading distance
CLX490 (all variants)	approx. 1,000 mm

Table 6-2: Reading distances for default settings

6.4 Configuring (parameterization) the CLX

The CLX adapts to the reading situation locally with the configuration. The read, evaluation and output characteristics can, therefore, be parameterized as required on the basis of the factory default settings or an application-specific CLX parameter set that has already been created.

The CLX supports two different configuration methods:

- Configuration via the "CLV-Setup" program
  (parameter values are set via the serial interface)
- Configuration via command strings
  (parameter values are set via the serial interface)
  See *Chapter 10.7 Configuring a CLX with command strings, Page 10-25*.

In the Parameterization mode, the CLX outputs no reading result.

6.4.1 Configuring the CLX with CLV-Setup

To be able to use CLV-Setup, a PC has to be connected and the program installed on it. The procedure for connecting the PC to the CLX is described in *Chapter 5.5.6 Connecting the PC, Page 5-15*. The procedures for installing and starting the "CLV-Setup" program and for starting and operating the user interface are described in the Appendix (*Chapter 10.6 Installing and operating the "CLV-Setup" program, Page 10-15*).

Transferring a parameter set between CLV-Setup and the CLX

Upload

When the CLX is being parameterized, CLV-Setup runs in the **offline mode**. To be able to modify the current parameter set of the CLX, this first has to be loaded to CLV-Setup from the CLX. This procedure is referred to as an **upload** ("Upload from CLV" in the CLX490 menu or [F3] key) during which CLV-Setup always loads a complete copy of the current CLX parameter set. This parameter set remains unchanged until it is overwritten by CLV-Setup.

With the help of the **context menu** (right mouse button), only the parameter just edited can be loaded ("Upload parameter") or from version 3.6 all parameters of one tab or one dialog box ("Upload parameters of this view") from the CLX's memory (RAM).

Download

Changes made to the current parameter set in CLV-Setup do not take effect until the parameter set has been transferred to the CLX. CLV-Setup always sends a copy of the complete parameter set to the CLX, i. e. all of the existing parameter values in the CLX are overwritten. The procedure for transferring and saving the parameter values in the CLX is referred to as a **download** ("Download to CLV" in the CLX490 menu or [F4] key).

With the help of the **context menu** (right mouse button), only the parameter just edited ("Download parameter") or from version 3.6 all parameters of one tab or one dialog box ("Download parameters of this view") will be **temporarily** loaded into the CLX's memory (RAM). To finish the parametrization done by this way all parameters must be download again to the CLX with the "**Permanent**" option.

Loading a complete CLX parameter set (upload)

➢ Click 🔲 in the toolbar or press [F3] key.
    CLV-Setup loads the current CLX parameter set from the RAM of the CLX to its database and displays the values in the tabs.
    The "Device Ready" LED is extinguished during the upload.

If the "CLV-Setup" program does not recognize parameters transferred during the upload, it outputs a warning message. Unknown parameters can be edited in the EXTRAS tab by following the conventions for command strings. When the parameter set is then saved, these parameters are also saved.

Transfering and saving a complete CLX parameter set (download)

1. Click 🔲 in the toolbar or press [F4] key.
    The "Device Ready" LED is extinguished.
    CLV-Setup copies the parameter set to the RAM of the CLX.
    The DOWNLOAD PARAMETERS dialog box with the storage options is then displayed.

    PERMANENT: CLV-Setup copies the parameter set to the RAM and to the EEPROM of the CLX.

    TEMPORARY: CLV-Setup copies the parameter set to the RAM only. The changes are lost when the CLX supply voltage is switched off.

2. Confirm the dialog box with the desired storage option.
    The "Device Ready" LED lights up again.

The new parameter set is stored in the CLX either permanently or temporarily.

CLX with external parameter memory

If the parameter set was downloaded and stored **permanently**, CLV-Setup opens a further dialog box for adjusting the parameter set in the external memory, if the start option is set to START WITH EXTERNAL PARAMETERS.

➢ Choose the COPY NOW INTERNAL PARAMETER SET TO EXTERNAL MEMORY option.
    CLV-Setup then instructs the CLX to copy the new parameter set to the external memory. The "Device Ready" LED lights up again.

The internal and external parameter sets are now identical.
See also *Chapter 10.3.5 Adjusting the parameter set in the external parameter memory after it has been downloaded to the CLX, Page 10-10*.

Saving a parameter set in CLV-Setup

1. To save the modified parameter set as a new configuration file in CLV-Setup, or to overwrite an existing file, choose FILE and SAVE AS.
    The SAVE AS ... dialog box is then displayed.

2. Enter the file name in the dialog box (file name extension "*.scl") and confirm the entry.

The new parameter set is now stored in CLV-Setup in the subdirectory "data".

8009237/RB47/2007-08-03 | | **6-5**

6.4.2   Function of the tabs in CLV-Setup (overview)

Reading Configuration

This tab and further dialog boxes are used to set the following:

- Scanning frequency
- Start/stop ratio
- Reading area (reading angle limits or three-dimensional reading space when the conveyor is running)
- Autofocus mode (object distance measurement, preference focus distance, delay of focus chance, depth of field optimization, autofocus space)
- Reading distance configuration for event-controlled focus control (focus position, assignment table)
- Trigger source for the focus control (if event-controlled)
- Adjustment to bar code characteristics

Device Configuration

This tab and further dialog boxes are used to set the following:

- Device number
- Source of the reading trigger mode
- Laser timeout
- Output time of the reading result referred to the start of the reading interval
- Scanner position parameters (position of the CLX in the space)
- Tracking parameters
- Object polling parameters
- Output filter of the reading result (host interface)
- Physical arrangement for data output via the host interface (stand-alone, master/slave)
- Functional assignment of the "IN 4" switching input
- Functional assignments of the "Result 1 to Result 4" switching outputs
- Start option for accessing the parameter set
- Match code

Code Configuration

This tab and other further dialog boxes are used to set the following:

- Type of active decoder (SMART, SMART/Standard or Standard decoder)
- Evaluation routines for individual code types
- Number of identical reads (multiple reads)
- Minimum and maximum number of bar codes to be read/output
- Kind of Start/Stop recognition
- Activation of the comparison of the reading angle for the separation of identical bar codes
- Special parameters of the SMART decoder (e. g. for OTS mode)

Recommendation   To enhance the reading reliability with fast applications, only activate those code types and code lengths that are actually relevant.

Host Interface

This tab and other further dialog boxes are used to set the following:

- Destination of the result data strings (host interface or CAN interface)
- Active physical interface (RS 422/485 or RS 232)
- Data format and transmission rate
- Data transmission protocol
- Start and stop characters of the interface protocol

Data Strings

This tab and other further dialog boxes are used to set the following:

- Data output format of the host interface (telegram format)
- Constants and reading diagnosis data in the "Header", "Code-Info/separator", "Splitter" and "Terminator" blocks
- Arrangement of the "Code-Info/separator" blocks in the data string
- Output format for no reads and contents of the error string
- Test string function (heartbeat)
- Output sequence and sort criteria for reading more than one bar code per reading pulse
- Format mask and its structure
- Output format of an external data string forwarded as reading result

Auxiliary Interface

This tab is used to change the following:

- Operating mode of the auxiliary interface

CAN Interface

This tab and other further dialog boxes are used to change the following:

- CAN interface operating mode
- Data transfer rate
- Type of logical data connection of the connected CLX
- Usage of the switch inputs/outputs of the CLX as CANopen Digital I/O

X   **Extras**

This tab is used to edit parameters that were not recognized by CLV-Setup after an upload.

Note   CLV-Setup Online Help contains a detailed description of the functions of the parameters and their valid entries (see *Chapter 10.6.8 CLV-Setup Help, Page 10-22* for calling up Help).

6.4.3   Guide to parameterization menu

Overview of parameterization steps

- Adjusting the optical read properties of the scanner
- Configuring a read pulse timing
- Adjusting the decoder's evaluation properties
- Adjusting the output properties (data, result status)
- Specifying the auxiliary interface function (auxiliary interface)
- Indicating the source of the parameter set for starting up (only with external parameter memory)

When the CLX is switched on for the first time, it is started with **the factory default** settings. The following parameters must then be set:

a) Adjusting the optical reading properties

- Scanning frequency ⇨ READING CONFIGURATION tab ⇨ Reading Parameters
- Blank zone ⇨ READING CONFIGURATION tab ⇨ Start/stop ratio
- Poor quality bar code print ⇨ READING CONFIGURATION tab ⇨ Code label characteristics
- Relative module width ⇨ READING CONFIGURATION tab ⇨ Code label characteristics

                   8009237/RB47/2007-08-03

Parameterizing the autofocus mode (Part 1):

Action	Settings
1. Activate autofocus mode	⇨ READING CONFIGURATION tab FOCUS CONTROL ⇨ Autofocus
2. Choose autofocus mode	AUTOFOCUS ⇨ MODE – Minimum distance or – Differential background or – Differential background and tracking see *Table 6-4*
3. Set up autofocus mode	AUTOFOCUS ⇨ AUTOFOCUS PARAMETERS ⇨ ADJUSTMENTS – Preference focus distance – Focus release ⇨ AUTOFOCUS LIMITS PARAMETERS – Autofocus limitation – Autofocus space (see *Table 6-4*) ⇨ AUTOFOCUS OPTIMIZATIONS PARAMETERS – Delay of focus change – Depth of field optimization – Object height passing in OTS mode – Distance measurement ⇨ ACTIVE – Source of distance information

4. Choose time of focusing
(based on reading pulse)
	FOCUS CONTROL
	⇨ Inputs/Serial/Autofocus
	  – Immediate or Synchronous
	  – Latched

Table 6-3: Guide: Parameterizing the autofocus mode (Part 1)

Configuring autofocus function (Part 2):

- Area parameters ⇨ DEVICE CONFIGURATION tab ⇨ Scanner Positon Parameters and Tracking Parameters (only in OTS mode)
- Teach-in/show ambient background ⇨ AUXILIARY menu ⇨ Device function

Parameter	Minimum Distance	Differential background	Differential background and tracking
Condition	1 object in reading field per reading interval	1 object in reading field per reading interval	No. of objects in the reading field per reading interval: ≥ 1
1. Limits: autofocus limitation	✖	○	○
2. Limits: autofocus space	–	○	○
3. Scanner position parameters (angles): angle alpha, beta, gamma	–	✖	✖
4. Scanner position parameters (coordinates): coordinates x, y, z	–	✖	✖
5. Tracking parameter: focus release point	–	–	✖
6. Teach-in background	–	○	○
✖ : required ○: optional			

Table 6-4: Guide: Parameterizing the autofocus function (Part 2)

8009237/RB47/2007-08-03   **6-9**

Parameterization the event-controlled focus control (alternative):

Action	Settings
1. Activate focus control func- tion (choose trigger source)	⇨ READING CONFIGURATION tab ⇨ FOCUS CONTROL – Inputs/Serial or – Timer or – Static/No Trigger
2. Choose focus switchover point (referred to reading pulse)	FOCUS CONTROL ⇨ Inputs/Serial – Immediate or Synchronous – Latched
3. Set up focus control	DISTANCE CONFIGURATION ⇨ Distance Configuration – Focus Position ⇨ Assignment Table – Index – Valid Configurations
4. In INPUTS/SERIAL trigger mode: choose function for "IN 4" switching input	⇨ DEVICE CONFIGURATION tab ⇨ ASSIGNMENT IN 4 – Focus Control

Table 6-5: Guide: Parameterizing the event-controlled focus control

 8009237/RB47/2007-08-03

b) Parameterizing the reading trigger source:

Action	Settings

1. Reading trigger: choose source for start	⇨ DEVICE CONFIGURATION tab
	⇨ Section READING TRIGGER SOURCE
	  – Sensor Input (Active High) or
	  – Sensor Input (Active Low) or
	  – Serial Interface or
	  – Free-running with Timeout or
	  – OPC-Trigger (special application) or
	  – OTS-Trigger (special application)

2. Trigger source "Sensor Input": Choose de-bouncing and response with firsttrigger	⇨ READING TRIGGER PARAMETERS
	⇨ DEBOUNCING SENSOR
	  – Standard or
	  – Fast
	⇨ FIRST TRIGGER SENSOR
	  – Dynamic or
	  – Static

3. Trigger source "Serial Interface": choose trigger character	⇨ READING TRIGGER PARAMETERS
	⇨ SERIAL INTERFACE
	  – Standard Trigger or
	  – Single Character

4. Trigger source "Free-running": choose timeout	⇨ READING TRIGGER PARAMETERS ⇨ END OF LABEL/FREE-RUNNING – Timeout

5. Reading trigger: choose source for end	⇨ READING TRIGGER PARAMETERS
	⇨ END OF READING INTERVAL
	  – Generated by Trigger Source or
	  – Timer or
	  – Generated by "IN 4" switching input

Table 6-6: Guide: Parameterizing the reading trigger source

Parameterizising the laser timeout:

Action	Settings

1. Choose laser timeout duration
  – or –
	⇨ DEVICE CONFIGURATION tab
	⇨ READING TRIGGER PARAMETERS
	  ⇨ LASER TIMEOUT
	    – Duration

2. Deactivate laser timeout (The laser diode is always active, when trig-gered, independent of the pulse duration)	⇨ LASER TIMEOUT – Click (deactivate) the control box INTERVAL ACTIVE

Table 6-7: Guide: Parameterizing the laser timeout

c) Parameterizising the evaluation characteristics

- Choose decoder type ⇨ CODE CONFIGURATION tab ⇨ Decoder
- Activate code types for evaluation ⇨ CODE CONFIGURATION tab ⇨ Codes and Edit Codes
- Activate code comparison ⇨ DEVICE CONFIGURATION tab ⇨ Match Codes Parameters
- Define output time of reading result ⇨ CODE CONFIGURATION tab ⇨ Output on Good Read

8009237/RB47/2007-08-03 **6-11**

Separation of identical bar codes (same code type/identical contents)

Number of bar codes per object	Stationary conveyor object	Moving conveyor object
Number n > 1: – Same code type – Contents different or identical	⇨ CODE CONFIGURATION tab ⇨ CODE SUMMARIZATION section – **Activate** "Seperate codes dependent on reading angle" – Min. distance between labels ⇨ NUMBER OF CODES section – Minimum – Maximum	⇨ CODE CONFIGURATION tab ⇨ CODE SUMMARIZATION section – **Activate** "Seperate codes dependent on reading angle" – Min. distance between labels ⇨ NUMBER OF CODES section – Minimum – Maximum ⇨ DEVICE CONFIGURATION tab ⇨ SCANNER POSITION PARAMETERS button ⇨ ANGLES section – Angle alpha ⇨ DISTANCE PER ENCODER PULSE section – value

Table 6-8: Guide: Parameterizing the separation of identical bar codes

Note   If the number n > 1, minimum distance between the bar codes on the object must be provided in the following cases:

- The SMART decoder is to read bar codes that originate from the same code type and have identical or different data contents

- The standard decoder is to read and distinguish bar codes with the same name (identical code type and data content)

The necessary calculations are provided in *Chapter 10.8.1 Calculating the necessary capture area for the bar code if several bar codes are read on each object, Page 10-27*.

d) Parameterizing the output characteristics

Result status: Switching outputs/"Read Result" LED:

- Define function of result status output of "Result 1" to "Result 4" switching outputs ("Read Result" LED): DEVICE CONFIGURATION tab ⇨ RESULT OUTPUT PARAMETERS button

Main data interface general:

- Destination result data strings ⇨ HOST INTERFACE tab ⇨ DESTINATION OF RESULT DATA STRINGS section

- Filter reading result ⇨ DEVICE CONFIGURATION tab ⇨ ODETTE FILTER section

- Sort reading result ⇨ DATA STRINGS tab ⇨ OUTPUT SEQUENCE SORT section

- Mask reading result ⇨ DATA STRINGS tab ⇨ FORMAT MASK section

Host Interface:

- Arrangement in data network ⇨ DEVICE CONFIGURATION tab ⇨ SCANNER ARRANGEMENT section

- Physical interface ⇨ HOST INTERFACE tab ⇨ DATA FORMAT section

- Communication parameters ⇨ HOST INTERFACE tab ⇨ DATA FORMAT section

- Protocol ⇨ HOST INTERFACE tab ⇨ INTERFACE PROTOCOL section

6-12   8009237/RB47/2007-08-03

Function of the CAN interface (alternative):

See the operating instructions *"Using the CAN interface"* (no. 8009180, English version)

Data output string of host interface:

- Choose contents of "Header", "Code Info/Separator", "Splitter" and "Terminator" blocks ⇨ DATA STRINGS tab ⇨ OUTPUT FORMAT section
- Position of "Code Info/Separator" blocks in data output string ⇨ DATA STRINGS tab ⇨ POSITION OF CODE INFO/SEPARATOR section
- Set wrong read format ⇨ DATA STRINGS tab ⇨ READING DATA IN CASE OF ERROR section, CHARACTER COUNT section and ERROR STRING section
- If necessary, parameterize/activate test string ⇨ DATA STRINGS tab ⇨ TEST STRING section
- Parameterize special functions ⇨ DATA STRINGS tab ⇨ SPECIAL PARAMETERS button
- Output external data string as reading result ⇨ DATA STRINGS tab ⇨ EXTERNAL DATA STRING PARAMETERS button

e) Parameterizing the auxiliary interface (auxiliary interface)

- AUXILIARY INTERFACE tab

f) Defining the start option for accessing the parameter set

- On the DEVICE CONFIGURATION tab ⇨ choose START WITH ...

8009237/RB47/2007-08-03   **6-13**

6.5　Operating modes and outputing the reading result

The following CLX operating modes/functions can be selected in CLV-Setup:

Standard operating mode:

- Reading mode

For setup:

- Percentage evaluation

For adapting the device to the application at hand:

- Configuring (parameterizing) the CLX
  See *Chapter 6.4.1 Configuring the CLX with CLV-Setup, Page 6-4*
- Background teach-in
- Background analysis

For monitoring purposes/troubleshooting:

- Display and edit operating data
- Reading diagnosis
- Monitor host interface
- Auxiliary input
- Self-test

6.5.1　Reading mode (standard operating mode)

The CLX performs a self-test after it has been switched on. It switches to Reading mode ("Device Ready" LED lights up). In the default setting the "Sensor" switching input is the (external) trigger source of the reading pulse. The reading result is output by the CLX at the end of the reading pulse via the host interface (default setting) and auxiliary interface.

Depending of the configuration, the "Result 1" to "Result 4" switching outputs become live for the predefined pulse length when defined events occur during the reading process (e. g. Good Read).

The reading result of the **auxiliary interface** can be displayed in the CLV-Setup Terminal Emulator. The CLX auxiliary interface must be set to the READING DIAGNOSIS mode for this purpose. This mode is selected for the default setting. The reading result of the auxiliary interface has a fixed, invariable format.

The Reading mode can be called up by choosing VIEW in the menu bar or via the Terminal Emulator.

Displaying the reading result in the Terminal Emulator:

1. Click 🖥 in the toolbar.
   The Terminal Emulator window is then displayed.
2. In the DEVICE MODE section, choose READING MODE.
3. Present the bar code pattern from *Fig. 6-1* to the CLX and activate the reading pulse.
   The scan line must not hit any object in a distance closer to the CLX than the represented bar code (default setting: autofocus mode "Minimum distance").
   The "Sensor" LED lights up and the red scan line appears. Also refer to *Chapter 6.3.1 Switching the CLX on for the first time with the factory default settings, Page 6-3*.

4. Ending the reading pulse.
    The CLX displays the reading result in the output window of the terminal emulator.
    The "Read Result" LED lights up for a duration of 100 ms (default setting).

Fig. 6-2, Page 6-15 shows two examples of the output of a reading result: Good Read and No Read. The reading result comprises the data contents of the bar code(s) and the reading diagnosis data. *Fig. 6-3, Page 6-16* explains the structure and function of the reading diagnosis data for Good Read, and *Fig. 6-4, Page 6-16* for No Read.

Note   The CLX only outputs several bar codes in the reading result of the **host interface** if the parameterized minimum and maximum number of bar codes is > 1, and several bar codes have been presented to it. The number of bar codes to be read/output for each reading interval can be selected in the CODE CONFIGURATION tab in the NUMBER OF CODES section. The reading result of the **host interface** can also be displayed. *Chapter 6.5.6 Monitor Host Interface, Page 6-22* describes the procedure for this and the structure of the reading result in the default setting.
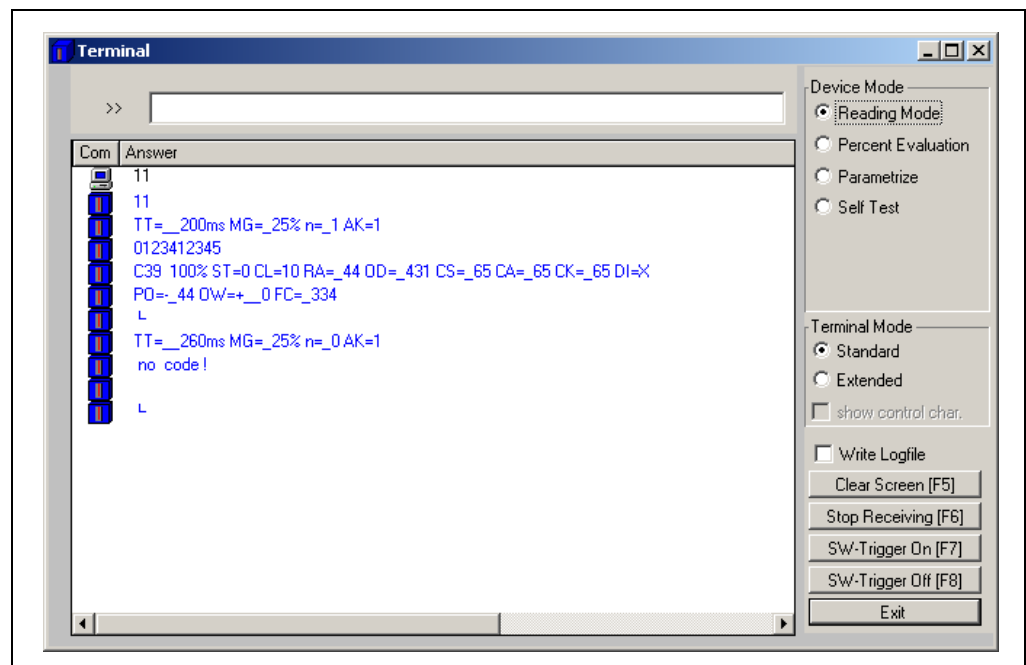
Fig. 6-2:   CLV-Setup: Displaying the reading result of the auxiliary interface in the Terminal Emulator

Good Read:

TT=_ _200 ms MG=_25 % n=_1　AK=1
0123412345
C39 100% ST=0 CL=10 RA=_44 OD=_431 CS=_65 CA=_65 CK=_65 DI=X
PO=·-_ 44 OW=+_ _0 FC=_334 ON=__0

With:

1st. line:	TT	=	Duration of the reading interval
	MG	=	Temporal mean value of the identification quality
	n	=	Number of detected bar codes
	AK	=	No. of the used distance configuration[1]
2nd. line:	0123412345	=	Data contents of the bar code
3rd. line:	C39	=	ID: Code type Code 39
	100%	=	Identification quality
	ST	=	Read status (ST = 0: Good Read)
	CL	=	Code length (number of characters)
	RA	=	Reading angle
	OD	=	Object distance, radial measured (mm)
	CS	=	Code reliability
	CA	=	Scan effort
	CK	=	Code continuity
	DI	=	Decoding direction (F = in scanning direction, R = against scanning direction)
4th line	PO	=	Exact reading angle (3-digit, in °)(unit 0,1°)
	OW	=	Exact oscillating angle (3-digit, in °)(unit 0,1°), not for CLX
	FC	=	Current focus position (4-digit) in mm
	ON	=	Consecutive object number

1) not relevant for autofocus function

Fig. 6-3:　　Reading result of the auxiliary interface: structure for "Good Read"

No Read:

TT=_ _ 260 ms　MG=_56 %　n=_0　AK=1
no code!

1st. line:	TT	=	Duration of the reading interval
	MG	=	Temporal mean value of the identification quality
	n	=	Number of codes detected
	AK	=	No. of the distance configuration used[1]
2nd. line:	no code!	=	No bar codes found!

1) not relevant for autofocus function

Fig. 6-4:　　Reading result of the auxiliary interface: structure for "No Read"

Triggering the reading pulse via the Terminal Emulator

In the default setting the "Sensor" switching input is the (external) trigger source of the reading pulse. The reading pulse can also be triggered directly via the Terminal Emulator of CLV-Setup for test purposes. To do so, a different trigger source must be selected temporarily in the CLX.

1. Choose DEVICE CONFIGURATION tab.

2. In the READING TRIGGER MODE section click the SERIAL INTERFACE option.

3. Perform a download to the CLX.
    To do so, click the SERIAL INTERFACE option again with the right mouse button and choose DOWNLOAD PARAMETER in the context menu.
    CLV-Setup copies the parameter to the CLX temporarily.
    The serial interface has been activated as the trigger source of the reading pulse and is ready to receive appropriate commands (until the CLX is switched off).

4. Click 🖥 in the toolbar.
    The Terminal Emulator window is then displayed.
    The CLX is in the Reading mode.

5. Click the SW-TRIGGER ON button or press [F7].
    CLV-Setup sends a start command to the CLX.
    The "Sensor" LED lights up and the red scan line appears as a cross.

6. Present the bar code pattern from *Fig. 6-1, Page 6-3* to the CLX.

7. Click the SW-TRIGGER OFF button or press [F8].
    CLV-Setup sends a stop command to the CLX.
    The "Sensor" LED is extinguished. The CLX switches off the laser diode.
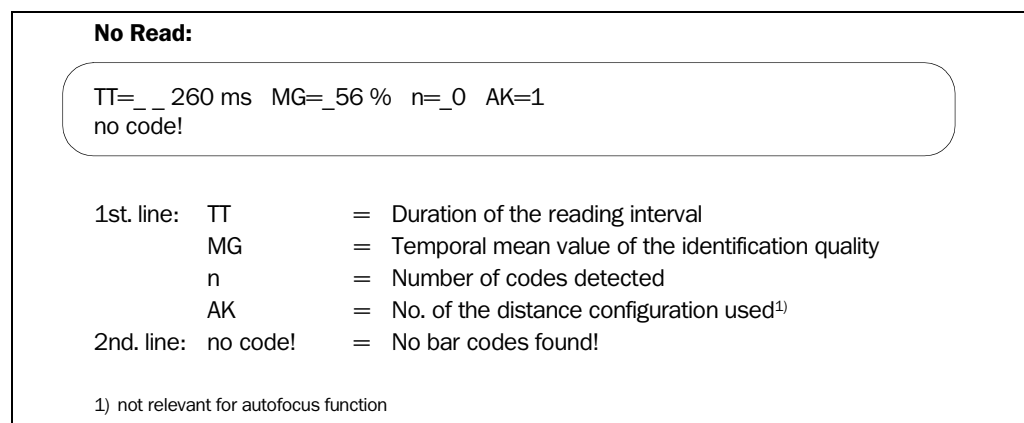   The CLX displays the reading result in the output window of the Terminal Emulator.
    The "Read Result" LED lights up for a duration of 100 ms (default setting).

6.5.2   Percentage evaluation

In the Percentage evaluation mode, the quality of the reading function is assessed (no conveyor movement).

The CLX performs 100 scans in the free running mode and evaluates the reading quality. It outputs the reading result continuously every 2 s via the **auxiliary interface**. The reading results can be displayed in the terminal emulator of CLV-Setup. The standard decoder has to be set temporarily for the percentage evaluation. The "Result 1" to "Result 4" switching outputs do not become live in the Percentage evaluation mode.

The Percentage evaluation mode can be called up by choosing VIEW in the menu bar, as a device function via CLX490 (interactively), or via the Terminal Emulator.

Note   *Autofocus mode:*
If the CLX operates with autofocus in stand-alone configuration, the Percentage evaluation mode can only be started in the Autofocus mode "Minimum distance" or "Differential background". The CLX fixes the timeout of the automatic focus position switchover to 30 ms, the preferred focus position is set to the last recognised object.
If the CLX operates with autofocus in OTS mode ("Differential background and tracking"), the CLX switches automatically to the autofocus mode "Differential background" during the the Percentage evaluation mode.

The **standard decoder** has to be set temporarily for the percentage evaluation.

1. Choose the CODE CONFIGURATION tab.

2. In the DECODER section, choose STANDARD.

8009237/RB47/2007-08-03   **6-17**

3. Perform a download to the CLX.
    To do so, click the STANDARD option again with the right mouse button and choose
    DOWNLOAD PARAMETER in the context menu.
    CLV-Setup copies the parameter to the CLX temporarily.
    The CLX then operates with the standard decoder (until the CLX is switched off).

4. Click 🖥 in the toolbar.
    The Terminal Emulator window is displayed. The CLX is in the Reading mode.

5. In the DEVICE MODE section, choose PERCENTAGE EVALuation
    The dialog box for choosing the distance configuration is then displayed.

6. Choose the appropriate distance configuration for the reading distance:
    – with autofocus mode the distance configuration no. 1
    – with event-controlled focus control the distance configuration that corresponds to the
      reading distance of the object (default setting: no. 1, focus position F1 = 1,200 mm).

7. Confirm the dialog box with OK.
    The "Device Ready" LED is extinguished. The CLX initiates the percentage evaluation
    and outputs the reading results continuously. An example shows *Fig. 6-5*.
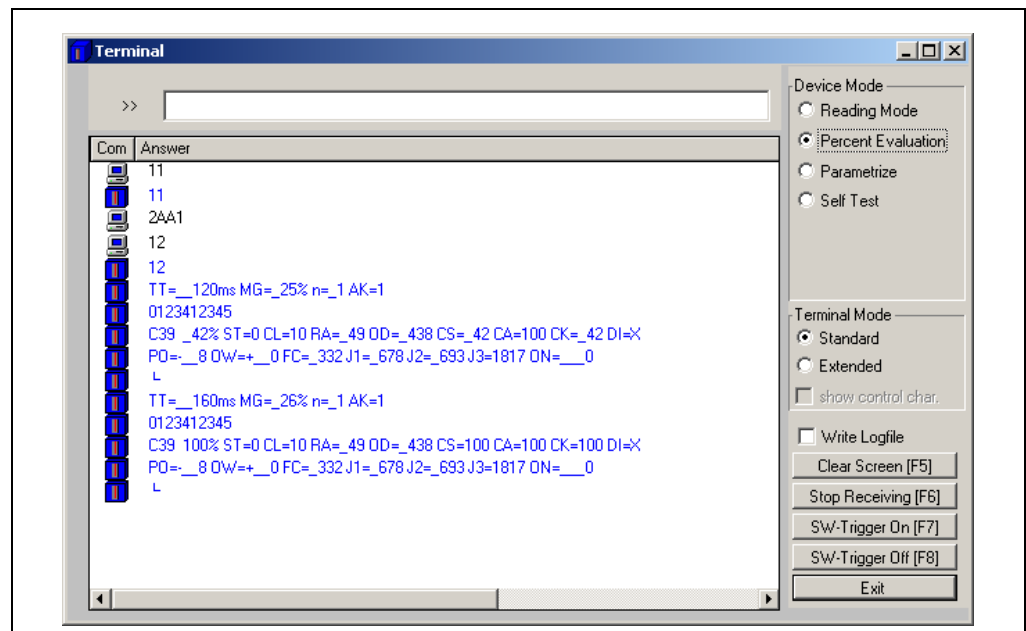
Fig. 6-5:   CLV-Setup: Displaying the percentage evaluation in the Terminal Emulator

8. Present the bar code pattern from *Fig. 6-1, Page 6-3* and monitor the reading results
    in the Terminal Emulator window.

Note In default setting, the CLX operates in the autofocus mode "Minimum distance". As a result,
the CLX focuses on the object that is nearest in Percentage Evaluation mode. The view on
the object with the scan line must be unobstructed, i. e. any other objects must not protude
into the autofocus space. If they do so, the autofocus mode "Differential background" must
be selected. Alternatively a fixed focus position can be set.

The "Read Result" LED also provides information on the reading quality:

–   The LED is extinguished if reading quality is < 30 %
–   The LED blinks twice per second if the reading quality is 30 % to 70 %
–   The LED blinks five times per second if the reading quality is 70 % to 90 %
–   The LED is lit continuously if the reading quality is > 90 %

The output format of the reading result is the same as that of the Reading mode. *Fig. 6-3, Page 6-16* explains the structure and function of the reading diagnosis data.

6.5.3 Background teach-in

If the Autofocus function is used in the DIFFERENTIAL BACKGROUND or DIFFERENTIAL BACKGROUND AND TRACKING mode, the CLX must first learn the **ambient background** in its reading field to narrow the reading field even further. When the internal distance profile is set, the reading field of the CLX must **not contain any objects**. In this mode, the CLX does not output any reading results.

The background teach-in function can be started as a device function in the submenus under CLX490, DEVICE FUNCTIONS, BACKGROUND, TEACH-IN or press the [F2] key.

Starting the background teach-in:

1. Mount the CLX at the reading station and align it with an object containing a bar code.
2. Remove the object so that the CLX has an unobstructed view of the background.
3. Choose CLX490, DEVICE FUNCTIONS, BACKGROUND, TEACH-IN
   – or –
   press the [F2] key.
   The EXECUTE DEVICE FUNCTIONS window opens.
   Choose BACKGROUND, TEACH-IN in the EXECUTE menue.

   The Device Ready LED extinguishes. The CLX then scans its background and learns the ambient background so that it can create a suitable distance profile.
   The CLX outputs a message once the teach-in procedure has been successfully completed (see *Fig. 6-6*).
   The CLX has then learned the ambient background.
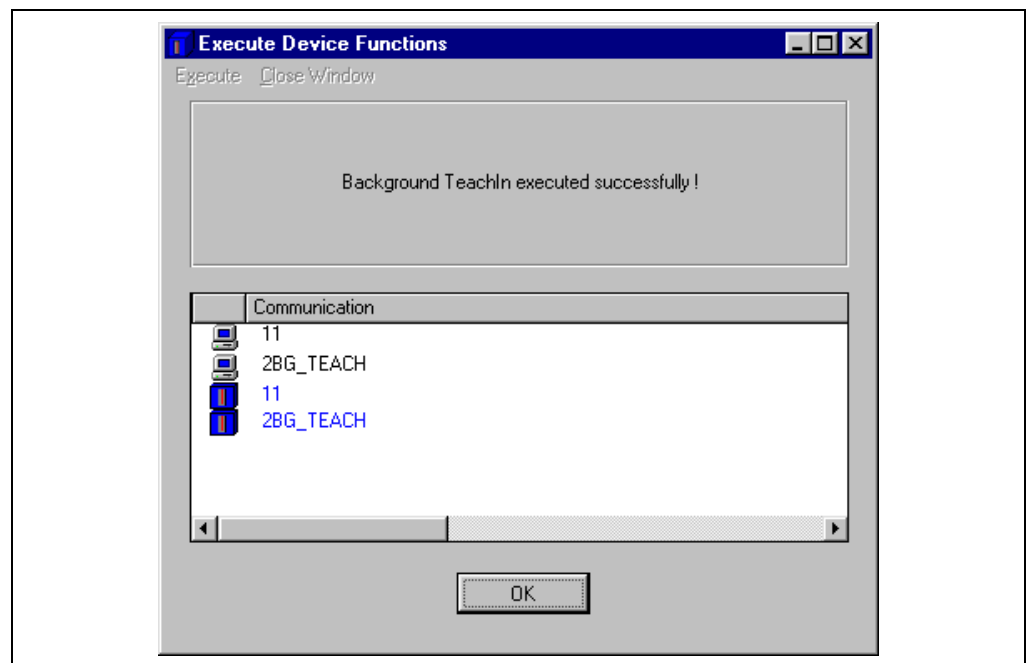
Fig. 6-6:   CLV-Setup: Dialog window for running the background teach-in

4. Choose CLOSE to close the window.
   If the parameters in the CLX were modified as a result of the teach-in procedure, CLV-Setup asks you whether you want to copy and display the modified parameter set by uploading it from the CLX.

5. Confirm the query with YES.
    The CLX resumes Reading mode and the "Device Ready" LED lights up.

Displaying the taught-in background:

The new background distance profile can be uploaded and displayed in CLV-Setup via the auxiliary interface of the CLX. CLV-Setup displays the background without any parameterized limitations ("Autofocus space").

1. Choose the READING CONFIGURATION tab.

2. In the AUTOFOCUS section, click the SHOW BACKGROUND button.
    The SHOW BACKGROUND dialog box appears.
    An example of a distance profile is shown in *Fig. 6-7*, with part A of the scan line.
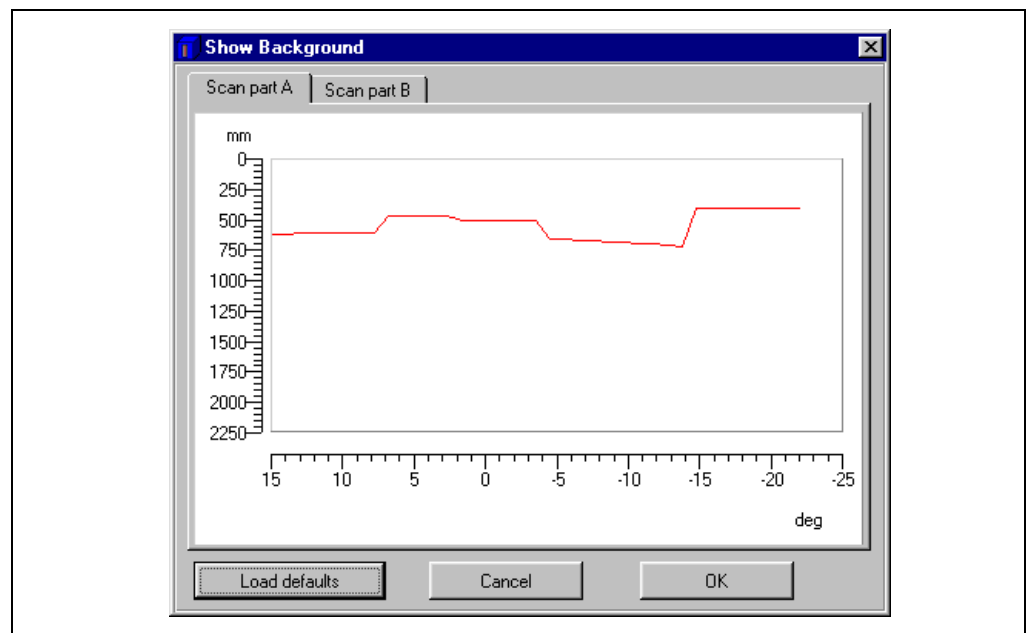
Fig. 6-7:   CLV-Setup: Display of the learned background

Note   The CLX adjusts the entire profile of the taught-in background by minus 100 mm, that is, the entire background curve is moved toward the CLX by this amount (also in the display in CLV-Setup) to compensate measurement inaccuracies. The parameterized limits of the applicable autofocus space are not corrected. The CLX also shifts the edges of the measured profile toward the center by 2 angular elements.
    If no background has been taught in, the CLX uses the default background (2,200 mm across the entire distance profile).

6.5.4 Displaying and editing operating data

This function enables statistical operating data, which the CLX maintains in the form of counters during the reading procedure, to be displayed and reset.

The CLX does not output a reading result in this mode.

1. Click 📈 in the tool bar.
   The CLX cancels the Reading mode and the "Device Ready" LED is extinguished. The OPERATING DATA dialog box appears (*Fig. 6-8*).

2. After checking/resetting the desired counters, click OK to confirm any changes made.
   The CLX then returns to the Reading mode and the "Device Ready" LED lights up.
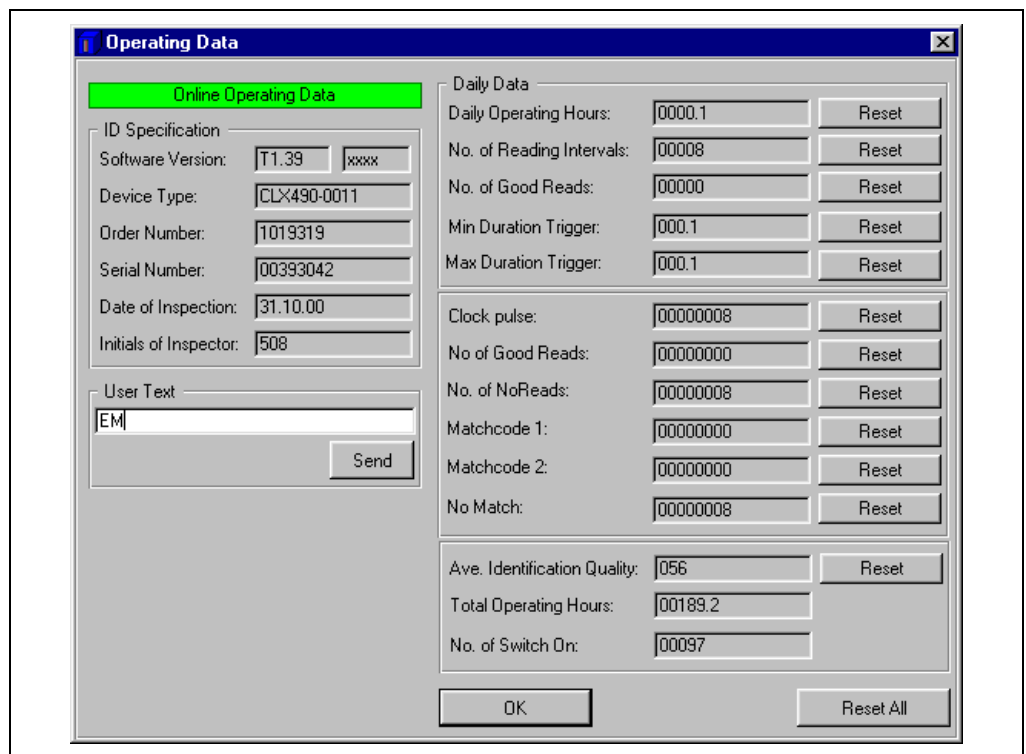
Fig. 6-8:   CLV-Setup: "Operating Data" dialog box

6.5.5 Reading diagnosis

Function of the **auxiliary interface**. In this mode, the CLX outputs the data contents of all the bar codes that were read – including those that, according to the evaluation criteria, were not read properly and were thus incorrect – together with the associated reading diagnosis data via the auxiliary interface. The number of bar codes output can, therefore, be higher than the number of those that were sent via the host interface in the reading result. In the default setting, this mode is selected for the auxiliary interface.

Fig. 6-3, Page 6-16 shows the output format of the auxiliary interface.

In the default setting, the CLX doesn't output any reading diagnosis data via the host interface.

If the reading diagnosis is to remain inactive, this can be set via the AUXILIARY INTERFACE tab.

1. In the AUXILIARY INTERFACE drop-down list, choose READ DIAGNOSTICS.

2. Perform a download to the CLX by clicking 📥 in the toolbar.
   The DOWNLOAD PARAMETERS dialog box is then displayed.

3. Choose the PERMANENT storage option in the dialog box.

The auxiliary interface is now set to the "Read Diagnostics" mode.

6.5.6   Monitor Host Interface

Function of the **auxiliary interface**. In this mode, the CLX outputs the data traffic of its host interface via the auxiliary interface. Protocol driver handshakes and protocol-specific data, such as start and stop characters, are suppressed here. Each data string is displayed on a separate line on the screen. Two monitoring modes are available that differ with regard to the data output format (*Table 6-9*).

Mode	Direction of data	Output format	Representation on screen
"Monitoring host interface"	CLX receives from host CLX sends to host	\<STX\> **I** Data \<CR\> \<LF\> \<ETX\> \<STX\> **O** Data \<CR\> \<LF\> \<ETX\>	I Data O Data
"Monitoring host interface 2"	CLX receives from host CLX sends to host	\<STX\> Data \<ETX\> \<STX\> Data \<ETX\>	Data Data

Table 6-9: "Monitor Host Interface" function

The MONITOR HOST INTERFACE or MONITOR HOST INTERFACE 2 function is activated via the AUXILIARY INTERFACE tab.

1. In the AUXILIARY INTERFACE drop-down list, choose MONITOR HOST INTERFACE or MONITOR HOST INTERFACE 2.

2. Perform a download to the CLX.
    To do so, click the desired option in the list again with the right mouse button and choose DOWNLOAD PARAMETER in the context menu.
    CLV-Setup copies the parameter to the CLX temporarily.
    The auxiliary interface then operates in the choosed "Monitor Host Interface" mode until the CLX is switched off again.

Note   On good read, the CLX only outputs the number of read bar codes being defined for maximum on the CODE CONFIGURATION tab, in the NUMBER OF CODES section.

Displaying the data traffic of the host interface in the Terminal Emulator:

The data traffic of the host interface can be displayed in the Terminal Emulator of CLV-Setup. *Fig. 6-9* shows an example of how the reading result can be output.

1. Choose the serial interface as the external trigger source for the reading pulse.
    See *Chapter 6.5.1 Reading mode (standard operating mode), Page 6-14*.

2. Click 🖥 in the toolbar.
    The Terminal Emulator window is then displayed.
    The CLX is in the Reading mode.

3. Click on the SW-TRIGGER ON button or press [F7].
    The red scan line then appears as a cross.

4. Present the bar code pattern from *Fig. 6-1, Page 6-3*.

5. Click the SW-TRIGGER OFF button or press [F8].
    CLV-Setup outputs the reading result in the Terminal Emulator.
    Example: "O 0123412345".
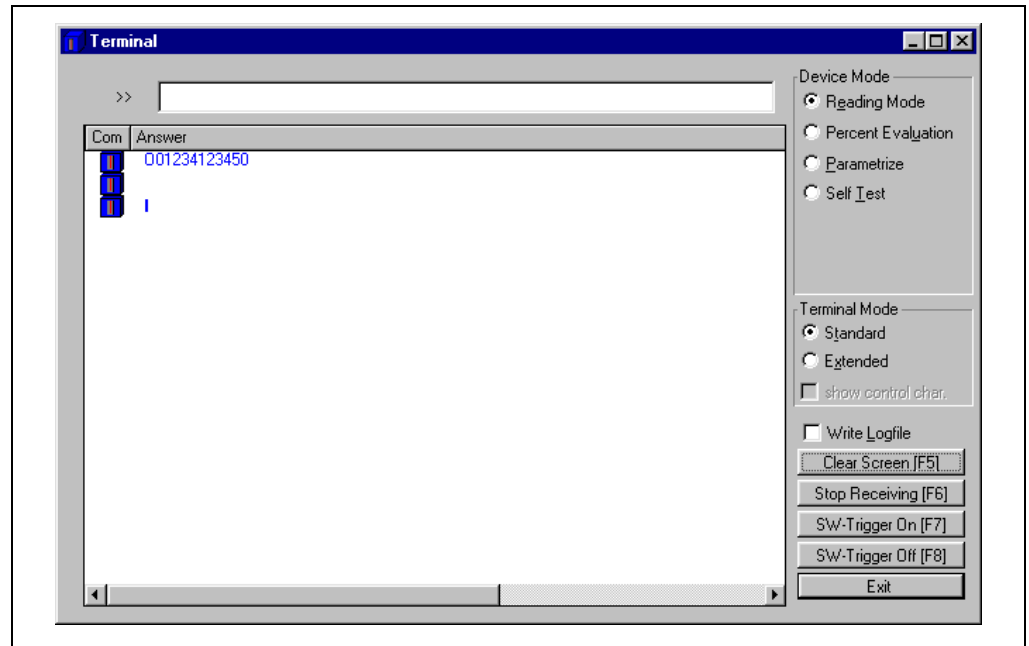
Fig. 6-9:   CLV-Setup: Displaying the reading result of the host interface in the Terminal Emulator with direction identifier at the beginning (in this case: O = Output)

Note   If a large amount of data is being read in at high speed and with a high transmission rate, the host interface's data trafficing may no longer be completely displayed on the auxiliary interface (display "..."). This is due to the slower transmission rate of the auxiliary interface (9,600 bd).

In the default setting, the CLX sends the following in the data output string of the host interface:

- On Good Read: Data content of one bar code
- On No Read: Character string "NOREAD"

The "Header", "Code-Info/Separator", "Splitter" and "Terminator" blocks are blank.

Tip   The structure of the data output string of the host interface can be configured via the DATA STRINGS tab.

- Up to 10 elements, consisting of constants (letters, digits, control characters) and/or reading diagnosis data, can be entered in the "Header", "Code-Info/Separator", "Splitter" und "Terminator" blocks.
- Up to 5 elements, consisting of constants (letters, digits, control characters) can be entered in the "Splitter" blocks.
- The position of the "Code-Info/Separator" block can be choosen before or after the code.

1. Choose the DATA STRINGS tab.
2. Click the HEADER field.
   The EDIT PARAMETER: TFH dialog box is then displayed.
3. Click the desired constants or placeholders for the reading diagnosis data.
   The selected elements appear in the text box at the top of the dialog box in the sequence in which they were selected.
4. Confirm the entries made by clicking OK.
5. Repeat this procedure for the "Code-Info/Separator", "Splitter" und "Terminator" blocks.

6. Perform a download to the CLX by clicking ▣ in the toolbar.
    The DOWNLOAD PARAMETERS dialog box is then displayed.

7. Choose the PERMANENT storage option in the dialog box.
    The CLX outputs the selected elements in the data output string of the host interface
    with the next reading result.

6.5.7   Auxiliary input

Function of the **auxiliary interface**. In this mode, the CLX accepts a bar code entered at the
auxiliary interface (via the keyboard or handheld scanner with decoder). It sends the bar
code to the host in a separate data string via its host interface. No reads can, therefore, be
corrected by transmitting missing bar codes subsequently.

Chapter 10.10.1 Auxiliary input via auxiliary interface, Page 10-29 describes this function
and the associated procedure in greater detail.

6.5.8   Self-test

After the CLX has been switched on, it performs a self-test before it is initialized with the pa-
rameter set. The test can be called up explicitly at any time via CLV-Setup. During the self-
test, the CLX checks that its hardware components are functioning correctly. A final messa-
ge via the auxiliary interface provides information on the test result. The CLX does not output
a reading result during the test routine.

1. Click ▣ in the toolbar.
    The Terminal Emulator window is then displayed. The CLX is in the Reading mode.

2. In the DEVICE MODE section, choose SELF TEST.
    The "Device Ready" LED is extinguished. The CLX cancels the Reading mode and starts
    the test routine.
    After a few seconds, the CLX outputs the encoded test result in the form of a code
    number (*Fig. 6-10*).

3. To return to the Reading mode, click READING MODE or close the terminal emulator.
    The CLX then returns to the Reading mode and the "Device Ready" LED lights up.
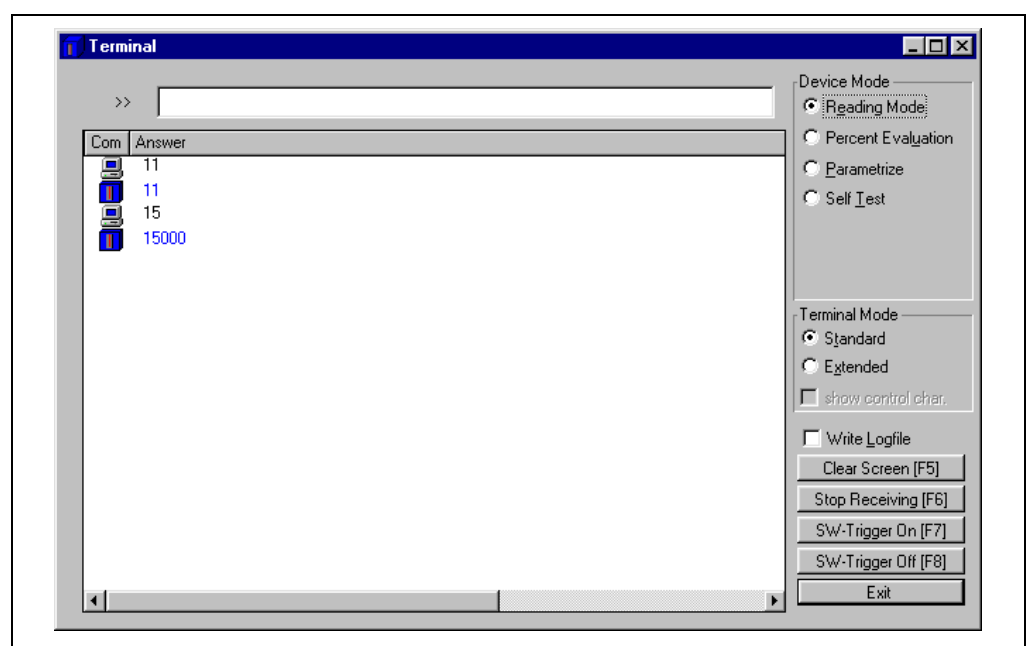
Fig. 6-10:   CLV-Setup: Displaying the self-test result in the terminal emulator

The code number "15**000**" means that the self-test was completed successfully and that no faults were diagnosed.

Chapter 8.3.1 CLX without external parameter memory, Page 8-2, lists the error keys together with the associated corrective measures.

6.5.9   Executing CLX functions interactively

CLV-Setup enables a number of CLX functions to be executed interactively. CLV-Setup prompts the user to carry out specific actions and provides information on the progress of the function being executed.

The following functions are available:

- Background teach-in/reset (default setting)
- Percentage evaluation
- Copy parameter memory
- Analyze scanner network
- Activate factory defaults in device

➢ Choose CLX490, DEVICE FUNCTIONS and the desired funktion
  – or –
  press the [F2] key.
  The EXECUTE DEVICE FUNCTIONS dialog box is then displayed.
  Choose the desired function in the EXECUTE menu in the menu.

  CLV-Setup starts the function and, where appropriate, prompts the user to carry out the necessary actions.

6.6   CLX messages

The CLX outputs encoded system and error messages via the auxiliary interface to report user actions or events in the reading process. When the system is started, the CLX also outputs system messages in plain text (English). If configured accordingly, the CLX transfers the error status ST in the data output string of the host interface.

6.6.1   Displaying messages

In the 4th field from the left in the status bar at the bottom of the screen, CLV-Setup displays system and error messages that occur at the auxiliary interface of the CLX. These are recorded in a file, which is continuously updated. The messages have the following format:

- System message: "CLV SYS-Message: xxx"
- Error message: "CLV SYS-Failure: xxx"

The additional system messages in plain text can be displayed in the terminal emulator if CLV-Setup and the terminal emulator are started before the CLX is connected.

Additional messages:

When the system is started, these system messages inform the user whether the starting process was successful. No further measures are normally required.

Chapter 10.5 System messages, Page 10-14 explains the contents of the messages.

Error messages:

Error messages indicate the following types of error:

- a device defect

8009237/RB47/2007-08-03   **6-25**

- incorrect parameter settings
- errors during data transmission to the host

Chapter 8.3 Error messages, Page 8-2 lists the messages with the associated corrective measures.

Note   To call up the most recent error to occur in the CLX, enter command "2?SF" in the command line of the terminal emulator.

6.7   Switching off the CLX

1. If the parameter set was modified in CLV-Setup or was only stored temporarily in CLX via a download ("Temproray" option or via context menu (right mouse button)), the parameter set must be stored permanently in the CLX by choosing the PERMANENT storage option.

2. Save the parameter set as a configuration file "*.scl" in CLV-Setup.

3. Switch off the power supply of the AMV/S60 or unplug both of the CLX's connecting cables from the connection module.

The last parameter set stored permanently in the CLX remains valid.

Archiving the parameter set:

We recommend that you print out the configuration file in order to archive the parameter set.

1. Click 🖨 in the toolbar.
   The PRINT FILE dialog box is then displayed.

2. Enter a comment in the input field in order to assign the printout to the CLX.
   Confirm your entry with OK.
   The PRINT dialog box for configuring the printer is then displayed.

3. Make the necessary entries in the dialog box and confirm these.
   CLV-Setup prints out the current configuration file in the form of a table.

7 Maintenance

7.1 Maintenance during operation

The CLX functions maintenance free. Maintenance is not required to guarantee laser class 2 of the CLX.

Note **Don't open the device. The warranty will be forfeited if the device is opened.**

The CLX indicates any faults or malfunctions by outputting coded system and error messages (e. g. "CLV SYS-Failure: 071") via its auxiliary interface. The messages are displayed in the "CLV-Setup" program window in the fourth field from the left on the bottom, in the status line (see also *Chapter 8.3 Error messages, Page 8-2*). CLV-Setup logs the messages in a file.

7.2 Cleaning the CLX

Recommendation In order to make use of the full optical reading capacity of the CLX, 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, finger prints, etc.).

7.2.1 Cleaning the front window

Laser beam can cause blindness!
The CLX uses a class 2 red-light laser. Looking directly at the laser beam can seriously damage your eyesight.

➢ As with sunlight, never look directly into the laser beam.

➢ Switch off the device while it is being cleaned.

➢ Never look directly into the reading window while the device is in operation.

Damage on the reading window!
The reading window is made of glass. Scratches and streaks on the window will reduce the reading performance.

➢ Do not use aggressive cleaning agents.

➢ Do not use cleaning agents which cause increased abrasion (e. g. powder).

➢ Avoid cleaning motions at the reading window which could cause scratches or abrasion.

Cleaning the reading window

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

➢ Use a clean, soft brush to free the reading window (*Fig. 7-1, Page 7-2*) from dust.

➢ 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.

Cleaning the housing

In order to ensure sufficient cooling for the CLX, make sure that the housing is always clean.

➢   Use a soft brush to free the housing from dust.

➢   If necessary, clean the LEDs on the rear of the device.

7.2.2   Cleaning other optical surfaces

If an external reading pulse generator and/or object-height detection sensors are used (e.g. photoelectric reflex switches), further sensors with optical effective surfaces can be installed. Soiling of these surfaces can cause incorrect switching behaviour.

➢   In order to prevent incorrect switching behaviour, remove soiling from the optical effective surfaces of the external sensors.
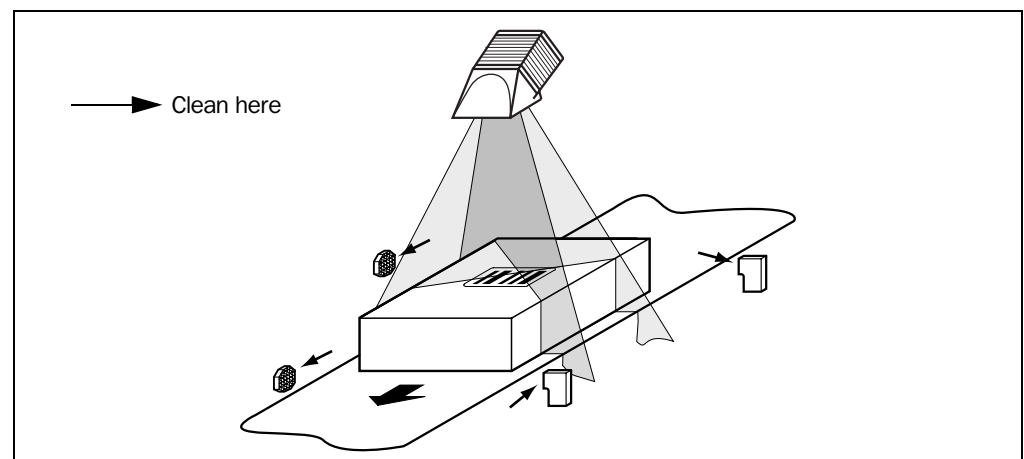
Fig. 7-2:   Cleaning the external optical sensors (reading pulse generator, object-height detector)

7.3   Checking the incremental encoder

If an incremental encoder is used, check the correct position on the conveyor.

➢ Ensure that the incremental encoder always contact the conveyor so that the friction wheel turns without slipping.

7.4   Disposal

Irreparable devices or devices that are no longer required must be disposed of in an environmentally-friendly manner:

1. Always observe the applicable national waste disposal regulations.
2. Remove the CLX housing.
3. Remove the electronic modules.
4. Send the chassis and cover (aluminium) to be recycled.
5. Send the electronic modules for disposal as problem waste.

At present, SICK AG does not accept any unusable or irreparable devices.

8009237/RB47/2007-08-03   **7-3**

Notes:

8   Troubleshooting

8.1   Overview of the possible errors and malfunctions

8.1.1   Mounting errors

- CLX aligned incorrectly with the object carrying the bar code (e. g. blanking)
- Reading pulse sensor positioned incorrectly
- With event-controlled focus control: sensors for object height detection positioned incorrectly

8.1.2   Electrical installation errors

- Interfaces on the CLX connected incorrectly (wiring error in AMV/S60)
- Host interface on AMV/S60 configured incorrectly

8.1.3   Parameter errors

- Functions not adjusted to local conditions, e. g. communication parameters on the host interface are set incorrectly
- Technical limits of the device exceeded, e. g. relationship between the scanning frequency and the reading distance

8.1.4   Malfunctions

- Start/stop mode: no external reading trigger, more than one object in the reading field
- Tracking mode: gap between the objects in conveying direction fallen below minimum
- Laser timeout for incorrectly terminated reading pulse
- Device error (hardware/software)

8.2   Monitoring error and malfunctions

The CLX is self-monitoring:

- After the power supply has been switched on, the CLX automatically carries out a self-test, in which it checks important hardware components, before it is initialized (parameter set loaded and device functions initialized). The self-test can be repeated at any time by cancelling Reading mode. See *Chapter 6.5.8 Self-test, Page 6-24*.
- If the CLX detects an error during the self-test or at any other time, it outputs the error status ST=3 on the host interface. Prerequisite: the error status is enabled for transmission. This is disabled by default. The CLX displays the diagnosed error as a numeric combination on the auxiliary interface (see *Table 8-1, Page 8-2*).
- While it is in operation, the CLX constantly monitors the laser diode and speed of the polygon mirror wheel. In addition, a watchdog circuit responds to error statuses. The CLX carries out referencing at regular cycles. To do so, the laser diode is switched on for max. 10 s.
- A timer (laser timeout) automatically deactivates the laser diode in Reading mode ("Sensor input" and "Serial interface trigger" mode) if the reading interval has not ended after 10 minutes (default setting). However, it does not end the reading interval. In this case, the CLX outputs the message: "Laser safety timeout" on the auxiliary interface. The reading interval must be terminated by resetting the trigger signal. The laser diode is activated again by the next reading trigger.

8.3   Error messages

The CLX outputs coded error message (number combinations) via the **auxiliary interface** only. *Table 8-1* contains a list of the messages.

Displaying messages:

To display the messages on the PC, proceed as follows in CLV-Setup:

➢ Click 🖥 in the toolbar.
   The Terminal Emulator is launched.

CLV-Setup logs the error messages automatically in a file (sys_msg.log).

8.3.1   CLX without external parameter memory

Message	Meaning	Possible cause	Remedy
"CLV SYS-Failure: xxx"	The CLX has diagnosed a system error. The "Device Ready" LED does not light up or extinguishes. The system is restarted.	Error key: [1] 011 Data error (RAM) 012 Address error (RAM) 013 RAM to small 051 Speed out of tolerance (mirror wheel) 061 Mirror interval out of tolerance 071 Error: laser shutter 091to095 Error: focus control 101to118 Error: external parameter memory 130 Amplifier error 131 Background profile invalid 132 Center reading angle RA 50 implausible 133 Brightness overflow 201to215 DSP error	If the error occurs again after the CLX is restarted, contact the SICK Service department. 1) Deactivate the CAN interface to suppress error numbers above 300 (not relevant in stand-alone mode). To do so, upload the parameter set from the CLX using CLV-Setup, choose the CAN INTERFACE tab and deactivate the function in the CAN INTERFACE FUNCTION section. Download the parameter set to the CLX!

Table 8-1: Error messages output on the auxiliary interface

8.3.2 LED error messages for the external parameter memory

The CLX also reports errors accessing the external parameter memory by means of the "Device Ready" and "Read Result" LEDs.

LED behavior	Meaning	Possible cause	Remedy
1. When the device is switched on, the "Device Ready" LED blinks for approx. 10 s and then lights up constantly.	Start option: START WITH EXTERNAL PARAMETERS. The CLX has successfully loaded the external parameter set to its RAM.	–	None.
2. When the device is switched on, the "Device Ready" and "Read Result" LEDs blink for approx. 10 s. The "Device Ready" LED then lights up constantly.	Start option: START WITH EXTERNAL PARAMETERS. The CLX has successfully loaded the external parameter set with tolerated errors[1] to its RAM	Transfer ok, but different parameter versions in the external memory and CLX.	Upload parameter set to CLV-Setup and check parameters[1].
3. The "Device Ready" LED lights up constantly when the device is switched on.	• Start option: START WITH EXTERNAL PARAMETERS. The CLX has **not** loaded external parameter set. Instead, it has loaded the internal parameter set to its RAM. • Start option: START WITH INTERNAL PARAMETERS. The CLX has successfully loaded the internal parameter set to its RAM.	• External parameter memory not connected. • Start ok.	• OK if the device is to be operated without an external parameter memory. • Check whether the external parameter memory is connected correctly (free wiring: check wire assignment). • None.
4. When the device is switched on, the "Device Ready" LED and "Read Result" LEDs blink continuously [2].	• Start option: START WITH EXTERNAL PARAMETERS. The CLX has **not** loaded the external parameter set. Instead, it has loaded the internal parameter set to its RAM. **The CLX, however, does not output data on the host interface.** • Start option: START WITH COPY INTERN —> EXTERN. The CLX was **not** able to copy the internal parameter set to the external memory. It has loaded the internal parameter set to its RAM.	• External parameter memory not connected. • The parameter set in the external memory is not from a CLX490. • The external parameter memory is defective. • External parameter memory is not connected. • Data transmission error. • Internal parameter set too large to be copied to the external memory (memory is full). • The external parameter memory is defective.	• See *3 Remedy.* • Use the correct external parameter memory or overwrite the current one. • Repeat the startup procedure. If the error is still present after following *4 Remedy, 1st and 2nd paragraph,* contact the SICK Service department. • Ensure that the external parameter memory is connected correctly (free wiring: check wire assignment). • Repeat the startup procedure. If the error is still present after following *4 Remedy, 2nd and 3rd paragraph,* contact the SICK Service department. • Contact the SICK Service department. • See *4 Remedy, 3rd paragraph.*

1) The software of the parameter set in the CLX is older than that of the parameter set in the external memory: print out the parameter set using CLV-Setup. If necessary, display the ID of the unknown/errored command group(s) using the <STX> 8?ERR <ETX> command in the Terminal Emulator window of CLV-Setup. Decode the ID using the reference manual entitled Command Language of the CLV Bar Code Scanners and check the relevant parameter values in the tabs.
The software of the parameter set in the CLX is newer than that of the parameter set in the external memory: all of the new parameters in the CLX are set to the default values. If these parameters are necessary, edit the values in the relevant tabs in CLV-Setup and download them to the CLX and the external memory.
2) Flashing stops when the device switches from Reading mode to Parameter mode (e. g. during download from CLV-Setup).

Table 8-2: LED error messages for access to the external parameter memory

LED behavior	Meaning	Possible cause	Remedy
5. When the device is switched on, the "Device Ready" LED and "Read Result" LEDs blink alternately for approx. 10 s. The "Device Ready" LED then lights up constantly.	Start option: START WITH COPY INTERN –> EXTERN. The CLX has successfully copied the internal parameter set to the external-memory[3] and set the option for the next start to START WITH EXTERNAL PARAMETERS. It has loaded the internal parameter set to its RAM.	Transfer ok.	Not applicable.
3) The parameter set stored in the external memory is not checked automatically to determine whether it can be read. To check the parameter set, switch off the power supply to the CLX briefly and monitor the "Device Ready" LED as described under *1*.

Table 8-2: LED error messages for access to the external parameter memory (contd.)

8.3.3 Messages for errors accessing the external parameter memory

The CLX outputs further error messages, in addition to the general error messages in *Chapter 8.3.1 CLX without external parameter memory, Page 8-2,* if problems arise when the external parameter memory is accessed.

Message	Meaning	Possible cause	Remedy
1. "error: access to external parameters not successful internal parameters loaded" (Error type: 104, 105, 106, 111, 112,115)	• Start option: START WITH EXTERNAL PARAMETERS. The CLX has **not** loaded the external parameter set. Instead, it has loaded the internal parameter set to its RAM. **The CLX, however, does not output data on the host interface.** • Start option: START WITH COPY INTERN –> EXTERN. The CLX was **not** able to copy the internal parameter memory. It has loaded the internal parameter set to its RAM.	The external parameter memory is defective.	Repeat the startup procedure. If the error is still present, contact the SICK Service department.
2. "error: external parameter memory full internal parameters loaded" (Error type: 108)	Start option: START WITH COPY INTERN –> EXTERN. The CLX was **not** able to copy the internal parameter memory. It has loaded the internal parameter set to its RAM.	The internal parameter set is too large for the external memory (memory is full).	Contact the SICK Service department.
3. "error: external parameters not valid for device internal parameters loaded" (Error type: 116)	Start option: START WITH EXTERNAL PARAMETERS. The CLX has **not** loaded the external parameter set. Instead, it has loaded the internal parameter set to its RAM. **The CLX, however, does not output data on the host interface.**	The parameter set in the external memory is not from a CLX490.	Use the correct external parameter memory or overwrite the current one.
4. "error: no external parameter memory connected internal parameters loaded" (Error type: 102)	• Start option: START WITH EXTERNAL PARAMETERS. The CLX has **not** loaded the external parameter set. Instead, it has loaded the internal parameter set to its RAM. • Start option: START WITH COPY INTERN –> EXTERN. The CLX was **not** able to copy the internal parameter set to the external memory. It has loaded the internal parameter set to its RAM.	• External parameter memory not connected. • External parameter memory not connected.	• OK if the device is to be operated without an external parameter memory. • Check whether the memory is connected correctly (free wiring: check wire assignment). • See 5 *Remedy 2nd paragraph*
5. "error: writing parameters CLV->EXT internal parameters loaded" (Error type: 110, 111, 112)	Start option: START WITH COPY INTERN –> EXTERN. The CLX was **not** able to copy the internal parameter set to the external memory. It has loaded the internal parameter set to its RAM	Data transmission error.	Check whether the external parameter memory is connected correctly (free wiring: check wire assignment). Repeat the startup procedure. If the error is still present, contact the SICK Service department.

Table 8-3: For messages for problems accessing the external parameter memory

Message	Meaning	Possible cause	Remedy
6. "warning: additional unknown parameter(s) external parameters loaded" (Error type: 101, 114)	Start option: START WITH EXTERNAL PARAMETERS. The CLX has successfully loaded the external parameter set with tolerated errors[1] to its RAM.	Transfer ok but different parameter versions in the external memory and the CLX.	Upload the parameter set to CLV-Setup and check the values[1].
1) The software of the parameter set in the CLX is older than that of the parameter set in the external memory: print out the parameter set using CLV-Setup. If necessary, display the ID of the unknown/errored command group(s) using the <STX> 8?ERR <ETX> command in the Terminal Emulator window of CLV-Setup. Decode the ID using the reference manual entitled Command Language of the CLV Bar Code Scanners and check the relevant parameter values in the tabs. The software of the parameter set in the CLX is newer than that of the parameter set in the external memory: all of the new parameters in the CLX are set to the default values. If these parameters are necessary, edit the values in the relevant tabs in CLV-Setup and download them to the CLX and the external memory.			

Table 8-3: For messages for problems accessing the external parameter memory (contd.)

8.4 ST error status in the reading result of a bar code

Value	Meaning	Possible cause	Remedy
0	Good Read.	–	None
2	No bar code of the enabled code type found according to the evaluation criteria.	• No bar code in the CLX's reading field during the reading pulse. • Code type/length in the CLX not enabled for decoding. • Reading window obstructed/dirty.	• Synchronize the pulse of the CLX with the entry of a bar code into the reading field. • Correct the code configuration parameters. • Check the reading window.
3	Device fault.	Device fault.	Call up the self-test. See *Chapter 6.5.8 Self-test, Page 6-24*. If result ≠ 15000: Contact the SICK Service department.
5	Required number of successful multiple reads for the bar code not reached.	• Conveyor speed of the object is too high. • Scanning frequency is too low. • Ladder-type arrangement for bar code relative to the conveyor direction: code height (bar length) too poor. • Print quality too poor.	• Check the conveyor speed. • Adjust the scanning frequency. • Check the code height. • Check the print quality.
6	Master: Number of slave reading results does not match the parameterized number of slaves.	• The parameterized number of slaves does not match the actual number of slaves available. • The master timeout is too short. • The data connection between the slaves and/or the master has been interrupted.	• Check the entered number of slaves. • Check the master timeout setting. • Check the cables between the slaves and the master.
7	The source of the reading result is the auxiliary input via the auxiliary interface.	The bar code was not detected by the reading function of the CLX, but was entered subsequently with the auxiliary function of the auxiliary interface and sent to the host in a separate data string.	–
9	The OUTPUT FILTER function is activated for the code comparison. The CLX has detected valid bar codes. However, these do not match the active match code(s).	The scanned object does not have a bar code that matches the specified match code.	–
A	The CHECK MAX. NUMBER OF CODES function is active. The number of valid bar codes detected by the CLX in Reading mode exceeds that specified under NUMBER OF CODES: MAXIMUM. It repeatedly outputs the defined error string until the number specified under NUMBER OF CODES: MINIMUM is reached.	One object in a set of objects with a constant number of bar codes, for example, contains more bar codes than defined in the application.	This message is used to indicate errors on the objects (e. g. check whether objects are homogeneous: mixed with incorrect objects).
D	The CODE 32 evaluation option is activated for Code 39. The CLX is attempting to interpret 6-digit C39 bar codes as C32 bar codes (output as 9-digit decimal values).	The read 6-digit bar code is not a C32 bar code. The CLX outputs the defined error string instead.	–

Table 8-4: Meaning of the ST error status in the reading result

Value	Meaning	Possible cause	Remedy
F	The CHECK MIN. NUMBER OF CODES function is active. The number of valid codes detected by the CLX in Reading mode is less than that specified under NUMBER OF CODES: MINIMUM. Instead of the code contents, it outputs the defined error string in the quantity defined under NUMBER OF CODES: MINIMUM	One object in a set of objects with a constant number of codes, for example, contains fewer codes than defined in the application.	This message is used to indicate errors on the objects (e. g. check whether objects are homogeneous: mix with incorrect objects).

Table 8-4: Meaning of the ST error status in the reading result

8-8
8009237/RB47/2007-08-03

8.5 Troubleshooting

The following are required for troubleshooting purposes using the tables below:

- These Operating Instructions
- Tools
- A tape measure (up to 2,000 mm)
- A digital measuring device (current/voltage mesurement)
- A PC running CLV-Setup
- A 3-core RS 232 data cable (null modem cable), pins 2 and 3 crossed, e. g. no. 2014054

8.5.1 General malfunctions: CLX not ready

Malfunction	Possible cause	Remedy
The "Device Ready" LED is not lit. The "Result 1" output is not outputting a pulse (default setting: Device Ready)	After switching on the power supply: • The CLX has no power • The CLX has diagnosed a device error during the self-test During operation: • The CLX is not in "Reading" mode • The CLX has deactivated the laser diode 10 min. (default setting) after the start of the current reading pulse (Trigger mode: sensor input/serial interface)	 • Check wiring (power connector fitted securely to the AMV/S60 Connection Module). Measure voltage at pin 1 and pin 5. • Switch CLX off and on again. Does the LED light up? If not, contact SICK Service department • Return to Reading mode using the "CLV-Setup" program. See *Chapter 6.5.1 Reading mode (standard operating mode), Page 6-14* • Terminate reading pulse. Check the reading pulse function. Supply new pulse. See *Chapter 6.4.3 Guide to parameterization menu, Page 6-8*, *Section Adjust Laser timeout*

Table 8-5: Troubleshooting: restoring operation (Reading mode)

8009237/RB47/2007-08-03   **8-9**

8.5.2   Malfunctions in Reading mode: reading trigger errors

➢   Check whether the "Device Ready" LED lights up.
    If the LED does not light, see *Table 8-5, Page 8-9*.

CLX in stand-alone configuration

Malfunction	Possible cause	Remedy
1. Trigger mode: **Sensor input** (external sensor). The CLX cannot be clocked: – the "Sensor" LED does not light up – the red scan line does not appear	• Sensor not connected or connected to incorrect switching input. • If sensor supplied by CLX: sensor not connected to ground potential. • Incorrect reading pulse source parameterized in the CLX. • Photoelectric switch not aligned with the reflector (photoelectric proximity switch/ inductive sensor not dampened).	• Connect sensor to "Sensor" switching input. Check sensor wiring (see *Fig. 5-4, Page 5-16*). Measure output signal on sensor. • Insert jumper between pin 5 and pin 15. • In the "CLV-Setup" program: choose the DEVICE CONFIGURATION tab, READING TRIGGER SOURCE section: is Sensor input selected? (active high: reading pulse starts when power applied) • Align sensor. Check functioning.
2. Trigger mode: **Serial interface** The CLX cannot be clocked: – the "Sensor" LED does not light up – the red scan line does not appear	• Incorrect reading pulse source parameterized on the CLX. • The CLX is not receiving any command strings to start the reading interval on the data interface.	• In the "CLV-Setup" program: choose the DEVICE CONFIGURATION tab, READING TRIGGER SOURCE section: is serial interface selected? Click the READING TRIGGER PARAMETERS button, SERIAL INTERFACE section: is trigger type correct? • Check data connection to host. In the "CLV-Setup" program: choose the HOST INTERFACE tab. In DATA FORMAT section: are the correct interface type (hardware) and data format selected? INTERFACE PROTOCOL section: are the correct start and stop characters selected? Use the "CLV-Setup" program to check the host command strings: choose AUXILIARY INTERFACE tab. Choose MONITOR HOST INTERFACE function. See *Chapter 6.5.6 Monitor Host Interface, Page 6-22*. Download temporarily to the CLX.
3. CLX does not respond to an external signal that ends the reading pulse (sensor input, serial interface)	Incorrect end of reading pulse parameterized on the CLX.	In the "CLV-Setup" program: choose the DEVICE CONFIGURATION tab, click the READING TRIGGER PARAMETERS button. END OF READING INTERVAL section: is Generated by Trigger Source selected?

Table 8-6: Troubleshooting: reading trigger errors in Reading mode

8.5.3 Malfunctions in Reading mode: result output errors

➢ Check whether the "Device Ready" LED lights up.
If the LED does not light, see *Table 8-5, Page 8-9*.

CLX in stand-alone configuration

Here: number of bar codes to be read = 1

Malfunction	Possible cause	Remedy
1. The "Read Result" LED (default setting: Good Read) does not light up at the end of the reading pulse. – The "Result 2" switching output (default setting: Good Read) is not outputting a pulse – The CLX outputs status ST=2 in the reading result on the host interface (if ST is enabled for the separator; this is not selected in the default setting)	• Read not successful, since there was no bar code in the reading field during the reading pulse. • Scan line positioned incorrectly. • Bar code presented at incorrect reading distance. • The presented bar code's module width cannot be read by the CLX type being used. • With event-controlled focus control: wrong focus position in Distance Configuration choosen. • With event-controlled focus control: trigger source parameterized incorrectly. • The reading angles at which the bar code appears to the CLX are too large.	• Synchronize read with presence of an object in reading field. See *Chapter 8.5.2 Malfunctions in Reading mode: reading trigger errors, Page 8-10*. • Align CLX. Is bar code at center of scan line? Check the reading quality with the "CLV-Setup" software. Choose PERCENTAGE EVALUATION. See *Chapter 6.5.2 Percentage evaluation, Page 6-17*. • Check whether reading distance of bar code is in the specified reading range? • Present a bar code with an acceptable module width. See *Chapter 9 Technical data, Page 9-1*. • In the "CLV-Setup" program: choose the READING CONFIGURATION tab, click the DISTANCE CONFIGURATION button. Does the focus position match the distance of the object? • In the "CLV-Setup" program: choose the READING CONFIGURATION tab, in the FOCUS CONTROL section. a) Trigger source: "Switching input": Check functional assignment of IN 3 and IN 4 and connection of the sensors. See *Fig. 5-5, Page 5-17*. b) Trigger source: "Serial interface": Check the data connection to the host. Use the "CLV-Setup" program to check the host command strings: choose AUXILIARY INTERFACE tab. Choose MONITOR HOST INTERFACE function. See *Chapter 6.5.6 Monitor Host Interface, Page 6-22*. Download temporarily to CLX! c) Trigger source: Timer: Check switchover time. • In the "CLV-Setup" program: choose the CODE CONFIGURATION tab, DECODER section: choose Standard decoder. Download temporarily to CLX! Start PERCENTAGE EVALUATION, choose DISTANCE CONFIGURATION. Monitor reading quality (reading quality > 70 %!). If necessary, realign CLX and/or reconfigure distance configuration. If ok, choose SMART DECODER. Download to CLX.

Table 8-7: Troubleshooting: result output errors in Reading mode

Malfunction	Possible cause	Remedy
1. The "Read Result" LED default setting: Good Read) does not light up at the end of the reading pulse: – continued –	• Evaluation criteria for bar code incorrect. • Bar code quality inadequate.	• In CLV-Setup: choose the CODE CONFIGURATION tab, CODES section. Enable all code types (except Pharmacode), set code lengths to FREE. Download temporarily to CLX! Start PERCENTAGE EVALUATION. Code type and length are displayed in the reading result. Enable recorded code type in the CODES section and disable all other types. Enter the code length under FIXED on the code type tab. Download to CLX! • Check: sufficient blank zones present? Print contrast adequate? Specified print tolerances exceeded? In the "CLV-Setup" program: choose READING CONFIURATION tab, SEGMENTATION section. Is START/STOP selected? Perform read with reference code.
2. The CLX is not transferring any reading results to the host	• Reading pulse is not functioning correctly. • Wiring fault in data connection. • Voltage level incorrect. • Host interface in CLX parameterized incorrectly.	• See *Chapter 8.5.2 Malfunctions in Reading mode: reading trigger errors, Page 8-10*. • Check wiring as shown in *Fig. 5-2, Page 5-14*. • Measure voltages. • In "CLV-Setup" program: choose HOST INTERFACE tab, DATA FORMAT section. Are the interface type (hardware) and data format correct? Check settings in INTERFACE PROTOCOL section.
3. The CLX transfers the status ST=3 to the host in the reading result (if ST is enabled for the separator; this is disabled by default)	The CLX has diagnosed a device error in the self-test	Switch the CLX off and on again. Does the "Device Ready" LED light up? If not, contact the SICK Service department.
4. The data content of the bar code output by the CLX is incorrect or incomplete	• The data format on the host interface is parameterized incorrectly in the CLX • The CLX suppresses the last character in the bar code	• In the "CLV-Setup" program: choose the HOST INTERFACE tab, DATA FORMAT section. Are the values correct? • In the "CLV-Setup" program: choose the CODE CONFIGURATION tab. Click the EDIT button. Choose the tab for the relevant code. Is the TRANSMIT CHECK DIGIT checkbox activated? Change if necessary. Download to CLX!

Table 8-7: Troubleshooting: result output errors in Reading mode (contd.)

8.5.4   Malfunctions in Reading mode: errors in the result status output

➢ Check whether the "Device Ready" LED lights up.
  If the LED does not light, see *Table 8-5, Page 8-9.*

Malfunction	Possible cause	Remedy

The
– "Result 1"
  (default setting: Device Ready)
– "Result 2"
  (default setting: Good Read)
– "Result 3"
  (default setting: No Read)
– "Result 4"
  (default setting: Match 1)
switching outputs are not outputting any pulses
	• The event associated with the assigned function for outputting the result status of the read does not occur in the reading operation.
	• Incorrect switching mode parameterized in the CLX.
		• Not applicable.
		
		• In the "CLV-Setup" program: choose the DEVICE CONFIGURATION tab. Click the RESULT OUTPUT PARAMETERS button. Are the outputs set to NO INVERT OUTPUT? Change if necessary. Download to CLX!

Table 8-8: Troubleshooting: errors in the result status output in Reading mode

8.6   SICK Support

If a system error occurs repeatedly ("CLVSYS-Failure: xxx", xxx= 000 ... 299)or if you cannot correct an error using the above measures, the CLX may be defective. The CLX cannot be repaired by the user, meaning that it is not possible to re-establish functions after a failure. However, the CLX can be rapidly replaced by the user. See *Chapter 10.11 Replacing a CLX (copying the parameter set), Page 10-33*.

➢   Please contact our local SICK office or subsidary if an error occurs which cannot be eliminated:

•   The telephone numbers and email addresses are listed on the *back page* of this manual.
      For postal addresses see also **www.sick.com**.

➢   Do not send the device to the SICK service without first contacting us.

8-14   8009237/RB47/2007-08-03

9 Technical data

9.1 Data sheet CLX490-0010 Compact OMNI Scanner

Type	CLX490-0010
Laser diode (wave length)	Red light ($\lambda = 650$ nm)
MTBF of laser diode	20,000 h
Laser class	Class 2 pursuant to EN/IEC 60825-1 (for publication date, see the warning sign on the device), shutoff of laser diode after 10 min[1]
Focus Control	Autofocus, alternatively event-controlled focus control
No. of distance configurations (DC)	Max. 8
Focus adjustment time	≤ 20 ms (typically)
Focus trigger source	"IN 0 to IN 4" switching inputs/data interface/timer
Scanning/decoding frequency	600 to 1,200 Hz
Resolution (typically)	0.30 to 1.0 mm
Reading ranges	*Fig. 10-1, Page 10-2*
Bar code print contrast (PCS)	≥ 60 %
Ambient light compatibility	2,000 lx (on bar code)
No. of bar codes per scan	1 to 12 (standard decoder), 1 to 5 (SMART decoder)
No. of bar codes per reading interval [2]	1 to 50 (autodiscriminating)
Bar code types	Code 39, Code 128, Code 93, Codabar, EAN, EAN 128, UPC, 2/5 Interleaved
Bar code length	Max. 50 characters (max. 600 characters across all bar codes per reading interval)
Print ratio	2:1 to 3:1
No. of multiple reads	1 to 99
Optical indicators	4 x LEDs
Reading pulse	"Sensor" switching input (Option: additionally "IN 4")/Free-running/Serial interface/ Object Polling/OTS
"Host" data interface	RS 232 or RS 422/485, variable data output format
Data transmission rate	300 to 57,600 bd
Protocols	SICK Standard and 3964(R)
Physical configurations	Stand-alone
"CAN" data interface	20 kbit/s to 1 Mbit/s, CANopen protocol, CAN Scanner Network
"Auxiliary" data interface	RS 232, 9,600 bd, 8 data bits, no parity, 1 stop bit, fixed output format
Functional switching inputs	6 (Sensor, "IN 0 to IN 4") – optodecoupled, $V_{imax} = +30$ V, non-interchangeable, can be connected to PNP outputs – "Sensor" (reading pulse): max. internal delay 30 ms, reduced max. 2 to 6 ms – "IN 0 to IN 4": focus position switching, IN 4: selectable function, max. internal delay 30 ms
Functional switching outputs	4 ("Result 1" to "Result 4") – PNP, short-circuit-proof, variable pulse duration (static; 10 to 990 ms or 100 to 9,900 ms) – Variable output function for result status
Electrical connections	1 x 15-pin D Sub HD plug, 1 x 15-pin D Sub HD socket
Operating voltage/power consumption	18 to 30 V DC/ typically 11 W, max. 16 W SELV respectively PELV pursuant to IEC 60364-4-41 (2005)
Housing	Aluminium die-cast, does not represent a problem in paint shops
Electrical safety	Pursuant to EN 61010-1 (2001-03)
Protection class	III, pursuant to EN 61140 (2002-03)

1) Default setting, in Reading mode with the Switching input sensor and Serial interface pulse types.

2) Reading interval: time window generated internally for evaluating the code.

Table 9-1: Technical specifications of the CLX490-0010

Type	CLX490-0010
Enclosure rating	IP 65[3] pursuant to EN 60529 (1991-10); A1: (2002-02)
EMC tested	Pursuant to EN 61000-6-2 (2001-10), EN 61000-6-3 (2001-10), EN 61000-6-3/A11 (2004-07)
Vibration/shock tested	Pursuant to EN 60068-2-6 (1995) test FC/to EN 60068-2-27 (1993) test EA
Weight	Approx. 2 kg
Ambient operating/storage temperature	0 to +40 °C/−20 to +70 °C
Max. rel. humidity	90 %, non condensing
Color	SICK blue (RAL 5012)
3) With plug cover or plug cover with parameter memory	

Table 9-1: Technical specifications of the CLX490-0010 (contd.)

9.2   Data sheet CLX490-0011 Compact OMNI Scanner

Technical data as CLX490-0010 with the following exceptions:

Type	CLX490-0011
Design	**With heater**
Switching on function/temperature graph	See *Chapter 10.4 Optional heating, Page 10-12*
Power-on delay	35 to 40 min (at 24 V DC and min. ambient operating temperature −30 °C)
Operating voltage	24 V DC +20 %/−10 %, SELV respectively PELV pursuant to IEC 60364-4-41 (2005)
Power consumption	Typically 75 W, max 90 W
Required cross-section	Min. 0.5 mm² (for power supply)
Weight	Approx. 2 kg
Ambient operating/storage temperature	−30 to +35 °C/−20 to +70 °C

Table 9-2: Technical specifications of the CLX490-0011

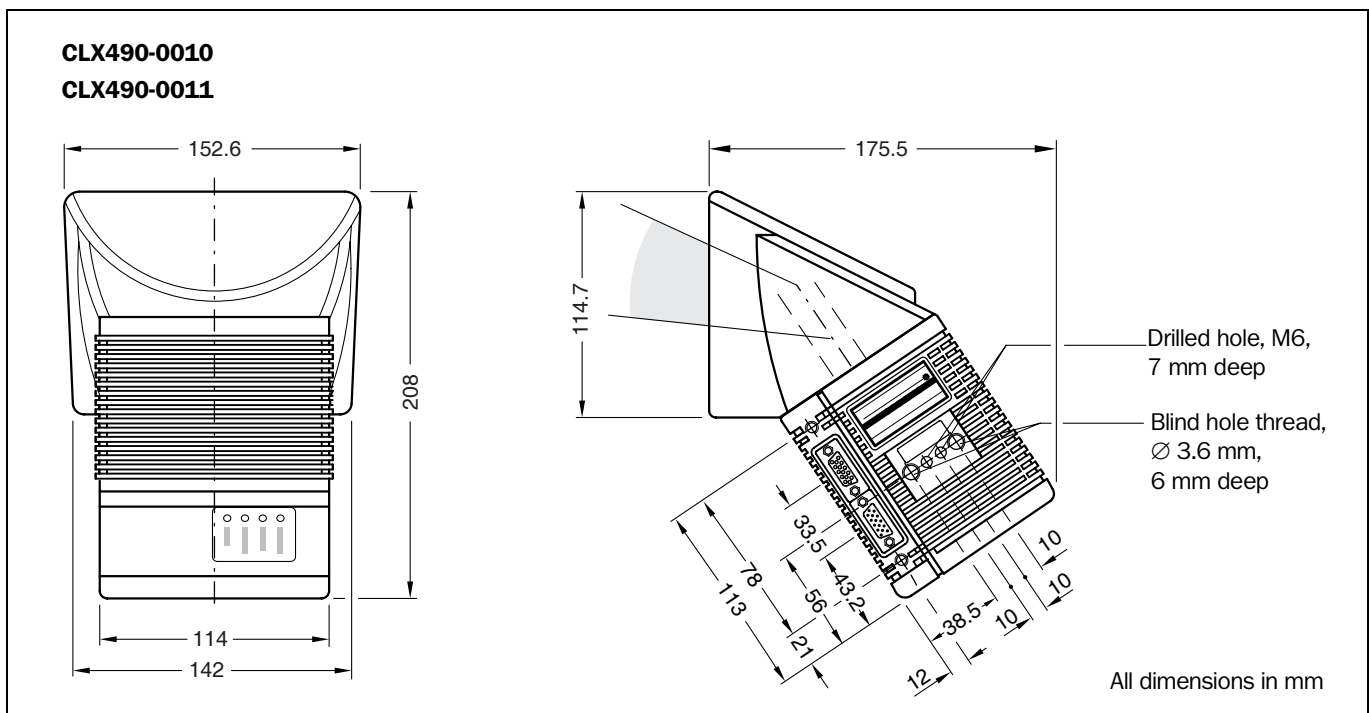## 9.3   Dimensioned drawing of the CLX

Fig. 9-1:   Dimensions of the CLX

10 Appendix

10.1 Overview

The appendix contains the following additional information:

- Specification diagrams
- Installation and operating instructions for the external parameter memory
- Optional heating (temperature graph/ switching on function)
- System messages
- Installation and operating instructions for the PC-based "CLV-Setup" program
- Configuring a CLX using command strings
- Parameter value calculations for configuring the CLX
- Tables
- Special applications and procedures
- Instructions for replacing a CLX (copying the parameter set)
- Ordering Information
- Dimensioned drawings of the accessories
- Supplementary documentation
- Glossary
- Copy of the EC-Declaration of Conformity
- Index
- Scannable sample bar codes

10.2 Specification diagrams

10.2.1 Reading conditions for all diagrams

Test code	Code 128
Print ratio	$>$ 90 %
Tilt	$\pm$45°
Ambient light	$<$ 2,000 lx
Good Read rate	$>$ 75 %

Table 10-1: Reading conditions for specification diagrams

Note **The min. and max. reading distances are measured radially by the CLX.**

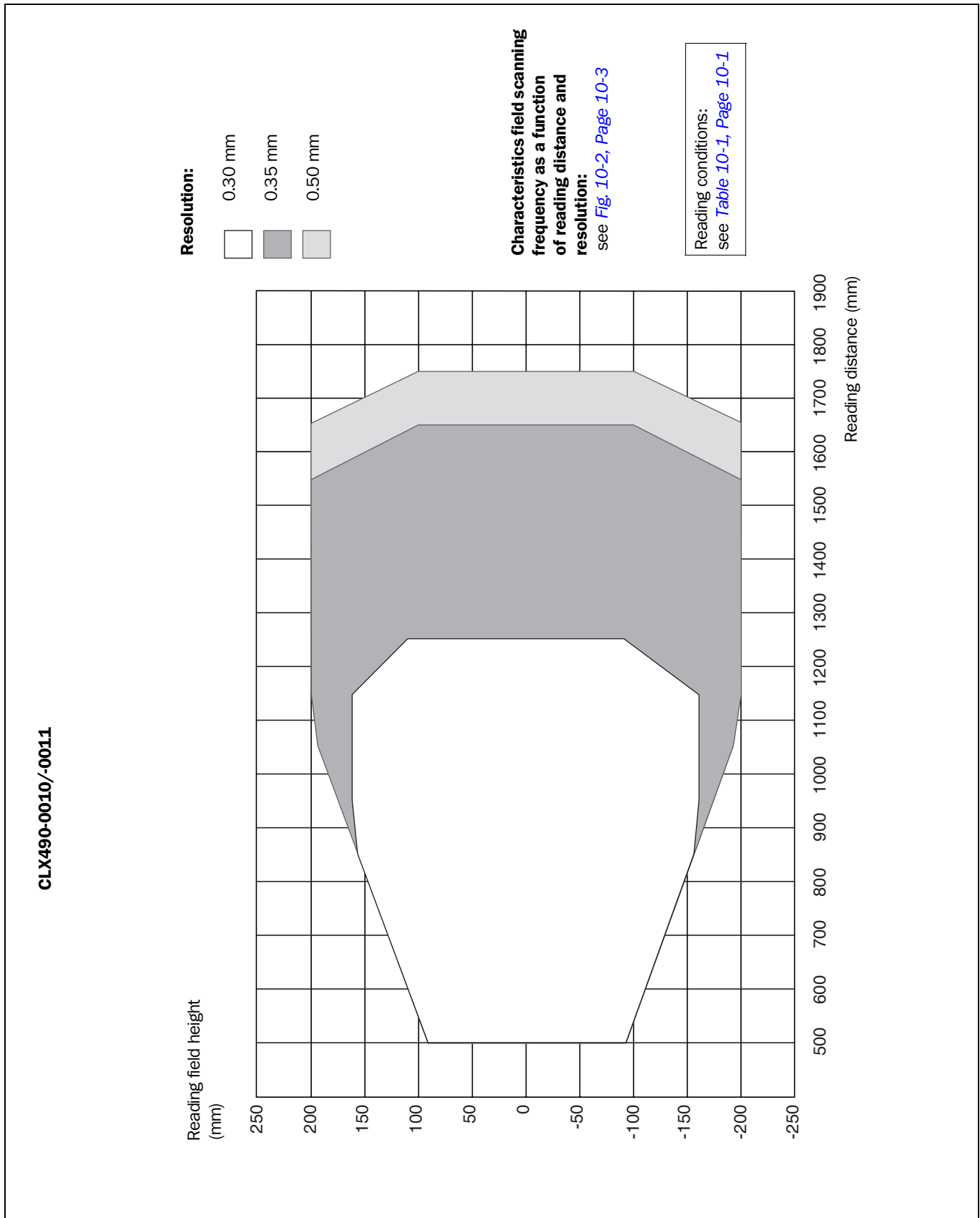### 10.2.2   Reading performance data CLX490 Compact OMNI Scanner

Fig. 10-1:   Diagram: Reading field (reading limits)

CLX490-0010/-0011

Scanning frequency (Hz)

Reading distance (mm)

Resolution:
—— 0.35 mm
– – 0.50 mm
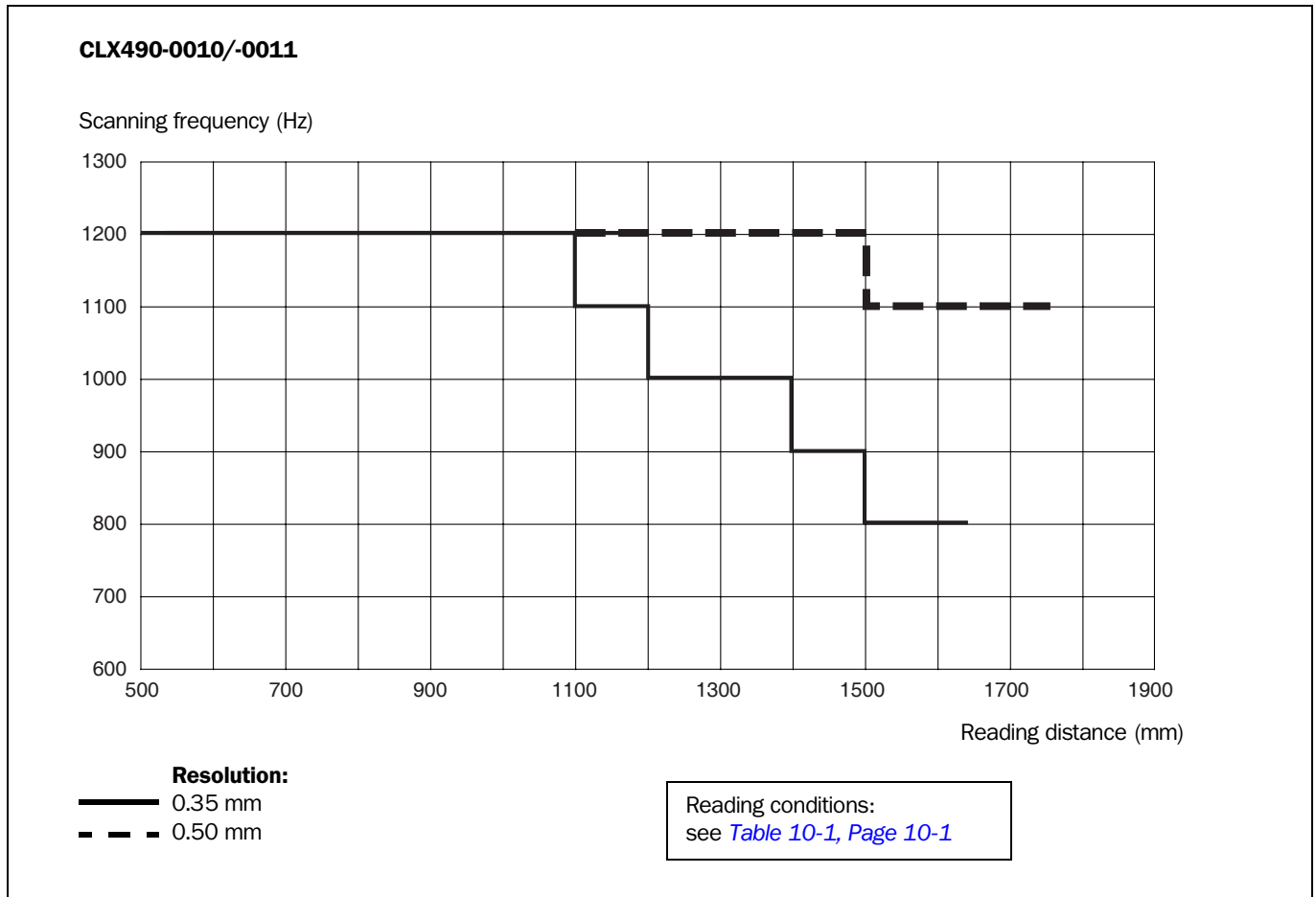
Reading conditions:
see *Table 10-1, Page 10-1*

Fig. 10-2:   Scanning frequency as a function of the reading distance and resolution

10.2.3 Reading field and system dimensions

Dimensions reading field and position scanner

conveyer width
300 mm

0,30

| Parameter 1 | Module width | 0,30 |
| Parameter 2 | Conveyer width | 300 |

min. reading distance   900

Parameter 3	required DOF (Depth Of Field)	100	200	300	320

Results			100	200	300	320
position light beam switch L2	x_{L2}		425	450	475	480
coordinates of scanner-reference point (refering to L1) [1]	x_P		540	560	590	600
	y_P		150	150	150	150
	z_P		1000	1100	1200	1220

holder # 2022996

226
109
1) 19
136

outer surface front window

0

x_P

height above conveyer [mm]

z_P

Z

L1

L2/ Output Host

conveyer surface

X

req.DOF

900 — min. reading distance 900

DOF

max. reading distance 1220   2)

Conveying Direction

0

x_{L2}

used reading height

reading height

scanner-reference point 1)
$x_P/y_P/z_P$

light beam switch **L2/ Output Host**

z_P

X

req.DOF

DOF

min. reading distance 900

max. reading distance 1220   2)

light beam switch **L1**

Z

Y

y_P

x_P

300 conveyer width

position light beam switch **L1** at **x = 0 mm**

1) scanner-reference point is shown in picture and is market at the CLX490

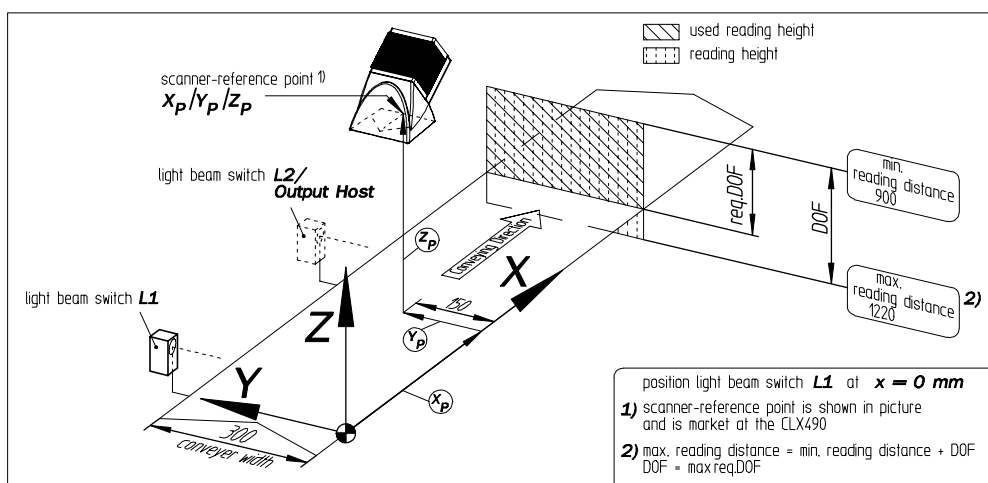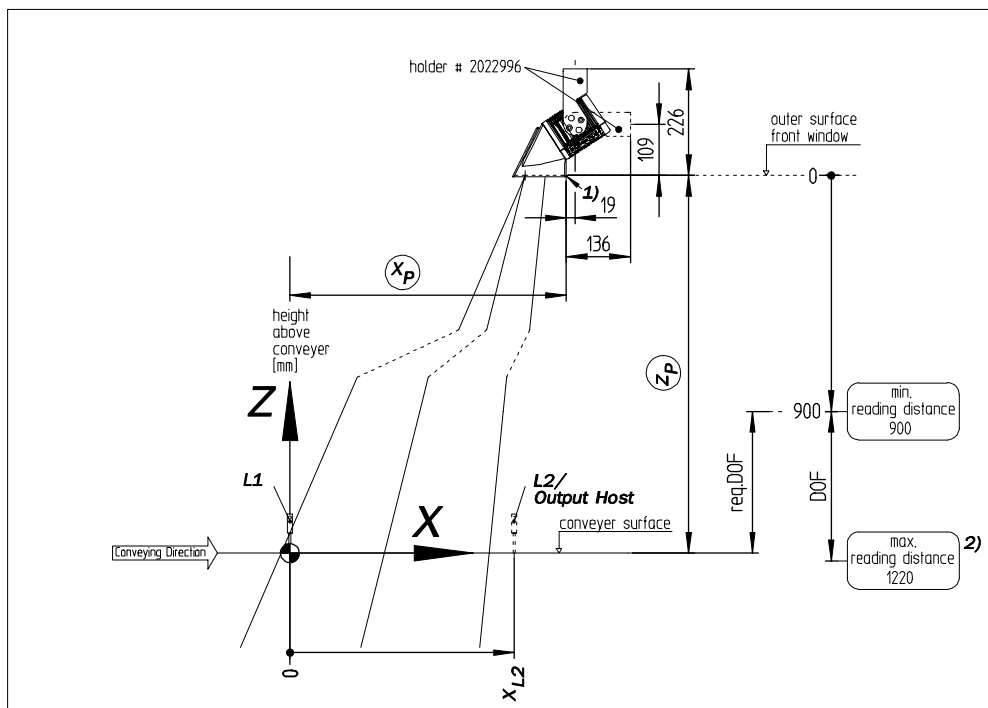**2)** max. reading distance = min. reading distance + DOF
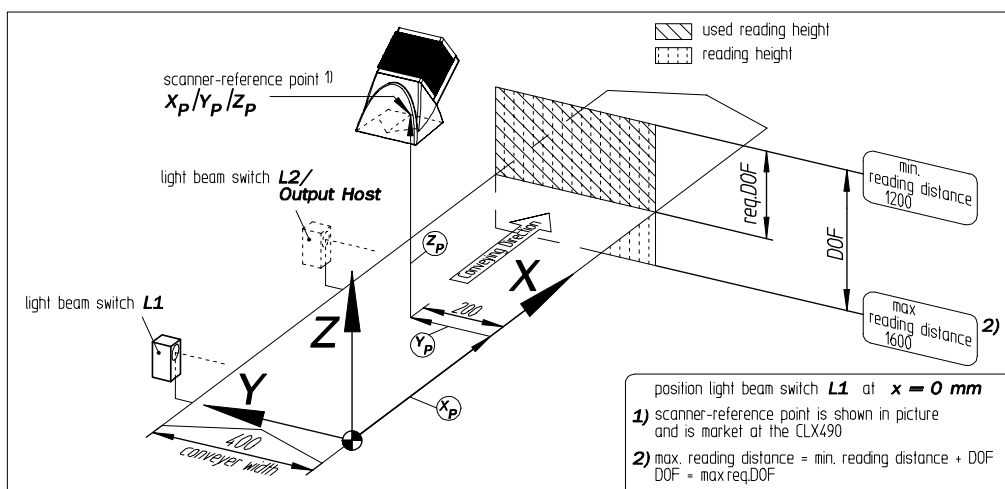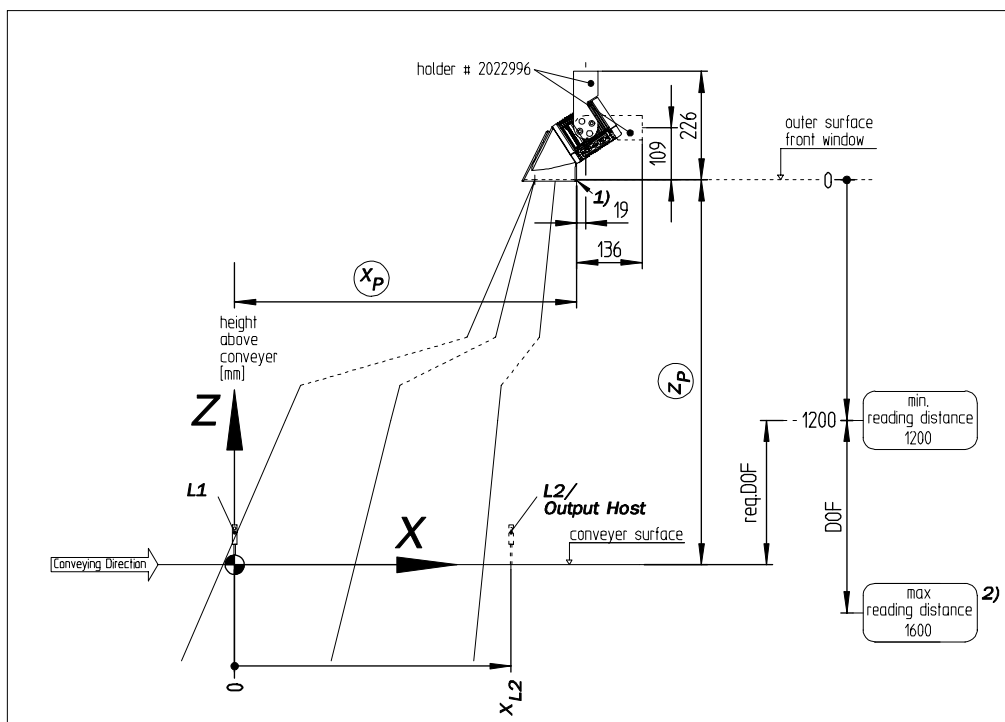DOF = max req.DOF
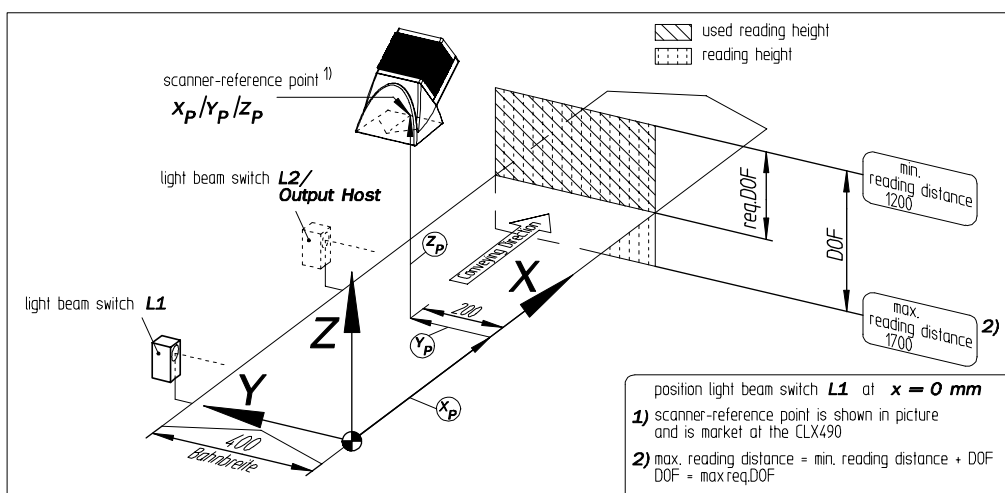
Fig. 10-3:   Required mounting position of the CLX above the conveyor belt (resolution 0.30 mm, conveyor belt width 300 mm)

Dimensions reading field and position scanner

conveyer width
400 mm
0,35

| Parameter 1 | Module width | 0,35 |
| Parameter 2 | Conveyer width | 400 |

min. reading distance **1200**

Parameter 3	required DOF (Depth Of Field)	**100**	**200**	**300**	**400**

Results						
position light beam switch L2	x_{L2}	525	550	575	600
coordinates of scanner-reference point (refering to L1) [1]	x_P	660	690	710	740
	Y_P	200	200	200	200
	z_P	1300	1400	1500	1600

holder # 2022996

226
109
1) 19
136

x_P

outer surface front window

0

height above conveyer [mm]

z_P

Z

L1

L2/ Output Host

X

conveyer surface

1200

min. reading distance 1200

req.DOF

DOF

Conveying Direction

0

x_{L2}

max reading distance 1600 2)

used reading height
reading height

scanner-reference point 1)
$x_P/Y_P/z_P$

light beam switch **L2/ Output Host**

light beam switch **L1**

z_P

Conveying Direction

X

min. reading distance 1200

req.DOF

DOF

200

Z

Y_P

Y

x_P

400 conveyer width

max reading distance 1600 2)

position light beam switch **L1** at **x = 0 mm**

1) scanner-reference point is shown in picture and is market at the CLX490
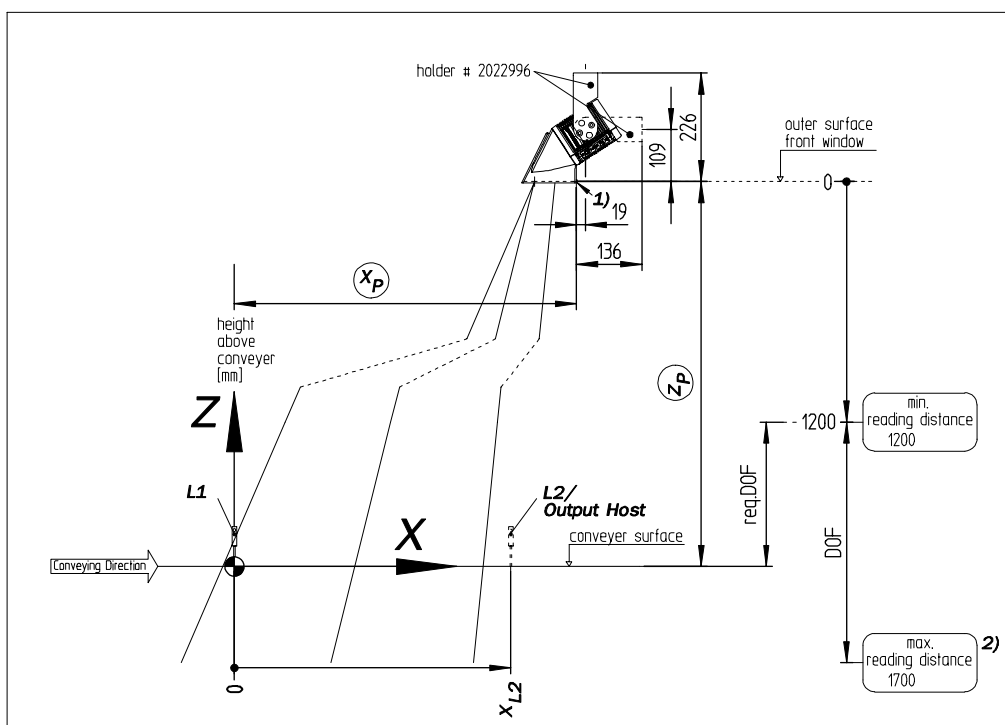
2) max. reading distance = min. reading distance + DOF DOF = max req.DOF

Fig. 10-4: Required mounting position of the CLX above the conveyor belt (resolution 0.35 mm, conveyor belt width 400 mm)

Dimensions reading field and position scanner

			conveyer width **400 mm**

Parameter 1	Module width	0,50	min. reading distance **1200**
Parameter 2	Conveyer width	400	**0,50**

Parameter 3	required DOF (Depth Of Field)	**100**	**200**	**300**	**400**	**500**

Results	position light beam switch L2	X_{L2}	525	550	575	600	625
	coordinates of scanner-reference point (refering to L1) 1)	X_P	660	690	710	740	760
		Y_P	200	200	200	200	200
		Z_P	1300	1400	1500	1600	1700

Fig. 10-5:   Required mounting position of the CLX above the conveyor belt (resolution 0.50 mm, conveyer belt width 400 mm)
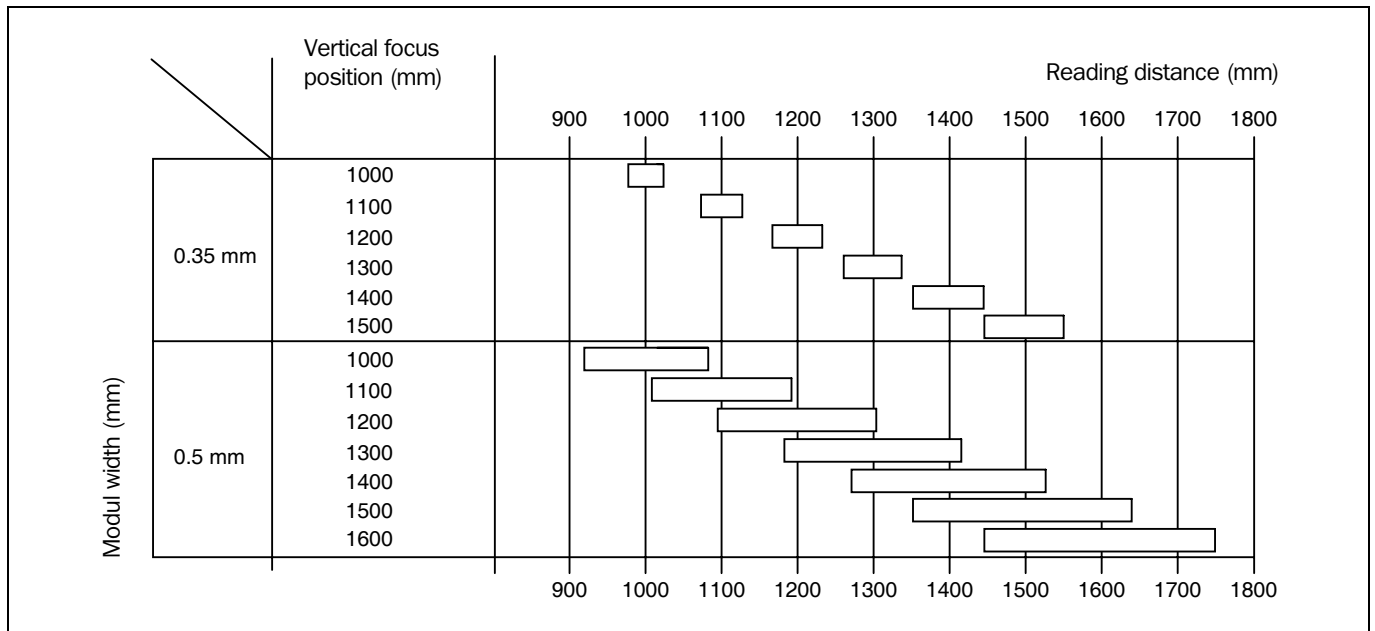
Fig. 10-6: Depth of field as a function of module width and focus position at a belt width of 400 mm

10.3   Installing and operating the external parameter memory

The external parameter memory is available as an accessory. It is located in a connector cover and comprises a permanent, rewriteable memory (EEPROM) with 4 kByte from CLX firmware V 2.0. The connector cover covers the two connections of the CLX in the enclosure rating IP 65. The cover is shown in *Fig. 10-7*. Two connection cables that are secured by means of conduit thread connections supply the signals to the CLX.
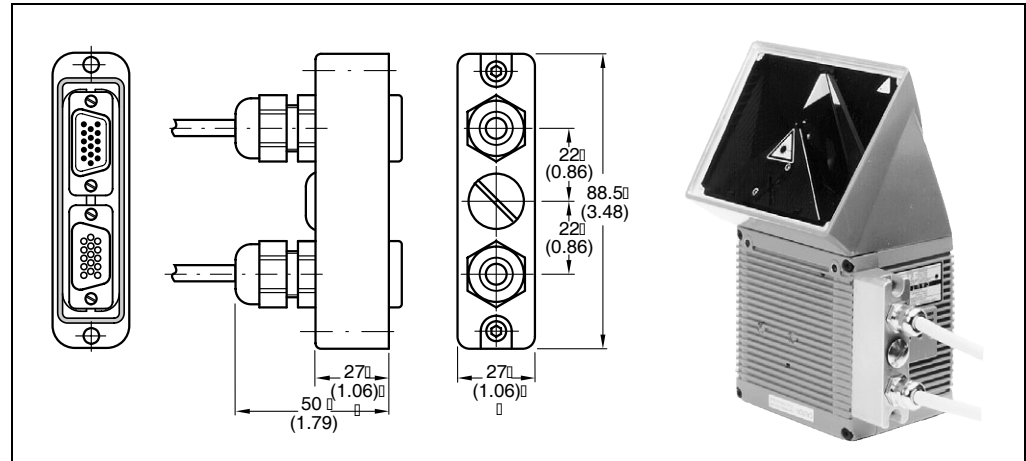
Fig. 10-7:   External parameter memory, installed on the CLX

The external parameter memory is available in different implementations:

Order no.	Two Connection cables with	CLX	Length	Connection
2020307	Two 15-pin D Sub HD plug connections, (pin assignment identical to device connections)	**Without** heater	3 m	CLX to AMV/S60 AMV30-071 and BMV10
2020981	Two open cable ends	**Without** heater	3 m	CLX to non-SICK Power pack, free wiring
2021689	Two 15-pin D Sub HD plug connections, (pin assignment identical to device connections)	**With** heater	3 m	CLX to AMV100/200

Table 10-2: External parameter memory variants

10.3.1   Function

When it is started, the CLX is initialized with he data stored in its internal parameter set. If this parameter set has been copied to an external memory, the device can be replaced easily. The replacement device, therefore, does not have to be configured manually. Instead, it accesses the external parameter memory automatically (assuming that the correct start option has been selected). It then imports the parameter set to its RAM. This option is set by default. The "Device Ready" and "Read Result" LEDs indicate whether the external memory was accessed successfully. The CLX also outputs plain-text messages for troubleshooting purposes on the auxiliary interface.

10.3.2   Installation and electrical connection

The pin assignments for the connection cables of the parameter memory no. 2020307/no. 2021689 are shown in *Table 5-5* and *Table 5-6, Page 5-7.*

➢   Mount the parameter memory on the CLX as shown in *Chapter 5.5.3 Connecting the supply voltage, Page 5-13* and connect the cables to the AMV/S60 Connection Module.

The color assignment of the wiring for the open ends of the connection cables for the parameter memory no. 2020981 is shown in *Table 5-12 and Table 5-13, Page 5-11*.

➢   Mount the parameter memory on the CLX as shown in *Chapter 5.5.3 Connecting the supply voltage, Page 5-13* and connect the cables to the external power supply.

10.3.3   Operation

The parameter memory connected to the CLX is accessed

- using the selected CLX start option
- after the parameters have been downloaded to the CLX with the permanent storage function and the START WITH EXTERNAL PARAMETERS option

The start option is set at the bottom right of the DEVICE CONFIGURATION tab as shown in *Fig. 10-8* (red frame). The START WITH EXTERNAL PARAMETERS option is selected by default.
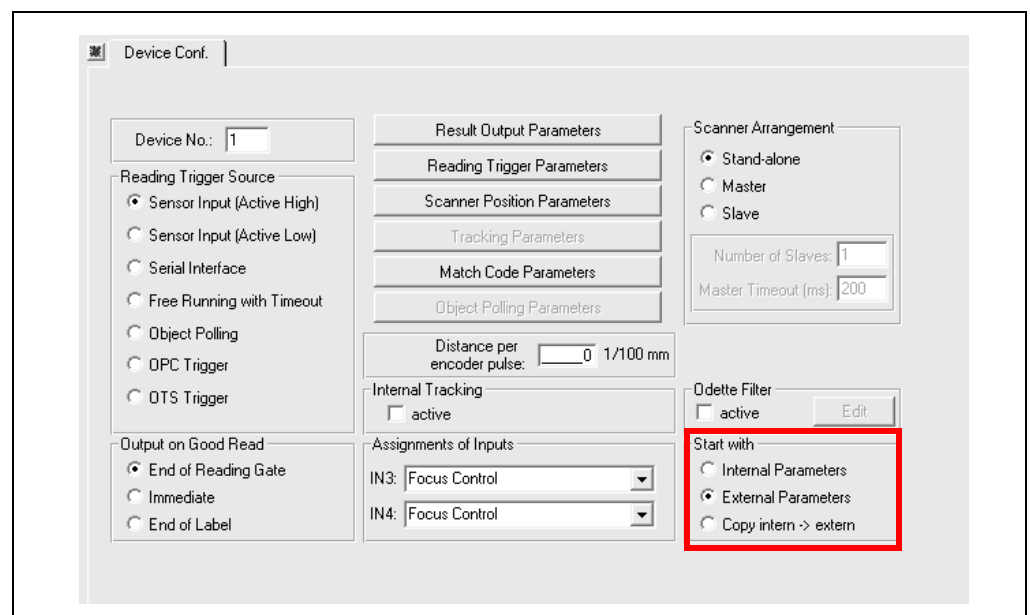
Fig. 10-8:   CLV-Setup: "Device configuration" tab with the CLX start options

Start with internal parameters

When it starts, the CLX loads the internal parameter set to its RAM.
The "Device Ready" LED lights up constantly.
Since the data is stored permanently, it is not lost when the device is switched off.

Start with external parameters (default setting)

When it starts, the CLX loads the external parameter set to its RAM.
The "Device Ready" LED blinks for approx. 10 s and then lights up constantly.
The data in the CLX is lost when the device is switched off.

Start with copy internal -> external

When it starts, the CLX loads the internal parameter set to its RAM. It then copies the parameter set to the external memory and resets the start option to START WITH EXTERNAL PARAMETERS.

The two "Device Ready" and "Read Result" LEDs blink alternately for approx. 10 s. The "Device Ready" LED then lights up constantly.

The data is not lost when the device is switched off since it is stored permanently in the CLX and is identical to the internal parameter set.

10.3.4   Switching on the device for the first time

Since the external parameter memory in the connector cover is empty (e. g. on delivery) after the CLV has started, the CLV copies its current parameter set to the external parameter memory. Then the "Device Ready" LED lights up. The CLX is ready for operation.
If an external parameter memory containing a corresponding parameter set is connected to the CLX, the "Device Ready" LED blinks for 10 s when the device starts up correctly and then lights up constantly.

10.3.5   Adjusting the parameter set in the external parameter memory after it has been downloaded to the CLX

If the CLX is started with he START WITH EXTERNAL PARAMETERS option with an external parameter memory and if the parameter set is downloaded from CLV-Setup to the CLX with the **permanent** storage option, CLV-Setup asks you whether the new parameter set is also to be copied to the external parameter memory (*Fig. 10-9*). This function prevents the CLX from reloading the old parameter set the next time it starts.
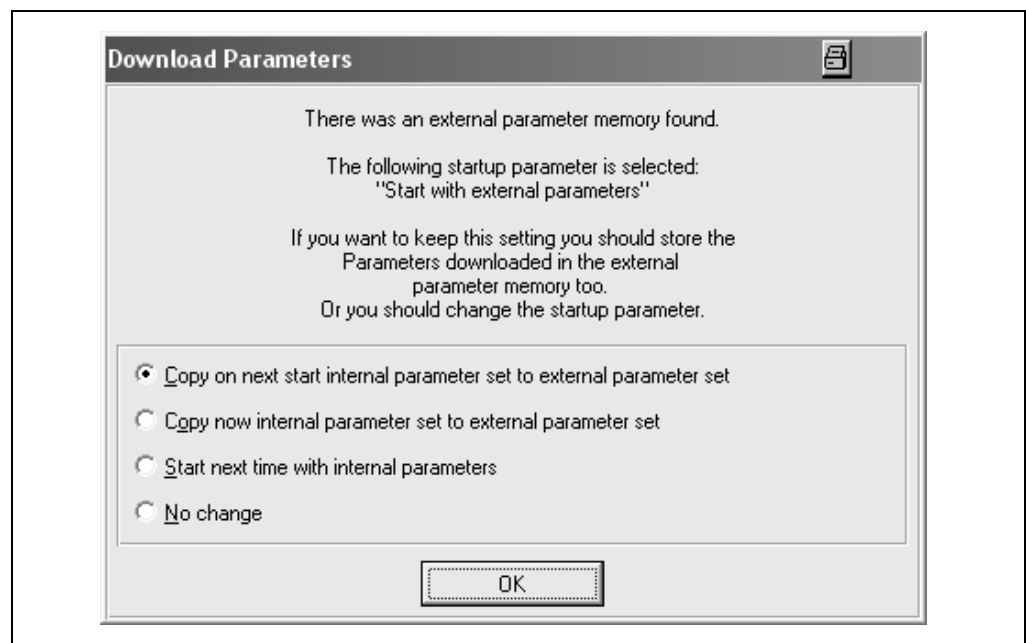

Fig. 10-9:   CLV-Setup: dialog box for adjusting the external parameter memory

➢   Adjust the parameter set in the external parameter memory as described in
Chapter 6.4.1 Configuring the CLX with CLV-Setup, Page 6-4.

10.3.6   Meaning of the LEDs

The function of the two "Device Ready" and "Read Result" LEDs, as defined by the selected start option, is shown in *Table 3-3, Page 3-9*. Their function in the event of an error accessing the external memory as well as troubleshooting measures are described in *Table 8-2, Page 8-3*.

10.3.7   Error messages

If errors occur accessing the external parameter memory, the CLX outputs error messages on the auxiliary interface. When the CLX is **started,** these messages can be displayed using the "CLV-Setup" program.

1. Connect the PC to the auxiliary interface on the CLX using a 3-core RS 232 data cable (null modem cable) (AMV/S60: connect the PC to the internal 9-pin "Service" plug). *See Chapter 5.5.6 Connecting the PC, Page 5-15*.
2. Switch on the PC and start Windows.
3. Start the CLV-Setup program and open the Terminal Emulator.
4. Choose the extended display mode.
5. Switch on the power supply for the AMV/S60.
    The CLX starts and loads the parameter set from the external memory.
6. Monitor the messages in the main window of the Terminal Emulator.

Table 8-3, Page 8-5 lists the error messages with the appropriate troubleshooting measures.

10.3.8   Replacing a CLX

The device is replaced by starting the new CLX with the Sᴛᴀʀᴛ ᴡɪᴛʜ Eхᴛᴇʀɴᴀʟ Pᴀʀᴀᴍᴇᴛᴇʀs option (default). This is the case when the device is put into service for the first time, e. g. when it is taken from the warehouse. The device must be replaced with a device of the same type (e. g. CLX490-0010 with CLX490-0010). You do not need to connect a PC to replace the device.

➢   Replace the device as described in *Chapter 10.11.2 Importing the parameter set from the external memory, Page 10-34*.

The CLX imports the external parameter set into the RAM. This is sufficient to ensure that the device operates correctly. If the parameter set is to be stored permanently in the CLX (EEPROM), a PC with the CLV-Setup program must be connected to upload the parameter set from the CLX to CLV-Setup and then download it again to the CLX with the Pᴇʀᴍᴀɴᴇɴᴛ storage option. When asked to do so, adjust the external memory again.

10.4 Optional heating

10.4.1 Features

- Integrated heater (permanently installed)
- Wider range of applications for CLX: up to max. −30 °C without air draft
- Supply voltage 24 V DC +20 %/−10 %
- CLX enabled via internal temperature switch (power-up delay approx. 35 to 40 minutes at 24 V DC and min. ambient temperature of −30 °C)
- Required cable cross-section (power supply): min. 0.75 mm^2

10.4.2 Design

The heating system comprises two parts:

- the front window heater
- the housing heater

The optional heating system is installed and tested at the factory. The user cannot install it on site.

10.4.3 Function

When the 24 V DC supply voltage is applied, a temperature switch first supplies electric current to the heater only. This switch enables the supply voltage for the CLX when the internal temperature rises above 7 °C during the warm-up phase (approx. 35 min). The device then performs a self-test and switches to Reading mode. The "Device Ready" LED lights up to indicate that the device is ready.

When the internal temperature has reached approx. 25°C, a further temperature switch deactivates the housing heater and reactivates it if necessary. Reading mode is not interrupted as a result. The front window heater remains active constantly. The temperature curve inside the housing is shown in *Fig. 10-10*.
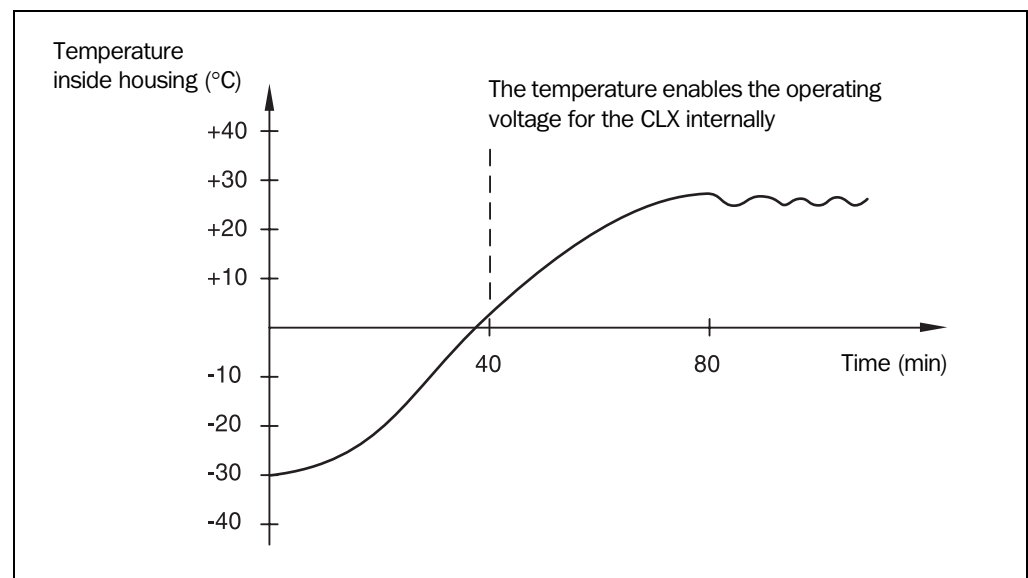
Fig. 10-10:   CLX with heater: Temperature curve inside the housing

10.4.4 Electrical installation

Cable cross-section

The connection cables for the power supply must have a cross-section of at least 0.75 mm^2.

See also *Chapter 5.4.2 Supply voltage, Page 5-8*.

Power consumption

The power consumption of the CLX with heater is typically 75 W and max. 90 W. These values apply to operation without the switching outputs connected.

AMV/S60 Connection Module

The AMV/S60 Connection Module is not suitable to power the CLX with heater. An external power supply pack with a higher power output should be used for this purpose.

See *Chapter 3.1.3 System requirements, Page 3-1*.

10.4.5 Outdoor applications

If the CLX with integrated heater is used outdoors, it should be installed in a protective housing to prevent the front window from being damaged by rain, snow, or dust. The housing also acts as a wind protector.

10.5   System messages

The CLX outputs all system messages in plain text on the auxiliary interface. The messages are in English and can be displayed in the Terminal Emulator mode in the "CLV-Setup" program.

See also *Chapter 6.6.1 Displaying messages, Page 6-25*.

10.5.1   CLX without external parameter memory

Message	Meaning
"CLX490 Soft.Vers. Vx.xx Aend. Nr. 0000 CLV 490/OTS"	The software version and revision is displayed when the power supply is switched on.
"internal parameters loaded"	When the CLX is started, it imports the parameter set that was last stored permanently in the internal EEPROM to the RAM.
"laser safety timeout"	The CLX has shut off the laser diode 10 minutes (default setting) after a reading pulse has begun. The reading interval is still active, even though the CLX is no longer reading. The reading interval has to be terminated by a corresponding pulse signal. The laser diode is activated again with the next reading pulse.
"no code"	In Reading/Percentage Evaluation mode, the CLX indicates that no codes matching the parameterized evaluation conditions were detected during the reading interval (error status ST = 2 output on the host interface).
"no ext. parameter memory connected"	No external parameter memory was connected to the CLX when it was started.

Table 10-3: CLX system messages

10.5.2   CLX with external parameter memory connected

In addition to the messages above, the CLX also indicates whether it was able to access the external parameter memory

Message	Meaning
"diff. SW version of parameters"	When the CLX was started, the software version of the parameter set in the external memory was different from that in the CLX. The parameter set is still transferred.
"external parameters loaded"	When the CLX was started, the external parameter set was imported successfully to the RAM.
"internal parameters copied to external memory"	When the CLX was started, the internal parameter set was successfully copied to the external parameter memory.

Table 10-4: Additional CLX system messages for the connected parameter memory

10.6   Installing and operating the "CLV-Setup" program

The scope of delivery of the CLX includes a CD-ROM ("Manuals & Software") containing the "CLV-Setup" program. The software can be installed on a PC with the following minimum configuration: Pentium II processor, 350 MHz, and 64 MB RAM, CD drive, serial interface and mouse (recommended) as well as an operating system Windows 95™ /98™, Windows NT™, Windows 2000™ or Windows XP™.

Approximately 25 MB of hard disk space is required to install CLV-Setup (V 4.10) and CLV Assistant, approximately 20 MB to install CLV-Setup Help (V 4.10).

Note   For the lastest version of the software, see **www.sick.com**.

10.6.1   Preparations

1. Make sure you have the CD-ROM ("Manuals & Software") at hand.
2. Connect the CLX to the AMV/S60 Connection Module (see *Chapter 5.5.3 Connecting the supply voltage, Page 5-13*).
3. Connect the PC to the auxiliary interface on the CLX using a 3-core RS 232 data cable (null modem cable) (AMV/S60: connect the PC to the internal 9-pin "Service" plug). See *Chapter 5.5.6 Connecting the PC, Page 5-15*.
4. Switch on the power supply to the AMV/S60.
   Once the CLX has started, the "Device Ready" LED lights up.
5. Switch on the PC and start Windows.

10.6.2   Installing the software

The "CLV-Setup" installation program creates a directory "CLX", a series of subdirectories, and the necessary links. A deinstaller is also installed automatically so that you can remove the program from the PC at any time. As of version V 2.6, CLV-Setup will only be available and further developed as a 32-bit application.

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

Initial 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 CLV, ICR, OPS SETUP SOFTWARE in the listing.
   A table with CLV-Setup 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. The software is automatically saved in the "Programs\CLV" directory on your hard disk.
   – 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 "CLVSetupxx.exe" file is then saved at this location (xx = version number). 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 program asks you for your user name and company name. This information appears as a header in printouts. "CLV-Setup" and CLV Assistant are installed. The software will be entried in the Windows start menu under "Programs\CLV-Setup".

9. Please read the Readme file, as it contains the latest information and problems regarding CLV-Setup.

10. Then confirm the final installation message by clicking "OK.

CLV-Setup Help (Online):

1. Return to the start page of the CD-ROM with the opened folder "Software".

2. Select CLV, CLV HELP SOFTWARE in the listing.
   A table with CLV Help information is displayed.

3. Select DOWNLOAD under SOFTWARE FILE.

4. In the FILE DOWNLOAD dialog box select the option to install directly from the CD-ROM. Confirm with OK. The software is automatically saved in the "Programs\CLV" directory on your hard disk.

   – 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 same target directory as selected for CLV-Setup on your hard disk.
   The "CLVHelp.exe" file is then saved at this location.

5. After downloading the software, select OPEN in the dialog box to start the software. The software is installed in the sub directory "Help" of the main directory "CLV". CLV Help will also be entried in the Windows start menu under "Programs\CLV-Setup".

6. Restart the PC.
   The Windows DLL files are possibly updated.

The "CLV-Setup" program, the CLV Assistant and the online "CLV-Setup Help" are installed and ready.

The program logs all of the files that are installed to the "install.log file". This list is used by the deinstaller to remove the program and must not be deleted if you want to use the deinstaller at some time in the future.

Updating the program

There are two ways of installing a new version of CLV-Setup:

• You can install the new version and still keep the old version (parallel installation)
  – or –

• You can install the new version over the old version (overwrite)

Installing the new version while still keeping the old one

If you want to install the new version and still keep the old version of CLV-Setup, follow the procedure described under *Initial installation.* When the program asks you for the target

directory, you must specify a **new directory.** Both versions of the software are then available but must not be started simultaneously.

The configuration files "*.scl " (scanner configuration), "*.npj" (network project), "*.opj" (OTS project) or "*.rpj" (redundant OTS project) of the old version can be used in the new version and contain the CLX parameter sets as well as project data if serveal scanners had been organized logically by projects. In order to do so, copy the configuration files from the "data" directory of the old version to the "data" directory of the new version.

Installing the new version over the old one

Before you can install the new version of the software, you must remove the files of the old version – with the exception of the configuration files "*.scl " (scanner configuration), "*.npj" (network project), "*.opj" (OTS project) or "*.rpj" (redundant OTS project). They contain the CLX parameter sets as well as project data if serveal scanners had been organized logically by projects.

The deinstaller of the old version removes the program files. You can use the deinstaller to remove all of the files (with the exception of the configuration files) or only selected files. The default setting is a complete deinstallation (the configuration files are not deleted). With the custom deinstallation, the files are listed and only selected files are deinstalled. If you choose this deinstallation method, make sure that the main directory containing the config-uration files "*.scl" is not deleted. We recommend that you move these files to a different directory and copy them back to the "data" directory later.

1. From the Windows Start menu, choose PROGRAMS and the deinstaller for CLV-Setup. The deinstaller starts and guides you step by step through the deinstallation procedure.

2. Choose the deinstallation method (complete or custom).

3. Install the new version of CLV-Setup as described under *Initial installation,* making sure to choose the same directory.

The new version of CLV-Setup is installed. The configuration files of the old version can be used again.

10.6.3 Starting CLV-Setup

The "CLV-Setup" program is launched with the following default settings:

Communication	COM 1, 9,600 bd, 8 data bits, 1 stop bit, no parity
Transmit control character	Start: STX, Stop: ETX
Receive control character	Start: STX, Stop: ETX
Unit of measure	Metric (depending on the selected installation)
Browser	User dependent
Language	As selected for the installation
Company name	As entered for the installation
User name	As entered for the installation
Automatic connection to CLX	On startup: yes On scanner selection: yes When the Terminal Emulator is started/closed: yes
Initial screen	Yes
Storage confirmation prompt	Yes
Last type selected	CLV41x
File storage location	"data" (configuration files for CLX)

Table 10-5: Default settings in CLV-Setup

1. Switch on the PC and start Windows.
2. Choose CLV-SETUP from the Start menu.
   The SICK logo is then followed by the initial screen.
3. Confirm the initial screen.
   CLV-Setup then checks whether a CLX is connected to the **COM 1** port on the PC (default setting in CLV-Setup) and whether the communication parameters on the PC match those on the CLX. If this is the case, the CONNECTED status is displayed with the CLX specification in the status bar right in the bottom of the screen. The CLX type (here: CLX490) is displayed in the DEVICE drop-down list in the top right of the toolbar.

The program then loads the internal description of the CLX as well as the default parameter values and displays them on the tabs. Finally, CLV-Setup uploads the current parameter set from the RAM of the CLX and displays the values on the tabs instead of the default values.

You can edit the current parameter set on the tabs. The default values are displayed when the device is used for the first time.

Troubleshooting

If the program cannot establish communication, it outputs a timeout warning and displays NO CONNECTION in the status field. This may be because the CLX is not connected or because the communication parameters on the CLX do not match those on the PC. In this case, CLV-Setup enters the CLX type of the device it last communicated with in the DEVICE field on the toolbar. The default setting the first time the device is used is the CLV41x. The software then loads the internal device description for this CLV type and displays the default values on the tabs.

1. Connect the PC to the auxiliary interface on the CLX using a 3-core RS 232 data cable (null modem cable) (AMV/S60: connect the PC to the internal 9-pin "Service" plug). See *Chapter 5.5.6 Connecting the PC, Page 5-15*.

2. Click �',⃰ (AutoBaud detect) in the toolbar or choose OPTIONS, AUTOBAUD DETECT. CLV-Setup scans the serial interface by varying the communication parameters and sends a telegram to the CLX repeatedly. As soon as a response is registered from the CLX, CLV-Setup signals the detected communication parameters.
    Fig. 10-11 shows an example of the results of the AutoBaud detect function. The CON- NECTED status is displayed right in the status bar in the bottom of the screen.

3. Confirm the AUTO DETECT dialog box with OK. CLV-Setup displays the detected CLX type in a separate dialog box and asks you whether you want to upload the current parameter set from the CLX.

4. Confirm the dialog box with Yes. CLV-Setup uploads the current parameter set from the RAM of the CLX to its database and displays the values on the tabs.

You can edit the current parameter set on the tabs.
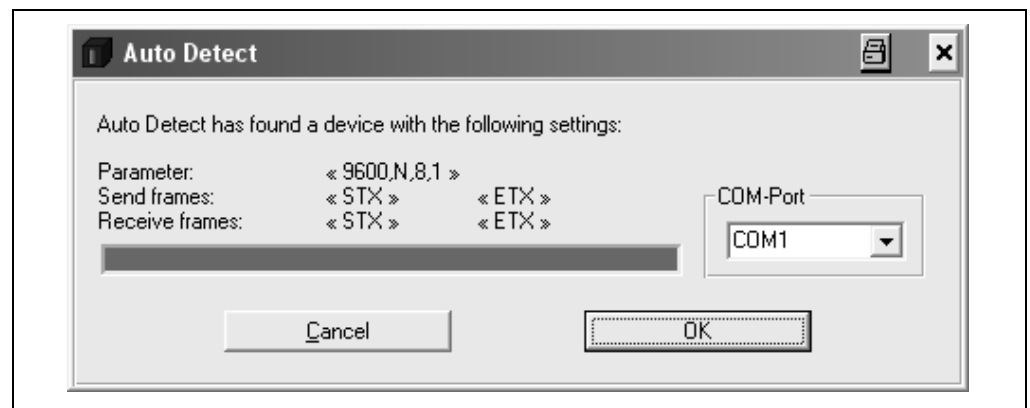
Fig. 10-11:   CLV-Setup: Result display of the AutoBaud Detect function

– or–

5. Choose OPTIONS, SERIAL INTERFACE from the menu bar. CLV-Setup displays the current communication parameter settings on the PC in the COM PARAMETERS dialog box.

6. Make sure that the communication parameters on the PC and CLX are identical (**connected COM port, 9,600 bd, 8 data bits, 1 stop bit, no parity**)

7. Confirm the dialog box with OK. CLV-Setup attempts to communicate with the CLX again. If it is successful, it displays the CONNECTED status right in the status bar in the bottom of the screen.

8. Click 🖳 in the toolbar. CLV-Setup then uploads the current parameter set from the RAM of the CLX to its database and displays the values on the tabs.

You can edit the current parameter set on the tabs.

8009237/RB47/2007-08-03   **10-19**

10.6.4 User interface

The graphical user interface (GUI) of the CLV-Setup is largely self explanatory. The online CLV-Setup Help function provides a description of how to use the program under HELP TO CLV-SETUP in the help navigation tree. The GUI is shown in *Fig. 10-12*.

The program window of the GUI comprises the following elements:

- Title bar that displays the program name, current configuration file, and its status (e. g. "No File")

- Menu bar with pull-down menus

- Toolbar with buttons for triggering various functions

- Drop-down list (top right) for selecting the device type

- Frame for displaying the navigation tree of the tabs (on left-hand side)

- Frame for displaying the tabs for CLX (Reading Configuration, Device Configuration, etc.) (on right-hand side). The numbers of displayed tabs depends on the selected items in the navigation tree on the left side. The parameters on the tabs are grouped according to their function. Some of these parameters open further dialog boxes

- Status bar (bottom) with two display fields for the communication between CLV-Setup and the CLX, the PC's interface parameter display, error display field (system errors), device specification field and status display for the connection to the CLX.
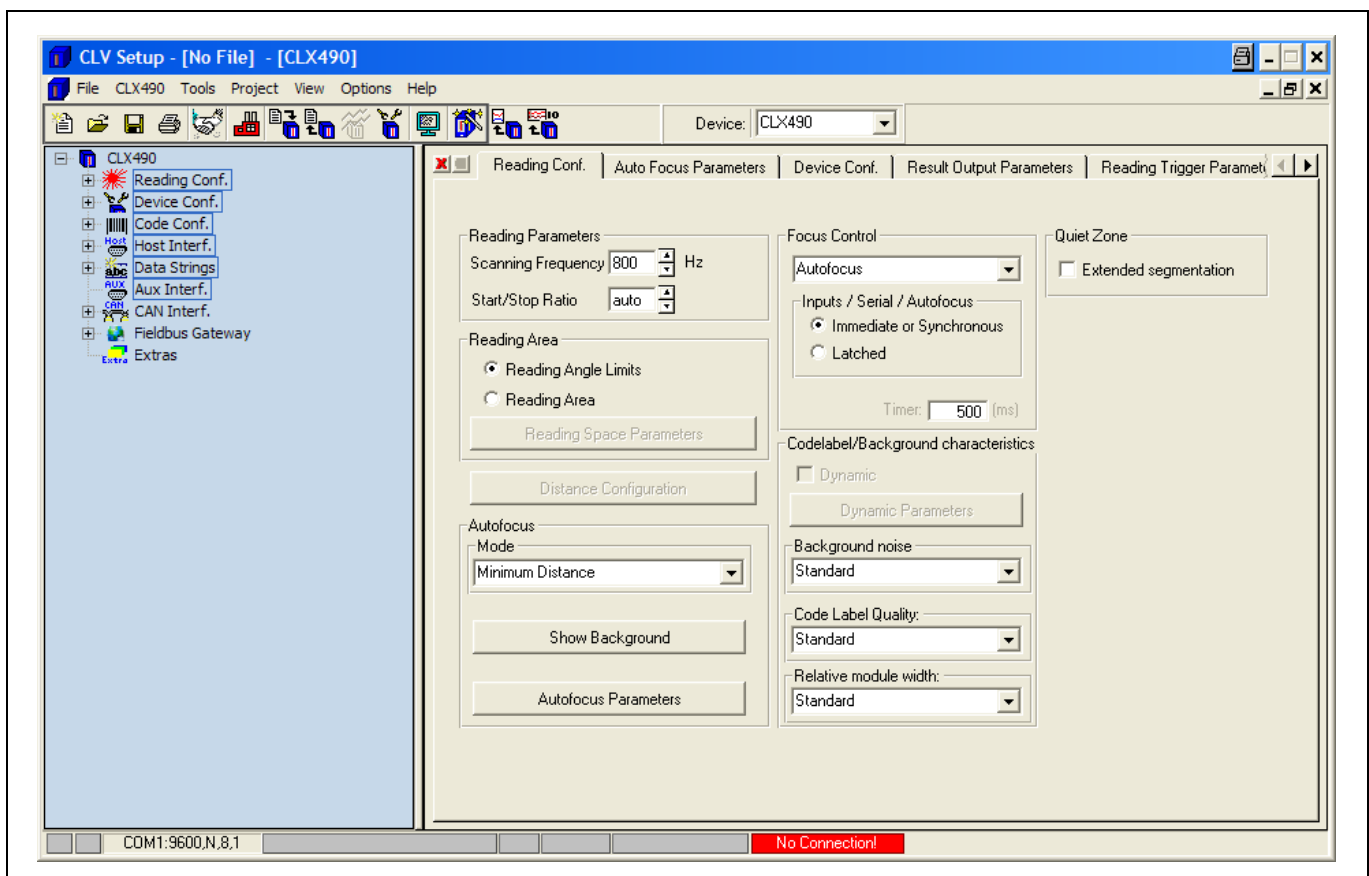
Fig. 10-12: User interface of the CLV-Setup software

10.6.5 Functions

The "CLV-Setup" program (from version V 4.0) features the following functions to carry out:

- Uploading the default parameter set from the database of CLV-Setup
- Automatic communication attempt with the CLX when the program is started
- Automatic software compatibility check in the CLX
- Uploading and displaying parameter set stored in the CLX
- Changing the parameter/parameter values on the tabs
- CLV Assistant for simplified parameterization (not for CLX)
- Downloading the changes to the parameter set in the CLX
- Saving the changes to the parameter set as a configuration file "*.scl"
- Printing the configuration files
- Exporting the configuration files in RTF format
- Exporting the command strings contained in the profile bar codes in ASCII format
- Printing the parameter set in the form of profile bar codes (not for CLX)
- Online access to the CLX via a Terminal Emulator (select operating mode, start operating functions, log file for communication between the CLX and CLV-Setup, extended Terminal mode, e. g. for displaying CLX messages)
- AutoBaud Detect for automatic communication setup with the CLX
- Selecting the COM port of the PC for adapting the data transfer parameters
- Monitoring the data communication of the CLV host interface
- Selecting language setting
- Selecting units of measure
- Displaying the last 10 configuration files that were processed
- Saving the device type that was selected last
- Automatic storage confirmation prompt when changes are made to the configuration file
- Wizards for individual functions
- CLX only: Background analysis
- CLX only: I/O monitoring
- Setting switches for starting the program (in the "CLVmain.ini" file)
- Hot keys [F keys] for important functions (using the program without a mouse)
- Starting program with SCL file as argument
- Macro player for recording and playing a macro file
- Context-sensitive help via the [F1] key

10.6.6 Hot keys

[F1]   Start "CLV-Setup Help" online

[F2]   Open dialog box to execute device functions

[F3]   Upload complete set of parameters from CLX

[F4]   Download complete set of parameters to CLX

[F5]   Open configuration file

[F6]   Save configuration file

[F7]   Load default setting of CLX from CLV-Setup database

[F8]   Start AutoBaud Detect

[F9]   Load operating data from CLX to be displayed and reset

8009237/RB47/2007-08-03   **10-21**

[F10]   Open Terminal Emulator

10.6.7   Opening and closing tabs

After starting the user interface, CLV-Setup displays those tabs in the frame on right-hand side whose names are framed in the navigation tree on left-hand side. The first tab covers the other tabs in the sequence but their marks are still visible on the top of the tabs. If you click some buttons on a tab in the fore-ground, several sub dialogs will also be opened as tabs and added to the first tab. In the frame, all tabs on the right will then be shifted more to the right side.

To scroll the tabs, use the sliding control elements at the left corner on top of the frame which are displayed by CLV-Setup.

You can open and close the tabs in the following way:

In the navigation tree:

*   Opening:
    Double-click the desired entry or put the mouse cursor on the entry and select "Show dialog" in the context menu using the right mouse button.
    To display several entries under a branch, click the corresponding "+" symbol.
    To hide displayed sub entries, click the corresponding "−" symbol.

*   Closing:
    Put the mouse cursor on the desired entry and select "Hide dialog" in the context menu using the right mouse button.

In the frame for displaying tabs:

*   Opening:
    Click on the desired mark on the top of the tab. If neccessary, scroll the tabs.

*   Closing:
    To close the tab in the fore-ground, click on the red cross at the left corner on the top.

Pressing the left mouse button, the left frame with the navigation tree can be move from the program window to a seperate position on the screen. If the navigation tree has been closed, it can be reopened using the VIEW menu.

10.6.8   CLV-Setup Help

The procedure for setting the CLX parameters is supported by the online help function, which is displayed in an HTML browser, such as Internet Explorer™. You can call up context-sensitive help on each parameter as well as a description of its function.

1. Press the [F1] key.
    The browser is launched automatically and displays the help topic.

2. If the program cannot find a browser, it asks you to specify the storage location on the hard disk.
    Enter the name of the executable file and the path in the dialog box.

3. Use the [ALT]+[TAB] keys to switch between the CLV-Setup and CLV-Setup Help applications and prevent several browser windows from being opened.

4. To display an overview of the Help function, Choose HELP, CONTENTS from the CLV-Setup menu bar.

5. In the left-hand frame click on the desired entry in the navigation tree.
    CLV-Setup Help then displays the associated help text in the right-hand frame and jumps to the parameter heading.

10-22   8009237/RB47/2007-08-03

10.6.9   Transferring parameter sets between CLV-Setup and the CLX

See *Chapter 6.4.1 Configuring the CLX with CLV-Setup, Page 6-4*.

10.6.10 Unknown parameters

Uploading from the CLX

If CLV-Setup does not recognize certain parameters or parameter values when it uploads them from the CLX, it outputs a warning. This may be due to the fact that the CLX is a special model or because the version of CLV-Setup is older than the version on the CLX. CLV-Setup displays the unknown parameters in the window on the EXTRAS tab. The parameters are displayed in the form of command strings and can be edited using the command string conventions. In this way, upward compatibility with the CLX is ensured. When the parameter set is saved as a configuration file in CLV-Setup, these parameters are also included and are also downloaded to the CLX.

Downloading to the CLX

If the CLX does not accept individual parameters or parameter values in the parameter set downloaded with CLV-Setup, it outputs a separate warning for each parameter on the screen. This could be due to the fact that the version of the "CLV-Setup" software is newer than the software version on the CLX and therefore contains new parameters and parameter values that are not implemented in the older software version.

We recommend that you check the effects of warnings in the CLX as follows:

1. Check whether the CLX functions correctly after the parameter set is downloaded.
2. Click ▦ in the toolbar.
    CLV-Setup loads the default settings from the database.
3. Click ▤ in the toolbar.
    CLV-Setup uploads the problem parameter set from the CLX.
4. Click 🖨 in the toolbar.
    CLV-Setup prints out the problem parameter set when you confirm the dialog box.
5. Open the previous configuration file "*.scl" for the CLX.
6. Click 🖨 in the toolbar.
    CLV-Setup prints out the parameter set used up to now when you confirm the dialog box.
7. Compare the two parameter sets.
    To restore the previous status, correct individual parameters in the problem parameter set if necessary and download them to the CLX again.

Opening configuration files "*.scl"

Every time it loads configuration files, CLV-Setup checks whether it recognizes all the parameters/values.
If the program detects an error, it outputs a warning and enters the problem parameter/value in the window on the EXTRAS tab.

10.6.11 Log file in the Terminal Emulator

The Terminal Emulator can log the communication between CLV-Setup and the CLX. CLV-Setup stores the data transmitted in both directions with the following identifiers:

--> PC: CLX sending to CLV-Setup

PC -->:   CLX receiving from CLV-Setup

1. Click 🖥 in the toolbar.
    The Terminal Emulator window opens.

2. Click the empty checkbox in front of the WRITE LOGFILE option on the right.
    The SAVE LOGFILE AS ... dialog box opens.

3. Enter a file name with the extension ".log" and exit the window by choosing SAVE.
    CLV-Setup saves the file in the "data" directory and records an entry in the log file.

4. To deactivate the log function, click the checkbox in front of the WRITE LOGFILE option again or close the Terminal Emulator window.

10.6.12 Starting CLV-Setup with an "INI file" as an argument

When the program is started, CLV-Setup can also be transferred the name of an "INI file" as a parameter. To do so, enter "/INI" in front of the file.

Example:

"CLVmain32.exe**data**\Set1_CLX490.scl /INI user.ini "

CLX-Setup is launched with the initialization data contained in the "user.ini" file and loads the configuration file "Set1_CLX490.scl" from the "data" directory straight away.

The "user.ini" file must be stored in the same directory as "CLVmain32.exe".

You can use this method to link CLV-Setup to several different configurations on your Windows desktop.

In this way, for example, you can prevent CLV-Setup from attempting to establish a connection when a CLX is not connected.

10.6.13 The CLV Assistant

The CLV Assistant is not suitable for parameterizing the CLX.

10.7 Configuring a CLX with command strings

The CLX can be parameterized and operated with command strings via the auxiliary inter-face or the host interface. Parameters which are unknown to the CLV-Setup may be used providing that the command string convention is followed. This allows, among other things, the setting of special devices as well as the configuration of new CLX parameters (which are unknown to "CLV-Setup" program) if your version of the CLX is older in comparison. The "CLV-Setup" user interface is based on the command language.

The command language accesses the CLX's command interpreter directly. Use this lan-guage with care. Commands sent to the CLX are carried out immediately.
Parameter values changed by commands are at first only activated in the current parameter set in the CLX's RAM. The altered parameter values must be saved to non-volatile memory in the EEPROM (after the changes are made) using a special command. If the values are not saved, they will be lost when the voltage supply is cut off.

The "CLV-Setup" Terminal Emulator's online mode makes it possible to parameterize the CLX with command strings directly. *Fig. 10-13* shows a view of the Terminal Emulator with command lines and PC/CLX communication output windows.

1. Click on [icon] in the symbol bar.
   The Terminal Emulator window opens. The CLX is in Reading mode.

2. Under DEVICE MODE, click on the PARAMETERIZING option field.
   The CLX aborts reading mode. The "Device Ready" LED extinguishes.
   CLV-Setup switches the CLX into the parameterize mode with a command.
   All commands in parameterize mode begin with "3".
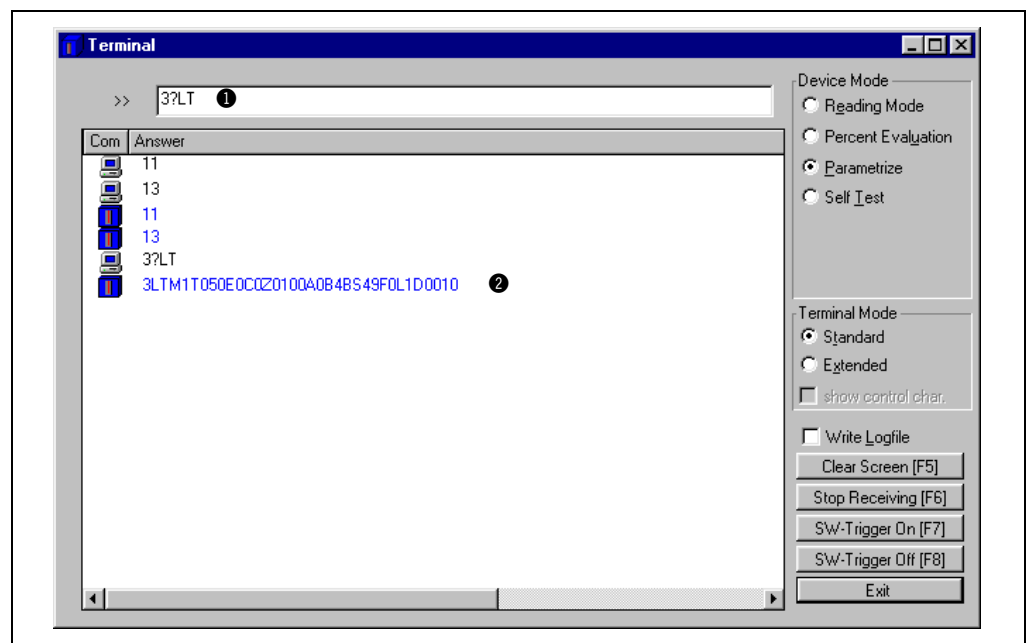
Fig. 10-13: CLV-Setup: entering commands in the Terminal Emulator

3. Enter the desired command in command line ① , and press the [Return] key.
   The command is sent to the CLX.
   The CLX answers with an echo if the command was syntactically correct (in most cases).
   Example:
   The command "3?LT" causes the CLX to display the parameter values of the reading trigger in coded form in output window ② .

4. To return to Reading mode, click on the READING MODE option field.
    The "Device Ready" LED lights up.

Note   The parameter values directly changed with command strings in the CLX are registered and shown only after the parameter set is uploaded from the CLX.

Outputting command strings for all the parameter settings:

You can output a list of all the parameter settings configured with CLV-Setup in ASCII format. To do so, proceed as follows:

1. In the menu bar, choose EXPORT PARAMETERS under CLX490.
    Starting from the default settings, CLV-Setup collects all the command strings required to parameterize the default configuration and customized settings.
    The SELECT FILE NAME FOR PARAMETER EXPORT dialog box is displayed.

2. Enter a file name and click the SAVE button.
    CLV-Setup saves the data as a text file in the directory shown.

You can open this text file using any Windows text editor.

If the commands are sent from the host/PLC to the CLX for configuration, note that "3 EEW" has to be sent as the last command to ensure that they are permanently transferred to the CLX (EEPROM).

                     8009237/RB47/2007-08-03

10.8   Calculating parameter values for setting the CLX

10.8.1   Calculating the necessary capture area for the bar code if several bar codes are read on each object

SMART Decoder:
for bar codes with identical code type and identical or different data contents.

Distance dx: min. 60 x module width
e. g. 30 mm for module width 0.5 mm

Distance dy: 7 x d_{scan}
where d_{scan} = vertical distance between two consecutive scan lines

e. g. scan line 90° to bar code, scanning frequency 800 Hz, v = 2 m/s

$$d_{scan} = \frac{V}{f} \qquad d_{scan} = \frac{2000 \text{ mm/s}}{800 \text{ /s}} = 2.5$$

$$dy = 7 \times 2.5 \text{ mm} = 17.5 \text{ mm}$$

Standard Decoder:
The above distances are also required for reading bar codes with identical names (identical data content and code types).

Prerequisite for separating bar codes with identical names:
1. The CAPTURE RANGE between the bar codes must be parameterized correctly
   (DEVICE CONFIGURATION tab, TRACKING PARAMETERS button)
2. The reading angle comparison must be activated
   (CODE CONFIGURATION tab, under CODE SUMMARIZATION)

Bar code lines in conveyor direction:
If the scan line is to detect bar codes of the same name with the same reading angle, the travel information must be supplied by an external incremental sensor or the internal INC timer so that the bar codes can be distinguished from one another.

Rule of thumb: the blank zone should surround the bar code completely!

CODE CONFIGURATION tab: due to the function OPTIMIZE FOR SHORT CODE DISTANCES under SMART-PARAMETER smaller code distances as described above are possible (depending on application)

Fig. 10-14:   Required distance between the bar codes on an object

10.9　Tables

10.9.1　Calculating the code length of a bar code

The code length of a bar code is the number of useful characters in the printed code including the check digit (if present). This code length must be specified in CLV-Setup.

If the code type of a bar code is known, the code length can be calculated by counting the bars and gaps. The relevant formulas are provided in *Table 10-6*.

1. Count the bars and gaps as specified in *Table 10-6*.
   Do not forget to include the start and stop characters.
2. Calculate the code length using the formula in the table.
3. Enter the value in CLV-Setup as described in column 4 in the table.

Code type	Count	Calculation of code length[1)2)]	Entry in CLV-Setup
Code 39	Number of bars	$I_{Code} = \dfrac{Number - 10}{5}$	Calculated code length
2/5 Interleaved	Number of wide elements (bars and gaps)	$I_{Code} = \dfrac{Number - 1}{2}$	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) 6 characters (UPC E, short version)	Activate Version A Activate version E
Codabar	Number of bars	$I_{Code} = \dfrac{Number - 8}{4}$	Calculated code length
Code 128 (character set A)	Number of bars	$I_{Code} = \dfrac{Number - 10}{3}$	Calculated code length
Code 93	Number of bars plus separator after the stop character	$I_{Code} = \dfrac{Number - 13}{3}$	Calculated code length
EAN 128	Number of bars	$I_{Code} = \dfrac{Number - 10}{3}$	Calculated code length

1. Check digit optional for Code 39, 2/5 Interleaved, Codabar.
   Check digit always integrated in printed bar code with EAN, UPC, Code 128, Code 93, EAN 128
   (suppressed automatically when the CLX read result is output)

2. With only few exceptions each printed character that has to be decoded corresponds to an ASCII character.
   With Code 39 extended, Code 93, Code 128 and EAN 128, the number of characters in the data string of the CLX
   can be larger than the number of characters in the printed code because it comprises several character sets.

Table 10-6: Formulas for calculating the code length of a bar code

10.10 Special applications and procedures

10.10.1 Auxiliary input via auxiliary interface

If the CLX cannot read a bar code in Reading mode (e. g. if there is no bar code on the object), the data content of the bar code can be sent subsequently to the host by using the "Auxiliary input" function. In this way, the sequence of reading results can be completed if necessary.

The auxiliary input function uses the auxiliary interface of the CLX exclusively and features two options:

- manual entry of the data content on the keyboard of a connected terminal or PC (Terminal Emulation function)
- entry of the bar code using a hand-held reader. The data is then forwarded to the CLX via an internal or external decoder

Fig. 10-15 shows the basic auxiliary input principle.
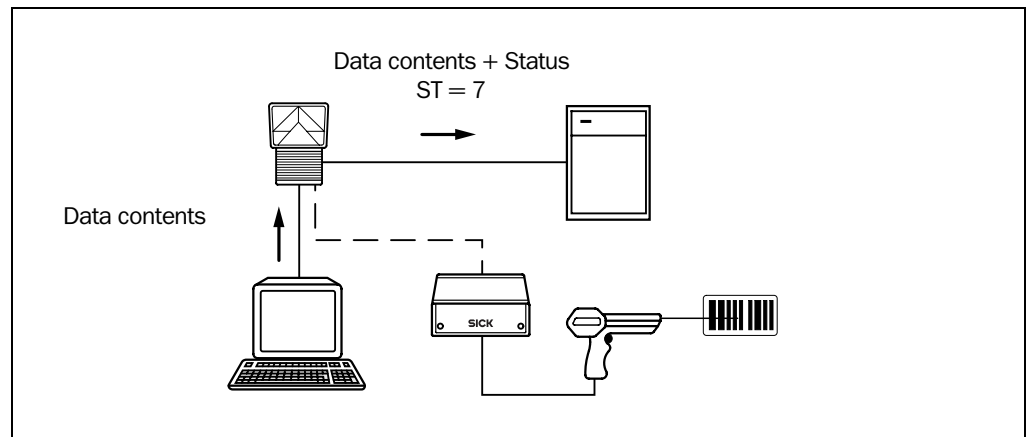
Fig. 10-15:   Auxiliary input via the auxiliary interface of the CLX

The CLX sends the data content of the bar code that it receives via the auxiliary interface to the host in the same format as the other reading results on the host interface. Each string can contain the data from a bar code with a maximum length of 50 characters. The CLX automatically enters the status ST = 7 if the error status has been enabled for transmission. The values of the other reading diagnosis data in the data string do not have any significance.

To enable the CLX to receive the data content of the bar code on the auxiliary interface, you must switch the operating mode on the interface to auxiliary input .

1. Connect the PC to the **auxiliary interface** on the CLX using a 3-core RS 232 data cable (null modem cable) (AMV/S60: connect the PC to the internal 9-pin "Service" plug).
   See Chapter 5.5.6 Connecting the PC, Page 5-15.
2. Start CLV-Setup on your PC.
   See Chapter 10.6.3 Starting CLV-Setup, Page 10-18.
3. Choose the AUXILIARY INTERFACE tab.
4. Choose the AUXILIARY INPUT option from the drop-down list.
5. Download the changes to the CLX.
   To do so, click the AUXILIARY INPUT option again with the right mouse button and choose DOWNLOAD PARAMETER in the context menu.
   CLV-Setup copies the parameter to the CLV temporarily.

The auxiliary interface then operates temporarily in "Auxiliary input" mode.

Entering the bar code using the Terminal Emulator function in CLV-Setup

1. Click 🖥 on the toolbar.
   The Terminal Emulator is launched.
   The CLX is in Reading mode.

2. Click the EXTENDED radio button in the TERMINAL MODE section.
   The start and stop characters used by the Terminal Emulator are displayed at the top of the screen, on the left and right of the text input field.
   Fig. 10-16 shows the Terminal Emulator window in extended mode.

3. Use the drop-down lists to set the start and stop characters to NUL.

4. Enter the data content of the bar code (character string) on the keyboard.
   Use the backspace key to correct any input errors.
   The data content must not contain control characters.

5. Press the [RETURN] or [ENTER] key.
   The CLX then interprets all further characters as a new data string.
   CLV-Setup sends the character string to the CLX and deletes the entry in the text field.
   The CLX does not send an echo.

6. Once the active reading pulse has ended, the CLX sends the data received from the PC to the host via the host interface.
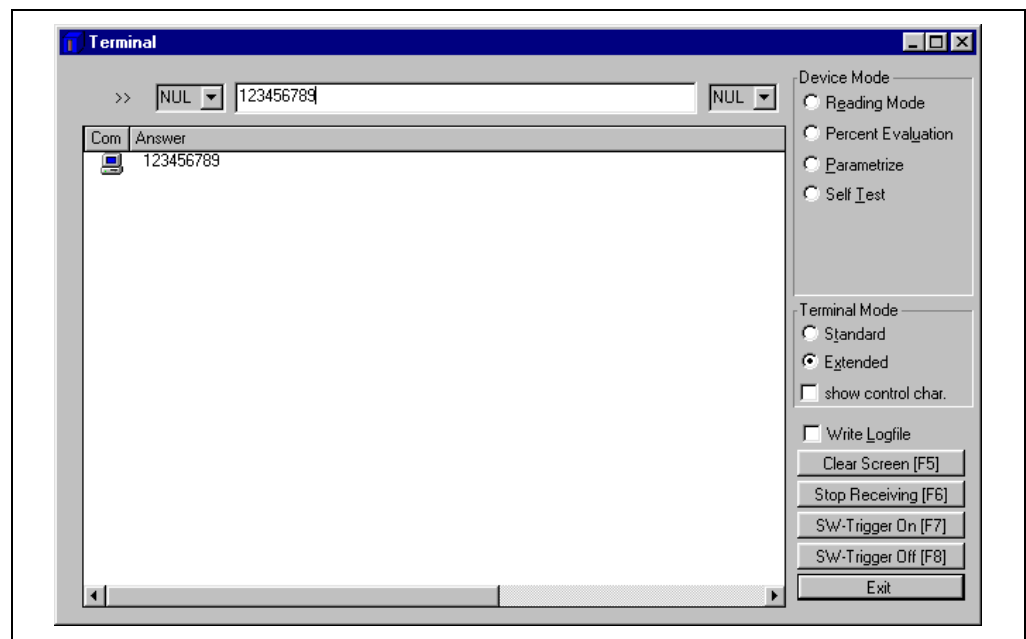
Fig. 10-16:   CLV-Setup: auxiliary input on the Terminal Emulator

Entering a bar code using a terminal/PC keyboard

1. Connect the terminal /PC with Terminal Emulation program to the auxiliary interface on the CLX (via AMV/S60). *For the pin assignment, see Chapter 5.5.6 Connecting the PC, Page 5-15*.

2. Set the communication parameters and data output format as shown in *Table 10-7*.

Parameter	Value
Data transmission rate	9,600 bd
Data bits	8
Parity	None
Stop bits	1
Data output format	Data terminator *e. g. 1234* *CR*

Table 10-7: Communication parameters on the terminal/PC for the auxiliary input

3. Enter the data content of the bar code on the keyboard.
    The terminal sends the individual characters to the CLX immediately.
    Use the backspace key to correct input errors.

4. Terminate the data content with the control character <CR>.
    The CLX then interprets all further characters as a new data string and ignores other control characters. The data content itself must not contain any control characters.

5. Once the active reading pulse has ended, the CLX sends the data received from the PC to the host via the host interface.

Entering bar codes using a handheld scanner with decoder

1. Connect the handheld scanner with decoder to the auxiliary interface of the CLX (via AMV/S60). *For the pin assignment,* see *Chapter 5.5.6 Connecting the PC, Page 5-15.*

2. Set the data format and communication parameters on the handheld scanner as shown in *Table 10-7*.

3. Read the bar code with the handheld scanner.
    Once the active reading pulse has ended, the CLX sends the data received from the PC to the host via the host interface.

If you connect a SICK Hand-held Scanner from the IT 38xx/46xx/48xx/58xx series, set the communication parameters and data output (data + terminator) as shown in *Table 10-8*.

Parameter	Value
Data transmission rate	9,600 bd
Data bits	8
Parity	No
Stop bits	1
Data interface	RS 232
Prefix (Header)	Clear all Prefixes
Suffix (Terminator)	CR

Table 10-8: Communication parameter settings for the SICK Hand-held Scanner from the IT 38xx/46xx/48xx/58xx series

10.10.2 Connection to the Profibus DP

See Operating Instructions "*BMV/BMH10 for Profibus DP*"
(order no. 8008825, English edition).

10.10.3 Connection to the DeviceNet

See Operating Instructions "*BMV/BMH10 for DeviceNet*"
(Order no. 8008972, English edition).

10.10.4 Connection to Interbus-S

See Technical Information "*BMS10/20 for Interbus-S*"
(Order no. 8007546, English edition).

10.10.5 Connection to Ethernet TCP/IP

See Operating instructions "*BMV/BMH10 for Ethernet*"
(Order no. 8009398, English version)

10.10.6 Building a CAN Scanner Network

See Operating Instructions "*Using the CAN interface*"
(Order no. 8009180, English edition).

10.10.7 Integration in an OPS reading system

See Operating Instructions "*Omni Tracking System OTS400*"
(Order no. 8008869, English edition).

 8009237/RB47/2007-08-03

10.11 Replacing a CLX (copying the parameter set)

There are two methods of replacing a CLX and transferring the current parameter set to the new device:

- by downloading the parameters from CLV-Setup
- by importing the parameter set from the external memory

The parameter set can only be transferred between identical device types (e. g. from one CLX490-0010 to another CLX490-0010, etc.).

10.11.1 Downloading the parameter set

To download the parameter set, you must connect a PC running the "CLV-Setup" software to the replacement device. The parameter set of the CLX that is to be replaced must be available as a configuration file in CLV-Setup, otherwise the device must be parameterized from scratch.

1. Disconnect the power supply to the AMV/S60 Connection Module (of the CLX).
2. Disconnect all cable connectors from the CLX.
3. Remove the CLX from the bracket.
   Before doing so, mark the position and alignment on the bracket/station.
4. Mount, align, and connect the replacement device.
5. Connect the PC to the auxiliary interface on the CLX using a 3-core RS 232 data cable (null modem cable) (AMV/S60: connect the PC to the internal, 9-pin "Service" plug).
   See *Chapter 5.5.6 Connecting the PC, Page 5-15*.
6. Switch on the power supply to the AMV/S60.
   Once the CLX has started, the "Device Ready" LED lights up.
7. Switch on your PC and start Windows.
8. Start CLV-Setup.
   If the communication parameters on the PC and CLX are identical, CLV-Setup uploads the parameter set from the CLX and displays the values on the tabs.
9. Open the archived parameter set as a configuration file "*.scl" in CLV-Setup and download it to the CLX.
10. Confirm the dialog box by choosing the TEMPORARY storage option.
11. Check whether the CLX reads the bar codes correctly.
    Correct the parameter settings if necessary.
12. Finally, download the tested parameter set to the CLX and save it with the PERMANENT storage option.
    The parameter set is transferred permanently to the replacement device.
13. Save the modified parameter set as a new configuration file in CLV-Setup.

Troubleshooting

If the software version on the replacement device is older than the version on the old device (e. g. new device is from warehouse stock), the parameter set transferred may contain coded parameters or parameter values that cannot be interpreted by the older software. The new device, however, outputs an error message in CLV-Setup for each of these parameters/values when the parameter set is downloaded.

8009237/RB47/2007-08-03   **10-33**

➢ Check whether all of the parameter settings used are necessary to configure the CLX for the current reading application. If necessary, replace the software version in the new device.

If the software version on the new device is more recent than that on the old one, the default settings in the imported parameter set will include parameters that were not contained in the old version.

➢ Upload the parameter set and check whether the new parameters are relevant for configuring the CLX for the current reading application. If necessary, change the parameter values and download the parameter set to the CLX again. Save the new parameter set as a configuration file in CLV-Setup.

See also .

10.11.2 Importing the parameter set from the external memory

A PC does not have to be connected to import the parameter set from the external memory. The parameter set in the external memory must contain an up-to-date copy of the set used by the CLX that is to be replaced. Otherwise, the replacement device will import a different parameter set to its RAM when it is started. The start option in the device must be set to START WITH EXTERNAL PARAMETERS. This is the default setting.

1. Switch off the power supply to the AMV/S60 Connection Module (of the CLX).
2. Remove the connector cover (containing the parameter memory) from the CLX.
3. Remove the CLX from the bracket.
   Mark the position and alignment of the CLX on the bracket/station.
4. Mount the connector cover on the terminals correctly and screw it into place.
5. Mount and align the replacement device.
6. Switch on the power supply to the AMV/S60.
   The CLX starts and loads the parameter set from the external memory to the RAM.
   The "Device Ready" LED blinks for approx. 10 s and then lights up constantly.

The parameter set is transferred temporarily to the replacement device. It is lost when the device is switched off but is loaded again from the external memory the next time the CLX starts.

See also .

Troubleshooting

If the software version on the replacement device is older than that of the parameter set in the external memory (e. g. if the replacement device originated from the warehouse), the loaded parameter set may contain parameters or parameter values that cannot be interpreted by the older software. In this case, the "Device Ready" and "Read Result" LEDs blink together for approx. 10 s, after which the "Device Ready" LED lights up constantly. See also .

If the software on the replacement device is newer than that of the parameter set in the external memory, the parameter set loaded from the external parameter memory to the replacement device will contain new parameters that are set to the default values.

10-34   8009237/RB47/2007-08-03

10.12 Ordering information

10.12.1 CLX490 Compact OMNI Scanner

Order no.	Type (red light)	Scanning method	Resolution	Heater
1019318	CLX490-0010	CLX490 Compact OMNI Scanner	from 0.30 mm	no
1019319	CLX490-0011	CLX490 Compact OMNI Scanner	from 0.30 mm	yes

Table 10-9: CLX variants

10.12.2 Accessories: Mounting accessories

Order No.	Description	See figure
2016110	Quick-clamping device, complete with securing material	–
2022996	Angle bracket, with 2 screws M6 x 10 mm, self-locking	*Fig. 10-17, Page 10-39*

Table 10-10: Accessories: mounting accessories

10.12.3 Accessories: Connection modules

Order No.	Type	Description
1017134	AMV60-011	Connection Module for a CLX490 without heater, with 1 x 15-pin D Sub HD device socket/plug, terminal strips (signal distributor) for connecting the data and function interfaces, internal 9-pin D Sub "Service" plug, strain-relief clamps, polycarbonate housing, enclosure rating IP 30 (max. IP 54), operating voltage 18 to 30 V DC, operating temperature 0 to +40 °C
1017139	AMS60-013	As AMV60-011, with integrated power pack: 230 V AC 50 Hz/24 V DC
1017140	AMS60-012	As AMV60-011, with integrated power pack: 115 V AC 50 to 60 Hz/24 V DC
1017387	AMS60-023	As AMS60-013, with 2-row LCD
1017391	AMV30-071	Connection Module for two CLX490 without heater, with 2 x 15-pin D Sub HD device socket/plug, terminal strips (signal distributor) for connecting the data and function interfaces, two 9-pin D Sub "Service" plugs, strain-relief clamps, polycarbonate housing, enclosure rating IP 30 (max. IP 54), operating voltage 18 to 30 V DC, operating temperature 0 to +40 °C
6021105	AMV100-011	Universal Connection Module for one CLX 490 with/without heater, for the CLX490 with 1 x 15-pin D Sub HD device socket/plug, terminal strips (signal distributor) for connecting the data and function interfaces, internal 9-pin D Sub "Service" plug, strain-relief clamps, cast aluminum housing, enclosure rating IP 54 (enclosure rating IP 65 with connector cover), operating voltage 18 to 30 V DC, operating temperature 0 to +40 °C
6021106	AMV100-012	As AMV100, but for two CLX490 with/without heater
6007655	–	Power cable for AMS60, 3-wire, length 2 m, with 3-pin connector (grounding) and one open end (stripped)

Table 10-11: Accessories: connection modules

8009237/RB47/2007-08-03 **10-35**

10.12.4 Accessories: Bus connection modules

Order No.	Type	Description
6020896	BMV10-0111	Bus Connection Module for connecting a CLX490 to a **Profibus DP**, for the CLX490 with 1 x 15-pin D Sub HD device socket/plug, bus connector, terminal strips (signal distributor) for connecting the RS 232 and function interfaces, internal 9-pin D Sub "Service" plug, strain-relief clamps, cast aluminum housing, enclosure rating max. IP 54 (enclosure rating max. IP 65 with connector cover), operating voltage 20 to 30 V DC, operating temperature 0 to +40 °C
6020893	BMH10-0111	Bus Module for connecting a CLX490 to a **Profibus DP**, with screw terminals, 9-pin D Sub plug for the bus, without housing, for DIN rail mounting, enclosure rating max. IP 20, operating voltage 10 to 30 V DC
6021190	BMV10-0311	Bus Connection Module for connecting a CLX490 to a **DeviceNet**, with screw terminal for the bus, see BMV10-0111
6021188	BMH10-0111	Bus Module for connecting a CLX490 to a **DeviceNet**, see BMH10-0111
1012683	BMS20-0113	Bus Connection Module for connecting a CLX 490 to an **Interbus-S**, for the CLX490 without heater, 15-pin D Sub HD device socket/plug. With 9-pin D Sub plug/socket (in/out) for the bus, terminal strips (signal distributor) for connecting the data and function interfaces, internal 9-pin D Sub "Service" plug, integrated power pack 230 V AC 50 Hz/ 24 V DC, strain-relief clamps, enclosure rating IP 30 (max. IP 54), operating temperature 0 to +40 °C
1012684	BMS20-0112	As BMS20-0113, with integrated power pack 115 V AC 50 to 60 Hz/ 24 V DC
6025757	BMV10-0411	Bus connection module for connecting a CLX490 to **Ethernet**. **TCP/IP**. TCP/IP communication, data transmission rate 10 MBit/s. For the CLX 490 with a 15-pin D Sub HD device plug/socket. With a 8-pin RJ-45 bus socket, terminal strips (signal distributors) for wiring the RS 232 data interface and the functional interfaces, a internal 9-pin D Sub "Service" plug, cable grips, die-cast aluminum housing, enclosure rating max. IP 54 (enclosure rating max. IP 65 with a plug hood), operating voltage 20 to 30 V DC, operating temperature 0 to +40 °C
6025756	BMH10-0411	Bus module for connecting a CLX490 to **Ethernet TCP/IP**. TCP/IP communication, data transmission rate 10 MBit/s. With terminal screws, a 8-pin RJ-45 bus socket, no housing, for top-hat-rail installation, enclosure rating max. IP 20, operating voltage 10 to 30 V DC, operating temperature 0 to +40 °C
6022140	BMV10-0431	As BMV10-0411, but with FTP communication, data transmission rate 10/100 MBit/s
6025748	BMH10-0431	As BMH10-0411, but with FTP communication, data transmission rate 10/100 MBit/s
6007655	–	Power cable for BMS20, 3-wire, length 2 m, with 3-pin connector (grounding) and one open end (stripped)

Table 10-12: Accessories: bus connection modules

10-36   8009237/RB47/2007-08-03

10.12.5 Cables, external parameter memories and plug cover

a) CLX without heater

Temperature range of connection material:

Stationary: −30 to +70 °C; moving: 0 to +70 °C

Order No.	Description	Wires	Length	Connection
2020302	Connection cable for data interfaces ("Host/Term") or function interfaces ("I/O"), ∅ 8 mm, shielded, with 15-pin D Sub HD socket and 15-pin D Sub HD plug. Required: 2 per CLX	15 x 0.25 mm²	3 m	CLX to AMV/S60 AMV30-071 BMV10/BMS20
2021815	As no. 2020302, but longer	15 x 0.25 mm²	10 m	as above
2020303	Connection cable for data interfaces ("Host/Term"), ∅ 8 mm, shielded, with 15-pin D Sub HD socket and one open end (stripped). Required: 1 per CLX	15 x 0.25 mm²	3 m	CLX to host
2020264	Connection cable for function interfaces and power supply ("I/O"), ∅ 8 mm, shielded, with 15-pin D Sub HD plug and one open end (stripped). Required: 1 per CLX	15 x 0.25 mm²	3 m	CLX to sensors PLC and non-SICK Power pack
2020307	**Connector cover with parameter memory** (EEPROM), enclosure rating IP 65, with two connection cables, each ∅ 8 mm, shielded, with 15-pin D Sub HD socket and 15-pin D Sub HD plug. Required: 1 per CLX	each 15 x 0.14 mm²	3 m	CLX to AMV/S60 AMV30-071 BMV10
2020981	**Connector cover with parameter memory** (EEPROM), enclosure rating IP 65, with two connection cables, each ∅ 8 mm, shielded, two open ends (stripped). Required: 1 per CLX	each 15 x 0.14 mm²	3 m	CLX to host, sensors, PLC and non-SICK Power pack
2020308	**Connector cover with parameter memory** (EEPROM), enclosure rating IP 65, with two connection cables ∅ 8 mm each, shielded, with 9-pin D Sub HD plug and one open end (stripped). Required: 1 per CLX	each 10 x 0.2 mm²	3 mm	CLX to BMS20
2014054	RS 232 data cable (null modem cable), ∅ 5 mm, shielded, with two 9-pin D Sub sockets (Pin2 (RxD) and Pin 3 (TxD) crossed)	3 x 0.34 mm²	3 m	PC to AMV/S BMV10/BMS20
6010088	Data cable, ∅ 6.6 mm, shielded, for connection cables up to 3 m	15 x 0.09 mm²	Meter ware	Free wiring
6007508	Data cable, ∅ 8.5 mm, twisted pair, shielded	2 x 2 x 0.23 mm²	Meter ware	SICK network (RS 485)

Table 10-13: Accessories: cables and connector covers for the CLX without heater

Note Other cable lengths/types for CLX without heater available on request.

b) CLX with heater

Temperature range of connection material:

Stationary: −50 to +70 °C; moving: −40 to +70 °C

Order No.	Description	Wires	Length	Connection
2021689	**Connector cover with with parameter memory** (EEPROM), enclosure rating IP 65, with 2 connection cables, each ∅ 8 mm, shielded, with 15-pin D Sub HD socket and 15-pin D Sub HD plug Required: 1 per CLX	each 15 x 0.14 mm^2	3 m	CLX490 an AMV100/200
2021298	2 x connector cover, enclosure rating IP 65, with 2 connection cables, each ∅ 6.7 mm, shielded. Required: 1 per CLX	each 13 x 0.14 mm^2 + 2 x 0.75 mm^2	3 m	CLX490 an AMV100/200
2021299	As no. 2021298, but longer connection cables	as above	10 m	as above
2021267	Connector cover, enclosure rating IP 65, with 2 connection cables, each ∅ 6.7 mm, shielded, two open ends (stripped). Required: 1 per CLX	1 x 18 x 0.14 mm^2 + 1 x 2 x 0.75 mm^2	3 m	CLX490 to host, sensors, PLC and non-SICK Power pack

Table 10-14: Accessories: cables and connector covers for the CLX with heater

Note Other cable lengths/types for CLX with heater available on request.

10.12.6 Plug-in connections

Order No.	Description
6009438	D Sub connector housing (metal) for 9-pin or 15-pin HD inserts
6007335	D Sub connector insert, 9-pin socket connector
6010019	D Sub connector insert, 15-pin HD socket connector
6010020	D Sub connector insert, 15-pin HD pin connector

Table 10-15: Accessories: plug-in connections

10.12.7 Reading pulse generators

The SICK catalog "SENSICK Sensors for Automation" (order no. 8006530, English edition) contains a large selection of photoelectric switches and photoelectric proximity switches as well as the associated accessories (brackets, connection cables).

10.13 Dimensioned drawings of the accessories

10.13.1 Angle bracket, no. 2022996
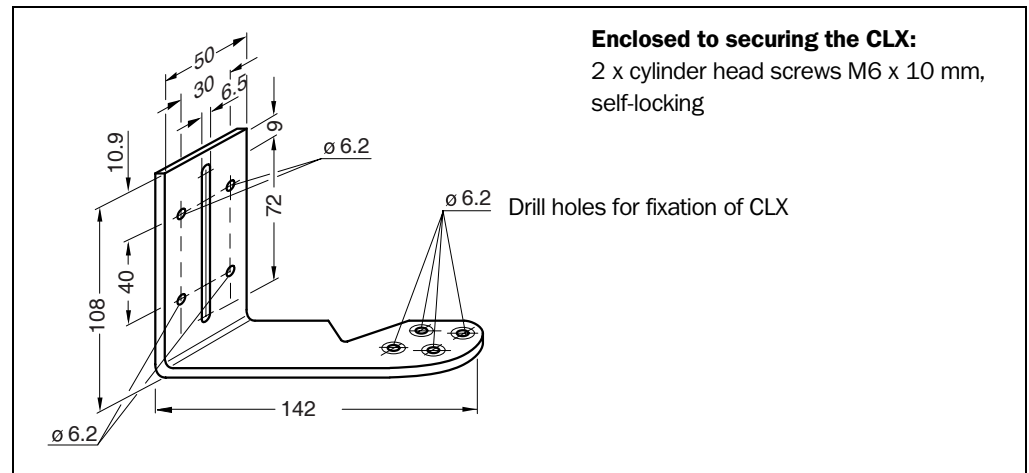
Fig. 10-17:   Dimensions of the angle bracket, single No. 2022996

10.14 Supplementary documentation

Order No.	Title	Contents
8008296	"AMV/S60" Operating Instructions	Description for connecting the CLX without heater to the host/PLC/sensor via the AMV/S60 Connection Module
8008648	"AMV30-071" Operating Instructions	Description for installing two CLX without heaters to the host/PLC/sensor via the AMV30-071 connection module
8008879	"AMV100/200" Operating Instructions	Description for connecting 1 (2) CLX without/with heater to the host/PLC/sensor via the AMV100 (AMV200) Connection Module
8007675	"Master/Slave with CLV Bar Code Scanners" Technical Information	Description of building a daisy-chain configuration (master/slave or data forwarding)
8008825	"BMV/BMH10 for Profibus DP" Operating Instructions	Description for connecting the CLX to the Profibus/PLC/sensor via the BMV/BMH10 Bus Connection Module
8008972	"BMV/BMH10 für DeviceNet" Operating Instructions	Description for connecting the CLX to the DeviceNet/PLC/sensor via the BMV/BMH10 bus connection module
8007546	"BMS10/20 for Interbus-S" Technical Information	Description for connecting the CLX to the Interbus/SPS/sensor via the BMS20 Bus Connection Module
8009398	"BMV/BMH10 for Ethernet" Operating Instructions	Description for connecting the CLX to the Ethernet/PLC/sensor via the BMV/BMH10 Bus Connection Module
8008869	"Omni Tracking System OTS400" Operating Instructions	Description of the integration of the CLX490 in an omnidirectional OPS reading system
8009180	"Application of the CAN interface" Operating Instructions	Description for building a CAN network (electrical connection, configuration of the CLX, functions)

Table 10-16: Supplementary documentation in English language

10.14.1 CLV Connect (from version 1.9)

Diagrams showing you how to connect the AMV/S60 Connection Module are also available in the "CLV Connect" PC program. This software is available on the "Manuals & Software" CD-ROM, which is included in the scope of delivery of the CLX.
The software can also be downloaded from the SICK home page (www.sick.com) at "Service&Support/Downloadpool".
It can be called up using a standard HTML browser (e. g. Internet Explorer™).

10.15 Glossary

For further terms, please refer to the online help "*CLV-Setup Help*".

Aspect ratio

Ratio code height (bar length) to code length (numer of characters). Using the SMART Decoder even bar codes with very small code height can be read.

Autofocus function

Ability of the CLX to detect the distance of the objects during the reading operation without external sensors in order to adapt the focus position to the reading plane of the bar codes.

Auxiliary input

Special function on ⇨ the auxiliary interface. Used to enter bar code data subsequently in order to complete reading results sent to the host.

Auxiliary interface

Auxiliary data interface (RS 232) on the CLX with fixed data output format. Used to connect the "CLV-Setup" program to the CLX so that it can operate and configure the device. Also used to output ⇨ system and error messages. Can be assigned various functions.

CAN interface

Can be used for building a quick SICK specific CAN Scanner Network with several functions (e.g. multiplex function, master/slave configuration) or for the integration into an existing CAN network according to the CANopen protocol.

Capture range

Zone around a moving bar code created by the CLX using the increment management and reading angle comparison functions. Enables bar codes with identical contents and code type to be separated.

CLV-Setup

PC program that runs on Windows 95™/98™, Windows NT4.0™, Windows 2000™, Windows XP™ and is used to parameterize the CLX offline (adjust the device to the local conditions) and operate it online. The parameter set is exchanged with the CLX by ⇨ uploading and ⇨ downloading it.

CLV-Setup Help

Online help function that provides support for using the "CLV-Setup" program. The help function explains the CLX parameters and their permissible values and can be launched directly from CLV-Setup in an HTML browser, such as Internet Explorer™.

Code geometry

Length and height dimensions of the bar code.

Code Info/Separator

Data block in the reading result on the ⇨ host interface. Used to provide additional information about the bar codes. Can be attached to the bar code as a prefix or suffix. Contains up to 10 elements, consisting of reading diagnosis data and/or constants (control characters,

8009237/RB47/2007-08-03   **10-41**

letters, digits), depending on the configuration. The "Code-Info/Separator" block is empty in the default setting of the CLX.

Command strings, commands

CLX user interface – alternative to the "CLV-Setup" program. Basic, yet clearly structured command language for modifying the CLX parameter sets online. Accesses the CLX command interpreter directly. Special programming activities are required to use the command strings from the host.

CLX490 Compact OMNI Scanner

Scanner with a scan line deflected by two mirrors in the device cover. The scan line is folded and crossed which allows omnidirectional reading of bar codes.

Configuration file

File in the "CLV-Setup" program that archives the entire ⇨ parameter set of the CLX. Can also be printed out in tabular form.

Data forwarding

Option of forwarding data sent by the host transparently to a terminal via the CLX using an identifier. Data can also be forwarded in the opposite direction. Furthermore, this function also allows data received on one of the serial interfaces to be output again straight away on one of the same interfaces (echo).

Data output string

Structured data telegram in the ⇨ reading result output by the CLX on the ⇨ host interface. The structure of the data string is flexible and can be adapted to a large extent to the subsequent data processing task. The data output format of the ⇨ auxiliary interface, on the other hand, cannot be changed.

Decoder, decoding

Code-type-specific evaluation routine for reconstructing the read bar code in electronic form in order to decode its data content.

Distance configuration

Data record in the CLX for defining a ⇨ focus position for the laser beam for ⇨ dynamic focus control. The focus position must be entered on the READING CONFIGURATION tab in the "CLV-Setup" program for this purpose. The depths of field for the individual focus positions are shown as a function of the resolution values in the specification diagrams.

Download

Method of transferring the ⇨ parameter set that was modified with the ⇨ CLV-Setup program offline from the PC to the CLX. CLV-Setup either always transfers a complete copy to the memory (RAM) of the CLX (DOWNLOAD TO CLV) or just the parameter previously processed using the context menu of the right mouse button (DOWNLOAD PARAMETER) or all parameters of the displayed tab (DOWNLOAD PARAMETERS OF THIS VIEW). You can overwrite the existing parameter set in EEPROM of the CLX by choosing the "Permanent" save option.

Dynamic focus control

Function for shifting the focal point of the laser beam across a wide range in the reading plane. The dynamic focus control function is event controlled (e. g. by the distance detector) or dynamic in the ⇨ Autofocus function.

Error messages

Messages in ⇨ plain text or coded (3-digit) that are used to identify a malfunction on the CLX in Reading mode. The messages are output on the auxiliary interface only. Exception: ST = 3 (device error), which is also output on the host interface. The error messages can be displayed in the Terminal emulator in the "CLV-Setup" program.

Error status

Identifier output with the reading result by the CLX for errors that were diagnosed while the bar code was being read. The entry for the host interface is made in the "Code-Info/Separator" block of the ⇨ data output string and must be enabled using the parameters (for the CLX disabled by default).

Focus position

Distance of the focal point of the emitted laser beam in front of the reading window. Can be varied using the optical components in the CLX. Creates a distance-specific depth of field (DOF) in which he bar code can be detected.

Functional interfaces

Digital switching inputs and outputs on the CLX.

Good Read

The CLX successfully detected a bar code or the required number of bar codes specified by the evaluation parameters during the ⇨ reading pulse.

Header

Data block in the reading result on the ⇨ host interface. Used as a header in the ⇨ data output string for the subsequent data content of the bar codes. Contains up to 10 elements, consisting of reading diagnosis data and/or constants (control characters, letters, digits), depending on the configuration. The "Header" block is empty in the default setting of the CLX.

Host interface

Main data interface on the CLX with configurable data output format. Used to output the ⇨ reading result in telegram form to the host/PLC. Used as gateway in the CAN Scanner Network. Can be physically switched to RS 232 or RS 422/485. It supports various transmission protocols.

Increment management

Used in certain applications to separate bar codes with identical contents that move during the reading procedure and assign them to the objects.

Master/slave configuration

Special arrangement for connecting up to max. 10 CLX to one reading station (e. g. left/right read) using the CAN interface. Thanks to the master, the entire network appears as one device to the host.

Multiple read

Variable number of reading operations that must provide identical reading results (data content) of the same bar code before the CLX outputs the result.

No Read

Special, parameterizable data block as a substitute for bar codes, which were expected but not detected, in the data output string on the host interface for ⇨ No Read. Comprises a variable combination of the error string and the ⇨ "Code-Info/Separator" block.

No Read format

Special, parameterizable data block as a substitute for bar codes, which were expected but not detected, in the data output string on the host interface for ⇨ No Read. Comprises a variable combination of the error string and the ⇨ separator.

Object polling

The CLX automatically detects a current object entering or leaving the reading field without any external sensors.

Parameter set

Data record used to initialize and activate the functions implemented in the CLX. With downloading and uploading the parameter set is transferred form CLV-Setup to the CLX or from the CLX to CLV-Setup.

Parameter memory, external

Optional accessory integrated in a connector cover. Enables devices to be conveniently replaced by storing a copy of the CLX parameter set (EEPROM). The replacement device then accesses this parameter set directly and does not have to be configured manually.

Percentage evaluation

Special operating mode in which the quality of the reads (not those of the barcodes, however) is assessed statistically. The bar codes must be stationary. The CLX carries out 100 scans and evaluates the reading quality. It then outputs the reading results on the ⇨ auxiliary interface every 2 s together with the reading diagnosis data.

Plain text

Legible form of a CLX message. The CLX outputs special messages in coded form, e. g. the result of the self-test is represented as three digits.

Reading angle (RA value)

Position of the first dark bar in a detected bar code along the ⇨ scan line. Calculated by the CLX for each scan and can be used, for example, to separate bar codes with identical data contents. The active evaluation range in the scan line can be restricted for ⇨ decoding purposes by specifying the maximum and minimum reading angle value for the application.

Reading diagnosis data

Data directly derived from the reading procedure by the CLX. This data enables the quality of the read to be assessed. The data is always output on the ⇨ auxiliary interface together with the reading result. Only output on the host interface if enabled on the DATA STRING tab in the "CLV-Setup" program (for the CLX disabled by default).

10-44

8009237/RB47/2007-08-03

Reading field height

Length of the ⇨ scan line that is available for detecting the bar code in the reading plane.

Reading interval

Timeslot in which the CLX activates the laser diode and attempts to detect valid bar codes from the information read. The reading interval may be shorter than the external reading pulse, depending on the selected output mode for the reading result.

Reading pulse

Clock pulse applied externally to the CLX to trigger the internal ⇨ reading interval. Can be supplied by a photoelectric reflex switch or a command from the host on the serial interface.

Reading range (DOF)

Depth of field about the focal point of the laser beam on two sides. The extent of the reading range depends on the resolution and reading distance.

Reading result

Electronic representation of the data content of the read bar code together with the ⇨ reading diagnosis data in one ⇨ data output string that is generated after the reading pulse has elapsed. The reading result on the auxiliary interface has a fixed format (content and output format); the reading result on the host interface can be configured separately for Good Reads and No Reads. Special characters can also be added if necessary.

Result status output

Function of the four "Result 1" to "Result 4" switching outputs in Reading mode. Signals the status of the reading result without indicating its contents (e. g. Good Read). You can assign a status to each output on the DEVICE FUNCTION tab in CLX. The "Read Result" LED is linked to the "Result 2" output.

Scan line

See CLX490 Compact OMNI Scanner.

Sending point

Point at which the reading result is output with respect to the start of the ⇨ reading pulse and the internal ⇨ reading interval.

SMART decoder

Specially developed ⇨ decoder for reading bar codes with an extremely small code height and for poor-quality or contaminated code prints.

Specification diagrams

Diagrams for reading the resolution-specific depth of field (DOF) for specific focus positions.

Splitter

Data block in the reading result of the ⇨ host interface. Used to separate the data content of the bar codes. Contains up to 5 elements, consisting of constants (control characters, letters, digits), depending on the configuration. The "Splitter" block is empty in the default setting of the CLX.

8009237/RB47/2007-08-03   © SICK AG · Division Auto Ident · Germany ·   **10-45**

Standard decoder

Tried-and-tested ⇨ decoder from the CLV product family. Suitable for applications with an adequate code height, limited tilt, and high-quality code prints.

Storage in the CLX

The application-specific ⇨ parameter set can be stored temporarily or permanently in the CLX. If it is stored temporarily in the RAM, it is lost as soon as the power supply is switched off. Parameter sets that are stored permanently are transferred to the EEPROM in the CLX and remain active as the current data record when the power supply is switched off. The default setting is not affected by this and is stored in a read-only memory (ROM).

Switching sequence

Focus control function for event-controlled switching. Sequence of focus position settings with associated depths of field. The numbers of the active ⇨ distance configurations are entered at the required position in the assignment table for this purpose.

System messages

Messages ⇨ in plain text used to output the operating status of the CLX. The messages are output on the auxiliary interface only and can be displayed in extended mode in the TERMINAL EMULATOR of the "CLV-Setup" program.

Teach-in

Method of programming the information required to adjust the CLX to the reading application in Parameterization mode. Example: teaching in the background for the Autofocus function, also known as a ⇨ distance profile.

Terminator

Data block in the reading result on the ⇨ host interface. Used to terminate the data content of the bar code. Contains up to 10 elements, consisting of reading diagnosis data and/or constants (control characters, letters, digits), depending on the configuration. The "Terminator" block is empty in the default setting of the CLX.

Upload

Method of transferring the ⇨ parameter set from the CLX to the PC ⇨ using the CLV-Setup program. CLV-Setup either transfers a complete copy of the current parameter set from the memory (RAM) of the CLX (UPLOAD TO CLV) or just the parameter previously processed using the context menu of the right mouse button (UPLOAD PARAMETER) or all parameters of the displayed tab (UPLOAD PARAMETERS OF THIS VIEW). Displays the current parameter values on the tabs. Prerequisite for modifying the current parameter set.

User interface

Windows-based PC software "CLV-Setup" for operating and configuring the CLX.

10.16 EC Declaration of Conformity

Fig. 10-18 shows the scaled down copy of the EC Declaration of Conformity (page 1).

➢ The complete EC Declaration of Conformity with the listing of the device versions and the fullfilled standards can be requested from SICK AG.

SICK

EC Declaration of conformity

Ident-No. : 9053454 O639

The undersigned, representing the following manufacturer

SICK AG
Nimburger Straße 11
79276 Reute
Deutschland

herewith declares that the product

CLV49. / CLX49.

is in conformity with the provisions of the following EC directive(s) (including all applicable amendments), and that the standards and/or technical specifications referenced in page 2 have been applied.

(place),..Reute.. (date),..2004-07-21..............

ppa. Pierenkemper
(Manager Development
Division Auto Ident)

ppa. Walter
(Manager Production
Division Auto Ident)

Fig. 10-18: Reproduction of the declaration of conformity (Page 1, reduced in size)

Notes:
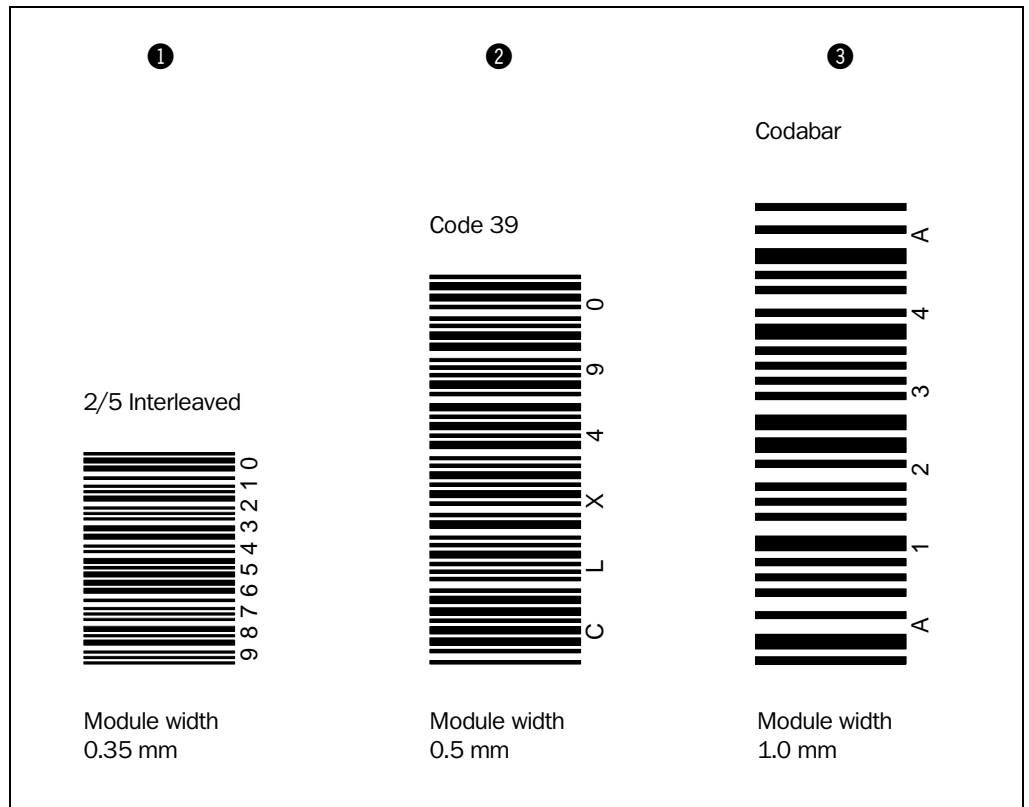
10.17 Index

10.18 Bar code example

Fig. 10-19: Scannable bar codes with various module widths (print ratio 2:1)

Australia
Phone +61 3 9497 4100
       1800 33 48 02 – tollfree
E-Mail sales@sick.com.au

Belgium/Luxembourg
Phone +32 (0)2 466 55 66
E-Mail info@sick.be

Brasil
Phone +55 11 3215-4900
E-Mail sac@sick.com.br

Ceská Republika
Phone +420 2 57 91 18 50
E-Mail sick@sick.cz

China
Phone +852-2763 6966
E-Mail ghk@sick.com.hk

Danmark
Phone +45 45 82 64 00
E-Mail sick@sick.dk

Deutschland
Phone +49 211 5301-270
E-Mail info@sick.de

España
Phone +34 93 480 31 00
E-Mail info@sick.es

France
Phone +33 1 64 62 35 00
E-Mail info@sick.fr

Great Britain
Phone +44 (0)1727 831121
E-Mail info@sick.co.uk

India
Phone +91–22–2822 7084
E-Mail info@sick-india.com

Italia
Phone +39 02 27 43 41
E-Mail info@sick.it

Japan
Phone +81 (0)3 3358 1341
E-Mail support@sick.jp

Nederlands
Phone +31 (0)30 229 25 44
E-Mail info@sick.nl

Norge
Phone +47 67 81 50 00
E-Mail austefjord@sick.no

Österreich
Phone +43 (0)22 36 62 28 8-0
E-Mail office@sick.at

Polska
Phone +48 22 837 40 50
E-Mail info@sick.pl

Republic of Korea
Phone +82-2 786 6321/4
E-Mail kang@sickkorea.net

Republika Slowenija
Phone +386 (0)1-47 69 990
E-Mail office@sick.si

România
Phone +40 356 171 120
E-Mail office@sick.ro

Russia
Phone +7 495 775 05 34
E-Mail denis.kesaev@sick-
       automation.ru

Schweiz
Phone +41 41 619 29 39
E-Mail contact@sick.ch

Singapore
Phone +65 6744 3732
E-Mail admin@sicksgp.com.sg

Suomi
Phone +358-9-25 15 800
E-Mail sick@sick.fi

Sverige
Phone +46 10 110 10 00
E-Mail info@sick.se

Taiwan
Phone +886 2 2365-6292
E-Mail sickgrc@ms6.hinet.net

Türkiye
Phone +90 216 587 74 00
E-Mail info@sick.com.tr

USA/Canada/México
Phone +1(952) 941-6780
       1 800-325-7425 – tollfree
E-Mail info@sickusa.com

More representatives and agencies
in all major industrial nations at
www.sick.com

SICK
Sensor Intelligence.

SICK AG | Waldkirch | Germany | www.sick.com