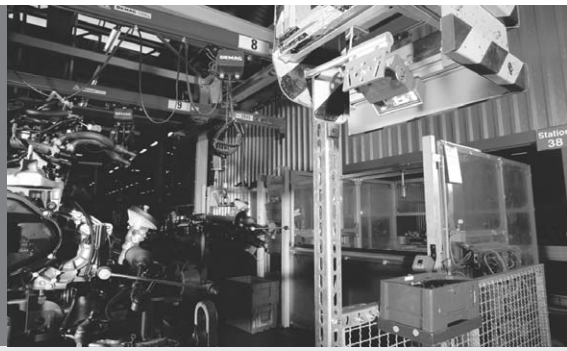
OPERATING INSTRUCTIONS



CLV45x
Bar Code Scanner

Advanced Line

SICK
Sensor Intelligence.

Described software versions

Software/Tool	Function	Version
CLV 45x	Firmware	V 3.03 K949
CLV-Setup	User interface (Windows-based)	V 3.2 L547
CLV-Setup Help	Online help (HTML)	From V 1.1
I-ViewPro™	HTML browser (offline)	From V 2.38

CLV 45x bar code scanner

Quick Finder

- **What is delivered with the device**
  - *Chapter 3.1.1 Scope of delivery, Page 3-1*

- **Caution!**
  - *Chapter 2 Safety information, Page 2-1*

- **Mounting the device at the reading station**
  - *Chapter 4 Installation, Page 4-1*

- **Connecting the device**
  - *Chapter 5 Electrical installation, Page 5-1*

- **Overview of the device and its functions**
  - *Chapter 3 Product description, Page 3-1*
  - *Chapter 6.2 Default setting, Page 6-1*
  - *Chapter 6.5 Operating modes and output of the read result, Page 6-18*
  - *Chapter 9 Technical data, Page 9-1*

- **Starting the device with the default settings**
  - *Chapter 6.3 Quick-Start, Page 6-3*

- **Installing the “CLV-Setup“ user software on the PC**
  - *Chapter 10.4 Installing and operating the "CLV-Setup" PC software, Page 10-20*

- **Adapting the device to the reading application**
  - *Chapter 6.4 Configuration (parameterizing), Page 6-4*

- **Help in cases of problems**
  - *Chapter 8 Troubleshooting, Page 8-1*

- **Finding information**
  - *Table of contents, Page E-5*
  - *Chapter 10.16 Index, Page 10-66*

Installation steps (overview)

Reading trigger via “Sensor 1“ switching input (default setting)

1. Check whether the delivery is complete.
2. Install the CLV in the reading station and align to the object with bar code.
3. Install the AMV/S 40 connection module and cover the terminal designations in the connection area.
4. Connect the CLV to the AMV/S 40 connection module.
5. Install the reading-pulse sensor.
6. Connect the reading-pulse sensor to the "Sensor 1" switching input in the AMV/S 40.
7. Install the sensor for the distance detection.
8. Connect the distance sensor to the "Sensor 2" switching input in the AMV/S 40.
9. Connect the host to the "Host interface" in the AMV/S 40.
   Adapt the AMV/S 40 to the host interface type of the CLV.
10. Switch on the supply voltage of the AMV/S 40.
    After the CLV has been started the "Device Ready" LED lights up. The beeper signals that Reading mode has been started by means of two consecutive sounds.
    Line scanner with oscillating mirror:
    In reading mode the CLV deflects the scan line in the default setting with a frequency of 1 Hz around the position CW = 50 at a maximum angle of ±20°.
11. Switch on the PC and start Windows™ (minimum requirement Windows 95™).
12. Install the supplied "CLV-Setup" user software, "CLV-Setup Help" online help and, if required, "I-ViewPro™" HTML browser from the CD-ROM on the PC.
13. Connect the PC to the terminal interface of the CLV.
    To this purpose connect the PC via the RS-232 data connection cable to the "Service" plug in the AMV/S 40.
14. Start the "CLV-Setup" software.
    CLV-Setup starts the communication with the CLV and copies the parameter record of the CLV by means of an upload. The parameter record is displayed in the tab cards.
15. Carry out a test read run with a test bar code specimen (pulse the CLV correspondingly). Display the read result in the terminal emulator of CLV-Setup.
16. Configure the CLV for the application by means of the setting options on the tab cards in CLV-Setup.
    Copy the modified parameter record temporarily to the CLV per download.
    Do not switch off the supply voltage of the AMV/S 40 (of the CLV).
17. Test the application under real conditions.
18. Check the correct data transfer of the CLV to the host.
19. If necessary, correct and optimize the set parameter values.
    Copy the parameter record **permanently** to the CLV per download.
20. Save the parameter record as a configuration file "*.scl" in CLV-Setup!

The CLV is ready to operate with the **application-specific** setting.

Table of contents

Contents

Abbreviations used

DC **D**istance **C**onfiguration

AMV/S Connection module with distributor (signal)/with additional power supply

BMV/S Bus connection module with distributor (signal)/with additional power supply

CAN **C**ontroller **A**rea **N**etwork (standard field bus system with message-orientated data exchange protocol)

CLV Code reader V principle. The bar code scanner CLV 45x is designated for all the types simply as a "CLV", except at text positions where a differentiation is required.

DOF **D**epth **O**f **F**ield

EEPROM **E**lectrically **E**rasable **P**rogrammable **R**ead **O**nly **M**emory

HTML **H**yper **T**ext **M**arkup **L**anguage (page description language in Internet)

LED **L**ight **E**mitting **D**iode

RAM **R**andom **A**ccess **M**emory

ROM **R**ead **O**nly **M**emory

RTF **R**ich **T**ext **F**ormat (standardized document format with format descriptions)

PLC **P**rogrammable **L**ogic **C**ontroller

SMART **S**ICK **M**odular **A**dvanced **R**ecognition **T**echnology

Tables

Figures

Figures and tables

1 Notes on this document

1.1 Function

This document instructs you on using the bar code scanner

- CLV 450 with dynamic focal position adjustment
- CLV 451 with dynamic focal position adjustment, optimized on 0.5 mm module width

in the variants

- Line scanner
- Line scanner with oscillating mirror

The document contains information on

- Device installation and electrical installation
- Startup
- Operation and configuration (parameterization)
- Maintenance
- Device replacement with importing of the parameter record
- Special applications and processes

The bar code scanners will all simply be called "CLV" below, except in such text passages where a differentiation is required.

1.2 Target audience

Target audience for this document are persons with the following activities:

1.2.1 Installation, electrical installation, maintenance, device 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 for the installation, electrical installation and startup of the CLV with the **default setting in our works**.

All actions are described step-by-step.

The configuration of the CLV for the **application-specific read situation** is carried out with the Windows-oriented "CLV-Setup" PC software and the "CLV Assistant". The "CLV-Setup Help" online help system is available as an additional help. Installation of the software and use of the user interface are described in the appendix.

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

1.4 Symbols used

Some information in this documentation is emphasized in order to facilitate rapid access to this information:

Warning!

A "Warning" protects persons against injuries or the bar code scanner against serious damage.

➢ Always read warnings carefully and observe them exactly.

Note A "Note" informs on exceptional features.

Explanation An explanation provides background information on technical correlations.

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

Hint A hint explains the setting possibilities in the user interface of the CLV-Setup.

Default setting Marks a section in which the values of the default setting of our works are listed.

SCANNING FREQUENCY This font characterizes a term used in the user interface of the CLV-Setup.

 A symbol refers to a command button in the user interface of the CLV-Setup.

"Host receive fault" This font characterizes messages which the CLV outputs via the terminal interface.

 This symbol characterizes a section in which the steps for using the user interface of the CLV-Setup are described.

 This symbol characterizes a section in which the steps for using the profile programming are described.

 This symbol refers to supplementary technical documentation.

➢ Here you have to do something. This symbol characterizes single-step operating instructions. Multiple-step operating instructions are characterized by sequential numbers.

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

2 Safety information

2.1 Authorized users

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

The following qualifications are required for the various activities:

2.1.1 Installation and maintenance

- Basic practical technical training
- Knowledge of the common safety instructions at the workplace

2.1.2 Electrical installation and replacing devices

- Practical electrical training
- Knowledge of the common electrical safety instructions
- Knowledge of the operation and handling of the devices of the respective application (e. g. transport unit)

2.1.3 Startup, operation and configuration

- Knowledge of the operation and handling of the devices of the respective application (e. g. transport unit)
- Knowledge of the software and hardware environment of the respective application (e. g. transport unit)
- A basic knowledge of Windows 95™/98™, Windows NT™ or Windows XP™
- Basic knowledge of a HTML browser, for example, Netscape Navigator™
- Basic knowledge of data transmission
- Basic knowledge of bar code technology

2.2 Intended use

The CLV detects and decodes bar codes automatically. It is installed in a reading station and reads, for example, bar codes on objects of a conveyor belt.

The CLV transfers the data contents of the decoded bar code via the host interface to a host for further processing.

The user forfeits any warranty claims against SICK AG in case of any other use as well as in case of changes to the device, also during device installation and electrical installation.

2.3 General safety instructions and protective measures

➢ Read the general safety instructions thoroughly and observe them strictly at all activities at the CLV. Also observe the warnings before operating instructions in the individual chapters of this document.

WARNING

Danger of injury through electrical current!

The AM**S** 40 connection module (accessory) for the CLV is connected to 230 V 50 Hz or 115 V AC 50/60 Hz supply voltage, depending on the type.

➢ Observe the common safety regulations when working on electrical installations.

WARNING

Laser radiation may cause damage to your eyes!

The CLV operates with a Class 2 red-light laser. The retina can be damaged if you look too long into the laser beam.

➢ Never look directly into the laser beam (comparable with sunlight).

➢ Do not point the laser beam at persons.

➢ When mounting and aligning the CLV take the reflection of the laser beam against reflecting surfaces into account.

➢ Do not open the housing.
(Opening does not interrupt activation of the laser diode by the reading pulsing.)

➢ Observe the laser protection specifications in accordance with DIN EN 60825-1 (latest version).

Laser performance

The laser operates with a wavelength of $\lambda = 650$ nm (visible red light). The power output of the laser beam amounts to a max. of 3.5 mW at the reading window.
The emitted radiation is not dangerous to the human skin.

Laser warning labels

The laser warning labels relevant for Europe (*Fig. 2-1*) are located at the following points at the CLV:

- At the line scanner the British/US version of the laser warning symbol and the laser warning are located next to the front-end reading window on the side surface (refer to *Fig. 3-1, Page 3-3*).
- At the line scanner with oscillating mirror the British/US version of the laser warning symbol and the laser warning are located on the side surface opposite the reading window (refer to *Fig. 3-2, Page 3-4*).

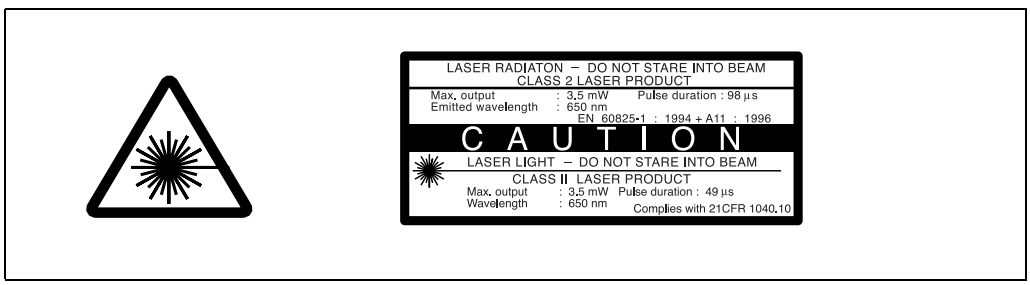


Fig. 2-1: Laser warning label attached to the CLV (valid for Europe)

Note The scope of delivery includes a set of laser warnings in German/US English and French/US English. These can be stuck over the British/US warning.

If the CLV is installed in a machine/casing in such a manner that the laser warning labels of the device is concealed, further warning labels (not included in the scope of delivery) must be attached on the machine next to the aperture of the laser beam!

Internal protective circuits

The CLV has monitoring circuits which shut off the laser diode when irregularities occur in the beam generation.

The switching on and off of the laser diode during the reading process is controlled by the reading pulsing (pulse source).

In the pulsing types "Sensor input" and "Serial interface" a timer (laser timeout) switches off the laser diode automatically 10 min (default setting) after the beginning of a lasting reading pulse during reading mode. However it does not terminate the reading pulse. CLV outputs the following message via the terminal interface:
"Laser safety timeout"
The reading pulse has to be terminated by means of a corresponding pulse signal. The next reading pulse re-activates the laser diode.

The laser timeout can be set in the range of 1 min ... 25 h or de-activated (refer to *Table 6-7, Page 6-12*).

The laser diode is always active in reading mode in the operating modes "Percentage evaluation", "Adjusting mode", "Show CP limits" and "Auto setup" as well as in the "free-running" pulsing type.

2.4 Quick Stop and Quick Restart

2.4.1 Switching off the CLV

➢ Switch off the supply voltage or pull off the cable plug of the CLV from the connection module.

At most the following may be lost:

- The application-specific parameter record, if it was only saved **temporarily** in the CLV
- The last reading result
- Day operating data
  (operating hours counter, trigger count, number of good reads, maximum duration trigger, minimum duration trigger, average identification quality)

2.4.2 Switching on the CLV again

➢ Switch on the supply voltage or pin up again the cable plug of the CLV to the connection module.
The CLV restarts operation with the parameter record **last saved permanently** and re-sets the day operating data.

2.5 Environmental information

The CLV is designed so that it harms the environment as little as possible. It does not have any materials using silicone and is therefore not a source of faults for, for example, coating wetting in paint shops.

2.5.1 Power requirement

The power requirement is low.

- The line scanner consumes a max. of 6 W
- The line scanner with oscillating mirror consumes a max. of 7.2 W

The values each correspond to operation with open-circuited switching outputs.

2.5.2 Disposal after final removal from service

Dispose of unusable or irreparable devices in accordance with the respective state regulations on waste disposal in a manner compatible with the environment. The design of the CLV allows it to be separated into recyclable secondary raw materials and hazardous waste (electronic scrap). Refer to *Chapter 7.3 Disposal, Page 7-2*.

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

3 Product description

3.1 Design

3.1.1 Scope of delivery

The **packaging** of the CLV contains the following:

- An information sheet (Notes on device) with electrical wiring diagram and Quick-Start
- An additional set of laser warning lables (self-adhesive) for Class 2 in German/US English and French/US English
- A lable with terminal designations for sticking over the connection designations of the mother board of the AMV/S 40 connection module

Depending on the **number of ordered devices** one or more **technical documentation sets**, consisting of:

- These CLV 45x operating instructions in English and German
- A CD-ROM containing the "CLV-Setup" software for Windows™, the "CLV-Setup Help" online help system and the "I-ViewPro™" HTML browser
- A foldable card with 12 printed Profile bar codes

Chapter 10.11 Available accessories, Page 10-51 provides an overview of the available mounting accessories, connection modules, cables and plug-and-socket connections as well as sensors for reading pulse generation and detection of the object distance.

3.1.2 Device variants

The CLV is available in the following variants:

Type (red light)	Order No.	Scanning process	Reading window
CLV 450-0010	1 018 556	Line scanner	On front
CLV 450-6010	1 019 218	Line scanner with oscillating mirror	Lateral
CLV 451-0010	1 019 522	Line scanner, optimized on 0.5 mm module width	On front
CLV 451-6010	1 019 524	Line scanner with oscillating mirror, optimized on 0.5 mm module width	Lateral

Table 3-1: Variants of the CLV 45x

3.1.3 System requirements

The following are required to start up and operate the CLV:

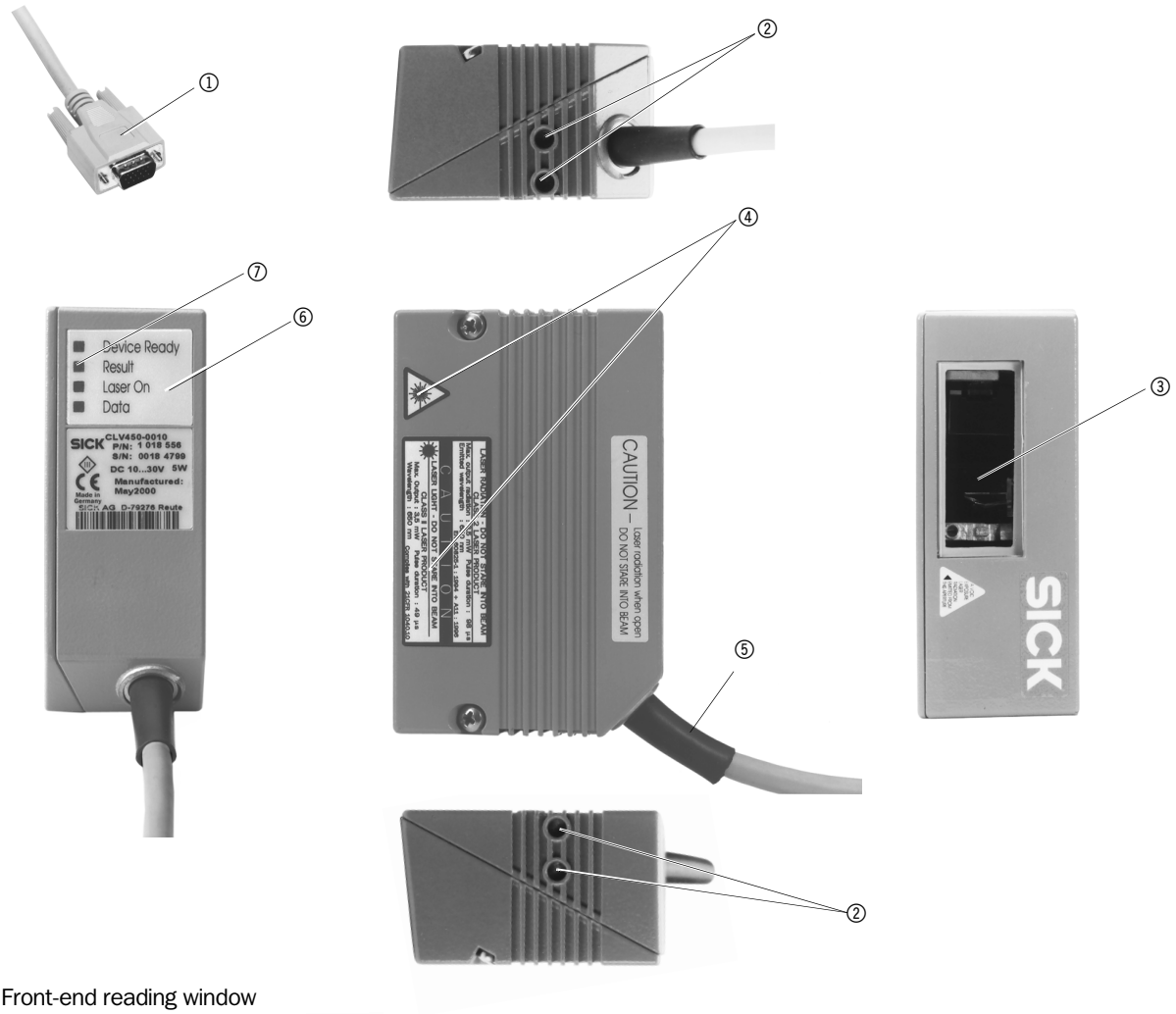
1. A SICK connection module for power supply and interconnection of the data and function interfaces.
   Available types:
   - AMV 40-011 (No. 1 017 132) for 24 V DC ±20 %, enclosure rating max. IP 54
   - AMS 40-013 (No. 1 017 135) for 230 V AC 50 Hz/24 V DC, enclosure rating max. IP 54
   - AMS 40-012 (No. 1 017 136) for 115 V AC 50/60 Hz/24 V DC, enclosure rating max. IP 54
   - AMV 100-011 (No. 6 021 105) for 10 ... 30 V DC , enclosure rating max. IP 65
   - AMV 200-011 (No. 6 021 106) for 10 ... 30 V DC, enclosure rating max. IP 65

– or –

Alternatively a non-SICK supply system device with an output voltage of 10 ... 30 V DC in accordance with IEC 742 (functional extra-low voltage) and at least **10 W** power output. The connection cable No. 6 010 137 with 15-pin D-Sub-HD socket and open cable end to connect the CLV to the supply system device.

2. Following operating voltages/power output
   - AM**V** 40-011: 24 V DC ±20 %, according to IEC 742, min. 10 W
   - AM**S** 40-013: 230 V AC ±10 % 50 Hz
   - AM**S** 40-012: 115 V AC ±10 % 50/60 Hz
   - AM**V** 100-011: 10 ... 30 V DC according to IEC 742
   - AM**V** 200-011: 10 ... 30 V DC according to IEC 742
3. In the case of external reading pulsing via the "Sensor 1" switching input: A suitable reading pulse sensor for signaling an object with bar code, for example, a photoelectric reflex switch.
4. In the case of detection of the object distance via the "Sensor 2" switching input: A suitable sensor for 2-stage focal position changeover, for example a photoelectric reflex switch.
5. A higher-level computer (host) with a data interface of type RS 422/485 or RS 232.
6. An optional interface converter No. 2 020 825 for installation in the AMV/S 40 connection module in order to connect the CLV to a 20 mA data interface.
7. A PC (al least 80486, 66 MHz, 16 MB RAM, CD-ROM drive, serial interface, mouse (recommended)) with Windows 95™/98™, Windows NT™ or Windows XP™.
8. An RS-232 data connection cable with two 9-pin D-Sub sockets for connecting the PC to the terminal interface of the CLV in the AMV/S 40 connection module, e. g. No. 2 014 054. Pin 2 (RxD) and Pin 3 (TxD) are transposed.
9. An HTML browser for using the "CLV-Setup Help" online help system, e. g. Netscape Navigator™ or the enclosed browser I-ViewPro™ (refer to *Chapter 3.1.1 Scope of delivery, Page 3-1*).
10. For connection of the CLV to the Interbus S, the Profibus DP, DeviceNet or the Ethernet: the corresponding BMV/BMH 10 Bus Connection Module (on request).
11. For connection of the CLV to the CAN Scanner Network: the Operating Instructions “Application of the CAN interface“ (no. 8 009 180, English edition)

3.1.4 Design line scanner



Front-end reading window

Legend:

① D-Sub HD cable plug, 15-pin

② Blind hole thread, M 5, 5 mm deep

③ Reading window

④ Laser warning lables

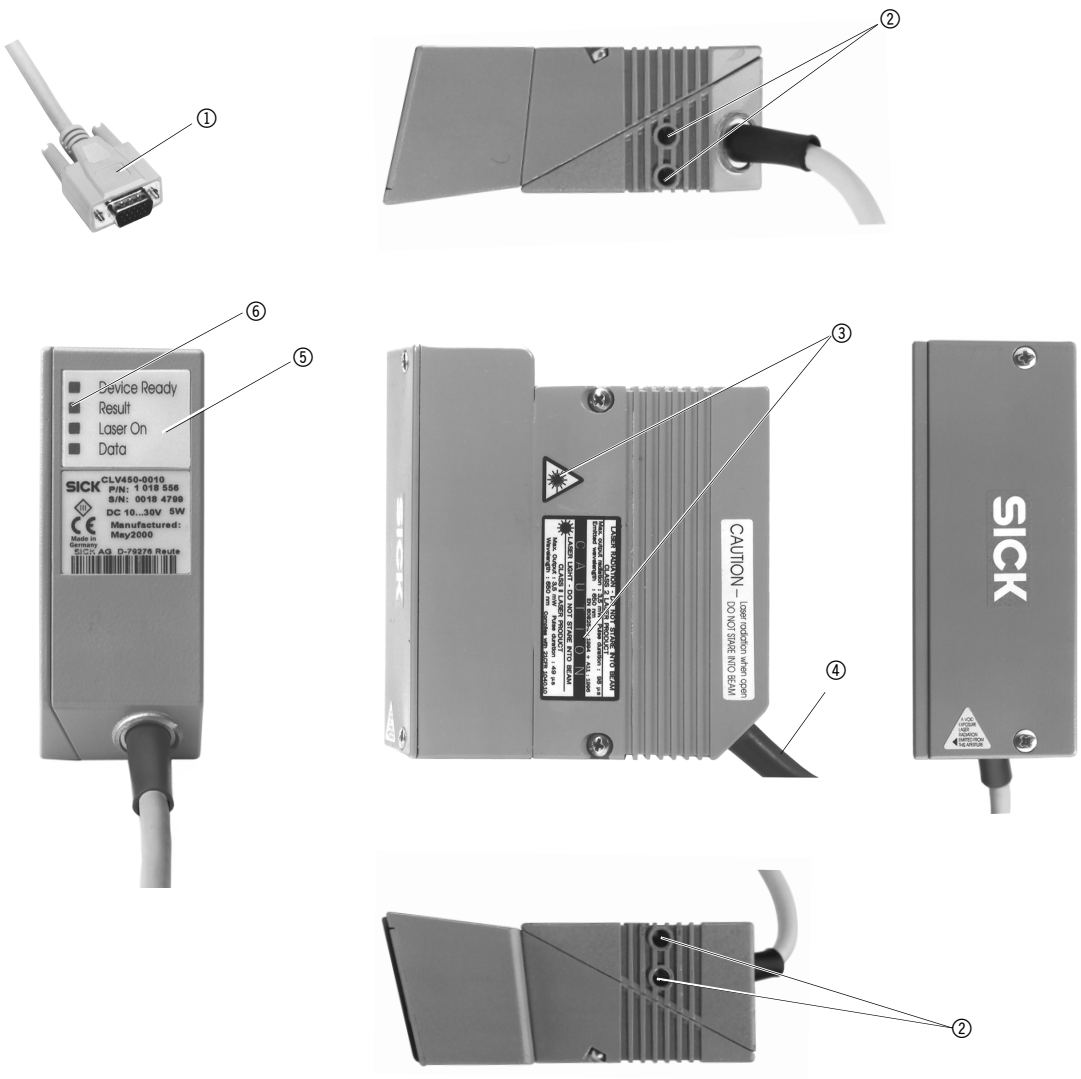
⑤ Connection cable

⑥ Sound opening of the beepers (concealed)

⑦ LEDs (status indicators)

Fig. 3-1: Design of the line scanner CLV 45x

3.1.5 Design line scanner with oscillating mirror



Side-end reading window

Legend:

① D-Sub HD cable plug, 15-pin

② Blind hole thread, M 5, 5 mm deep

③ Laser warning lables

④ Connection cable

⑤ Sound opening of the beepers (concealed)

⑥ LEDs (status indicators)

⑦ Integrated oscillating mirror

⑧ Reading window

Fig. 3-2: Design of the line scanner with oscillating mirror CLV 45x

3.2 Working method of the device

The CLV detects bar codes by means of a scan line and decodes them. The CLV transmits the data via the main data interface (serial host interface) to a host/PC for further processing.

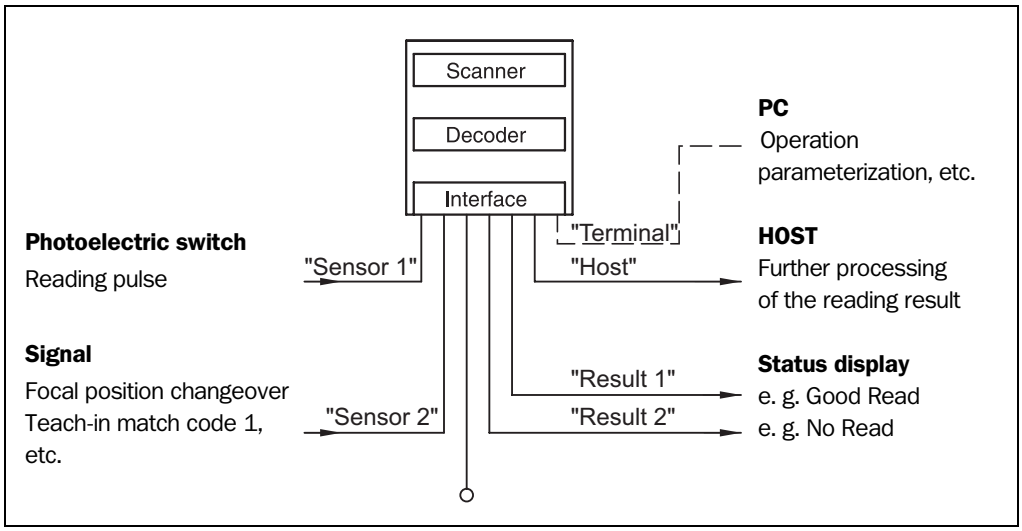


Fig. 3-3: Block diagram: Functions of the CLV

The CLV provides two decoders for decoding:

- The SMART decoder (**S**ICK **M**odular **A**dvanced **R**ecognition **T**echnology) for decoding bar codes with a small "aspect ratio" (ratio of the code height to the code length), for bar codes with damaged or soiled printing image as well as for reading bar codes under a strong tilt (azimuth angle)
- The proven standard decoder of the CLV series

The CLV derives useful data for diagnostics from the reading processes, which can also be transferred to the host. In addition it carries retrievable operating data. The quality of the reading can be checked in the "Percentage evaluation" operating mode.

The CLV requires suitable triggering in order to start a reading process when there is an object in the reading area. This results in a time window ("reading interval") for the reading process being opened in the CLV. In the default setting triggering is carried out by means of an external reading pulse sensor. Alternative trigger sources are free-running operation or a command via the host interface.

Four LED status displays inform optically on the current operating state.
A beeper (buzzer) signals the status of the read result acoustically. In the default setting the Good Read function is selected to this purpose.

In the case of external triggering by a sensor the "Sensor 1" switching input signals the CLV when it is to start a reading. The "Sensor 2" switching input is used to change over the focal position. It can be used alternatively e. g. for the teach-in of a match code. The switching outputs "Result 1" and "Result 2" can have various output functions of the result status assigned to them and control external devices, such as a PLC.

The CLV is operated and configured via the auxiliary data interface (serial terminal interface) by means of the user interface of the "CLV-Setup" PC software or via the host interface/ terminal interface by means of command strings.

System, warning and error messages provide support in setting up and searching for errors during starting up and reading operation.

3.2.1 Changeable focal position

The CLV 45x can change its focal position dynamically and thus cover a large reading range. To this purpose a max. of 8 reading ranges can be defined internally as a distance configuration and can be approached during reading mode by the optics in a random order (*Fig. 3-4*).

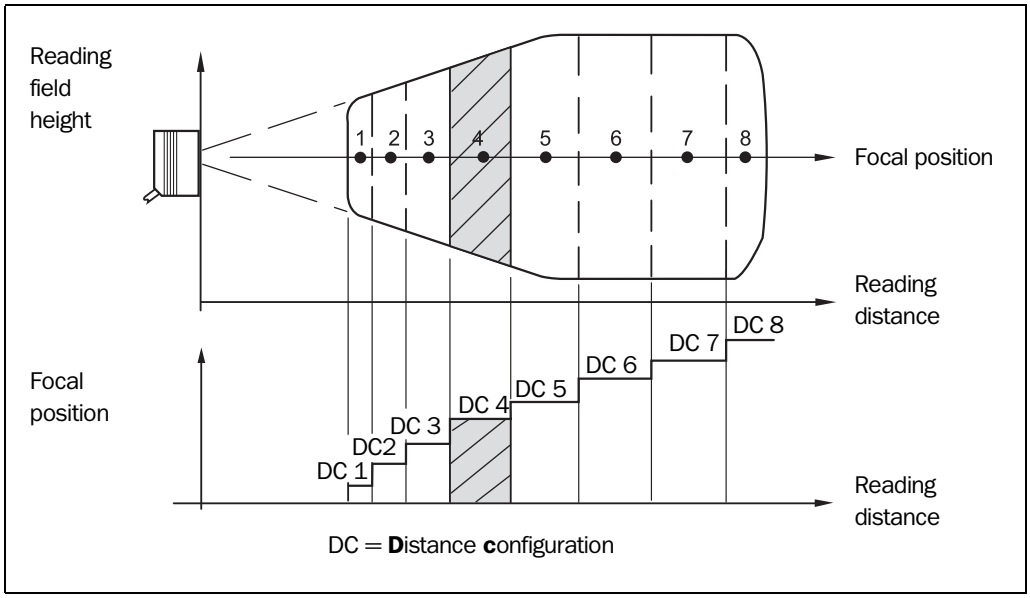


Fig. 3-4: Focal position changeover: Division of the overall reading range into distance configurations

The changeover is carried out on the basis of the changing object distance (when reading from above: object height detection). The trigger source for the changeover with a maximum of 2 stages is a signal at the "Sensor 2" switching input. For the changeover with a maximum of 8 stages a command at the host interface interface or the integrated timer (e. g. for search runs). At the line scanner with oscillating mirror additionally the oscillating mirror inversion points of the two-sided displacement. The distance configurations are assigned to the changeover sequence by means of a programmable assignment table.

3.2.2 Variants of the scanning process

Line scanner

Generates one scan line. The reading area height (for evaluating the usable length of the scan line) depends on the reading distance because of the V principle of the beam deflection.

Line scanner with oscillating mirror

The oscillating mirror additionally deflects the scan line vertically to the scanning direction to both sides at a low oscillating frequency. This means that the CLV can also scan larger areas or ranges for bar codes. The reading field height (for evaluating the usable length of the scan line) depends on the reading distance because of the V principle of the beam deflection.

In addition to parking (fixed position) and the simple deflection with a maximum deflection width, optimized function runs of the oscillating mirror are also possible:

- Oscillation with variable deflection per distance configuration
- One-Shot: Single defined deflection per reading pulse (forward and return).

For the case of reading without a transport movement of the object *Fig. 3-5* shows an example of the triggering of the focal position changeover by means of the internal timer or of the oscillation mirror inversion points ("search run") at 6 distance configurations.

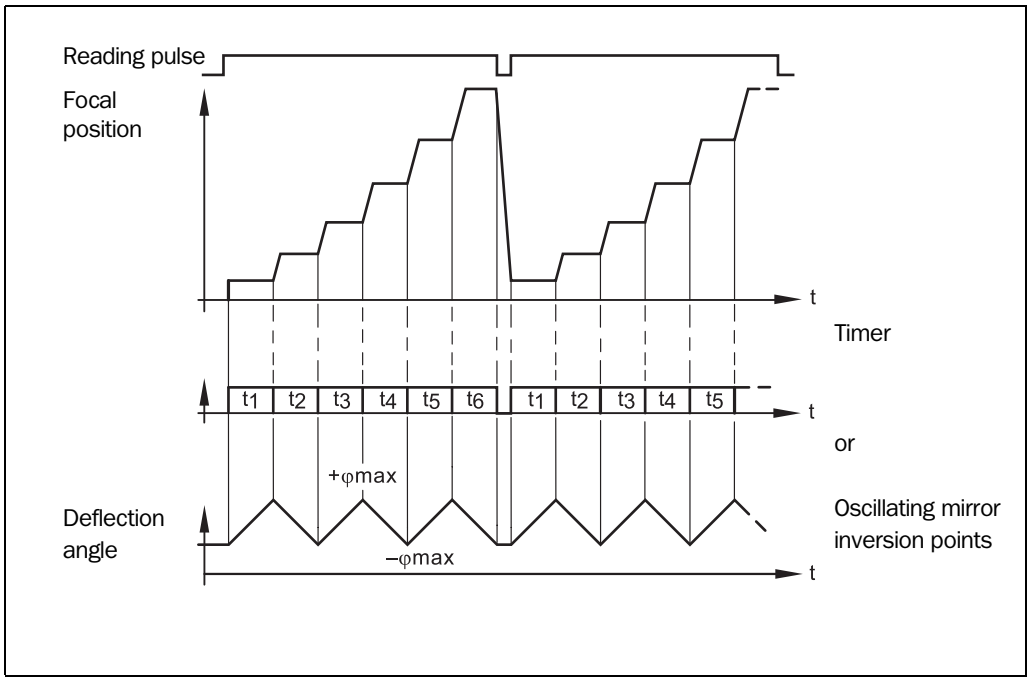


Fig. 3-5: Oscillating mirror: Example of the focal position changeover in the search run

3.3 Display and operating elements

3.3.1 Operating elements

The CLV is operated and configured via the terminal interface by means of the user interface of the "CLV-Setup" PC software or via the host interface/terminal interface by means of command strings. Manifold parameterization options allow the adaptation to highly different applications.

The following can also be set

- Configuration of the code types to be read
- Reading, evaluation and output properties
- Communication parameters of the host interface
- Structure of the data output string of the host interface for “Good Read“ and “No Read“
- Function of the terminal interface

Chapter 10.4 Installing and operating the "CLV-Setup" PC software, Page 10-20 describes the installation of the "CLV-Setup" PC software and the use of the user interface. The configuration (parameterization) is explained in *Chapter 6.4 Configuration (parameterizing), Page 6-4*.

3.3.2 Function of the LEDs

Four LEDs signal the operating state, the activity of the laser diode, the status of the read result and the data transfer to the host interface. The LEDs (*Fig. 3-6, Page 3-8*) are positioned on the rear narrow side of the device. *Table 3-2* lists the meaning of the LEDs in the various operating modes/functions.

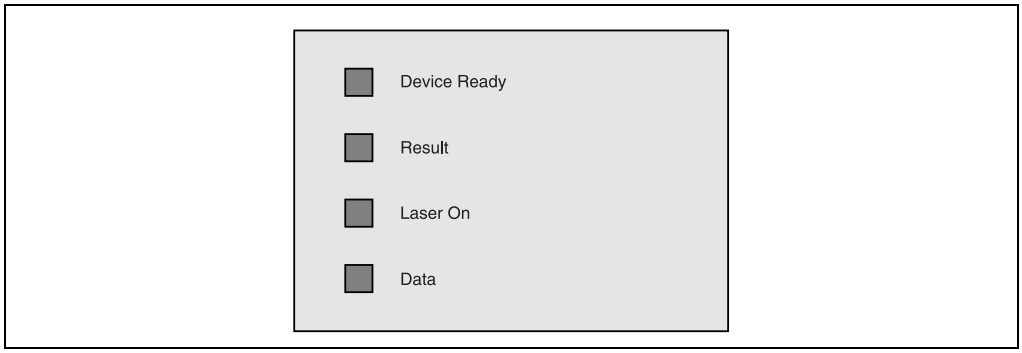


Fig. 3-6: LEDs

Operating mode	LED	Display	Function
Start	**Device Ready**	*Orange*	• Lights up after activation if the self-test was successful and the waiting time for reading the Profile bar codes has passed
	Laser On	*Orange*	• Lights up while the laser diode for reading the Profile bar codes is active
Reading mode	**Device Ready**	*Orange*	• Lights up constantly • Extinguishes at a change to another operating mode/function
	Laser On	*Orange*	• Lights up when the laser diode for reading is active. (The laser diode is switched on and off by the reading pulsing.) • Lights up constantly in the pulsing type "free-running", since the laser diode is constantly active.
	Result	*Orange*	LED is coupled to the "Result 2" switching output. It displays the result status selected for the set pulse duration of the output. • Lights up after a successful reading (default setting: Good Read) • Lights up when the code comparison is activated, the read bar code agrees with the specified comparison code(s) and the corresponding event status output for the "Result 2" output has been selected.
	Data	*Orange*	• Flickers when the CLV on the host interface transfers data to the host
Percentage evaluation	**Laser On**	*Orange*	• Lights up constantly since free running operation
	Result	*Orange*	Behavior depends on the reading quality: • Extinguishes if the reading rate < 30 % • Flashes twice per second if the reading rate is 30 % ... 70 % • Flashes five times per second if the reading rate is 70 % ... 90 % • Lights up constantly, if reading rate > 90 %
Profile-programming	**Laser On**	*Orange*	• Lights up while the Profile bar codes are being read, since free running operation.
Auto Setup	**Laser On**	*Orange*	• Lights up while the application-specific bar codes are being read, since free running operation.
Adjusting mode	**Laser On**	*Orange*	• Lights up constantly since free running operation
Show CP limits	**Laser On**	*Orange*	• Flashes alternatively bright/darker in the rhythm of the partial shielding of the scan line

Table 3-2: Meaning of the LEDs

3.3.3 Function of the beeper (buzzer)

The beeper signals the successful execution of device functions and any malfunctions by means of differing sequences and lengths of sounds (*Table 3-3*). For information on troubleshooting please refer to *Chapter 8.5 Troubleshooting, Page 8-6*.

In the default setting the beeper is activated and displays the "Good Read" result status for reading mode. The further description in these operating instructions assumes that the beeper is operated in reading mode in the default setting.

The sound opening of the beeper is positioned on the rear narrow device end concealed under the LED labeling.

Operating mode/function	Sequence of sounds	Function of the beeper
Start	Beep	• Signals after activation that the self-test was successful
Reading mode	Beep Beep	• Confirms starting of the reading mode after the activation and after the waiting time of 5 s for reading the Profile bar codes has passed
	Beep	• Confirms a successful reading ("Good Read"; default setting) and the output of the read result
Profile programming Start Auto Setup	Beep	• Confirms successful reading of the Profile bar code for starting/ ending the Auto Setup
	Beep Beep	• Confirms successful reading of the application-specific bar code and starting of the reading mode.
	Beep (long sound)	• Signals that the application-specific bar code was not read
Profile programming	Beep	• Confirms successful reading of the Profile bar code
	Beep Beep	• Confirms starting of the reading mode 10 s after reading the last Profile bar code
Exceeding of the laser timeout	Beep Beep Beep	• Signals de-activation of the laser diode after the laser timeout of 10 min (default setting) has been exceeded in reading mode. However, the reading pulse is not terminated.

Table 3-3: Function of the beeper

HINT

The behavior of the beeper in **reading mode** can be modified by means of the DEVICE CONFIGURATION tab card of the user interface of CLV-Setup.

ON/OFF:

➢ In order to switch off the beeper, click on the BEEPER ACTIVE check box in the RESULT OUTPUT section in order remove the check mark.

Output function for the result status:

1. Click on the EDIT RESULT OUTPUTS command button in the RESULT OUTPUT section. The EDIT RESULT OUTPUTS dialog box is displayed.
2. Click on the BEEPER list box in the RESULT FUNCTIONS section.
   The list with the selectable functions for the result status is displayed.
3. Click on the desired function and confirm the dialog box with OK.
4. Carry out the download to the CLV. To do so, click on  in the toolbar.
   The DOWNLOAD PARAMETERS dialog box is opened.
5. Confirm the dialog box with the saving option PERMANENT.

The CLV operates the beeper with the selected values for the function of the result status display.

Notes

4 Installation

4.1 Overview of the installation steps

- Replacing the language version of the laser warning label (if required)
- Selecting the installation site for the CLV
- Aligning the CLV to the bar code
- Installing the CLV
- Installing the AMV/S 40 connection module
- Connecting the CLV to the AMV/S 40 connection module
- Adjusting the CLV
- Installing the reading-pulse sensor for reading pulse triggering
- Optional for focal point changeover:
  Mounting the sensor for detecting the object distance

4.2 Preparations for installation

4.2.1 Laying out the components to be installed ready

- CLV bar code scanner

4.2.2 Laying out the accessories ready

- Mounting bracket No. 2 020 410 with two screws M 5 x 8 mm and 2 washers (not included in the CLV scope of delivery) or

  Mounting bracket No. 2 022 564 with 3 screws M 5 x 8 mm, 3 spring washers and 2 hexagon screws M 5 x 12 mm with washers (not included in the scope of delivery) or

  Rod clamp No. 2 023 691 with 3 screws M 5 x 8 mm and 3 spring washers (not included in the scope of delivery)

Alternatively, if the user provides a retainer:

Stable mounting device which allows the alignment of the CLV to be changed in the X- and Y-axes. In the line scanner version the weight of the CLV amounts to 530 g, while the line scanner with oscillating mirror weighs 700 g, each with a connection cable.

Two screws M 5 for the CLV. The screw length depends on the wall thickness of the retainer used. **Max. screw-in depth into CLV 5 mm** from housing surface.

- AMV/S 40 connection module, optionally additionally with CL 20 mA interface converter (not included in the CLV scope of delivery)
- Reading-pulse sensor for external reading-pulse triggering, e. g. photoelectric reflex switch/photoelectric proximity switch (not included in the CLV scope of delivery)
- Optional for focal point changeover: Sensor for detecting the reading distance, e. g. photoelectric reflex switch/photoelectric proximity switch (not included in the CLV scope of delivery)

4.2.3 Laying out the required tools ready

- Two/three screws M 5 for fastening the SICK mounting bracket to the mounting base. Screw length depends on the wall thickness of the base.
- Set of laser warning labels (if required)

- Labels with terminal designations of the CLV 43x/44x for the AMV/S 40 connection module (also valid for CLV 45x)
- Tool
- Measuring tape (up to 2 000 mm)
- Angulometer

4.2.4 Replacing the laser warning label

If required, stick the warning label in the required language variant over the British/US warning applied to the CLV (*Fig. 4-1*).

The enclosed set of laser warning labels consists of:

- A German/US English laser warning label
- A French/US English laser warning label

Also refer to *Chapter 2.3 General safety instructions and protective measures, Page 2-1*.

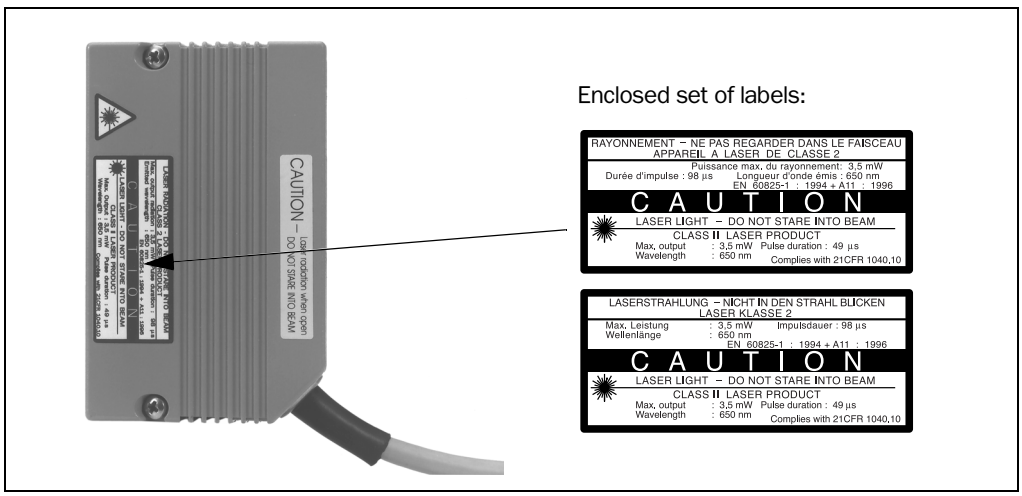


Fig. 4-1: Example of line scanner: Exchanging the laser warning label

4.2.5 Selecting the installation site

When selecting the installation site take the distance between the CLV and the host as well as the distance between the CLV and the bar code into consideration.

Distance between the CLV and the host

The CLV can be mounted at a max. of 1 200 m from the host without being connected to a SICK network or to a bus connection. However, the possible distance depends on the selected physical implementation of the host interface and the set data transfer rate (refer to *Table 5-2, Page 5-2*).

Distance between the CLV and the AMV/S 40 connection module

The AMV/S 40 connection module should not be installed more than 10 m from the CLV, since the PC with the "CLV-Setup" software accesses the terminal interface of the CLV via the module (RS-232 type).

4.2.6 Mounting accessories

The CLV is fastened by means of two blind hole threads (M 5), which are positioned on the narrow upper and lower device sides. *Fig. 4-2* shows the position of the thread at the line scanner.
The complete housing dimensions of the CLV are shown in *Fig. 9-1, Page 9-3* and *Fig. 9-2, Page 9-4* .

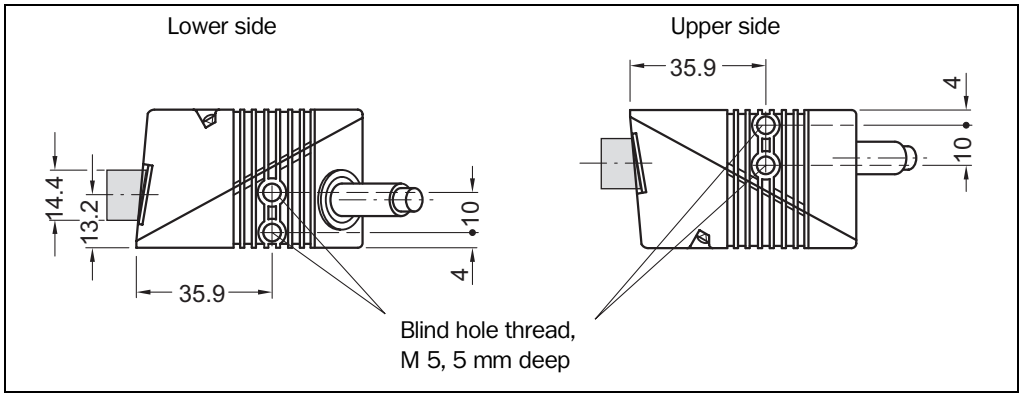


Fig. 4-2: Example of line scanner: Position of the fastening thread at the CLV

The CLV can be installed by means of the following SICK retainers:

- Mounting bracket No. 2 020 410
- Mounting bracket No. 2 022 564
- Rod clamp No. 2 023 691

The design of the brackets supports a number of mounting variants and the alignment of the CLV in two levels. *Fig. 4-3* and *Fig. 4-4* show two mounting examples.

The elongated holes of the mounting bracket No. 2 020 410 make it possible to align the CLV finely by an angle of rotation of ±15°. The elongated holes of the mounting bracket No. 2 022 564 and the rod clamp N0. 2 023 691 make it possible to rotate the CLV freely.

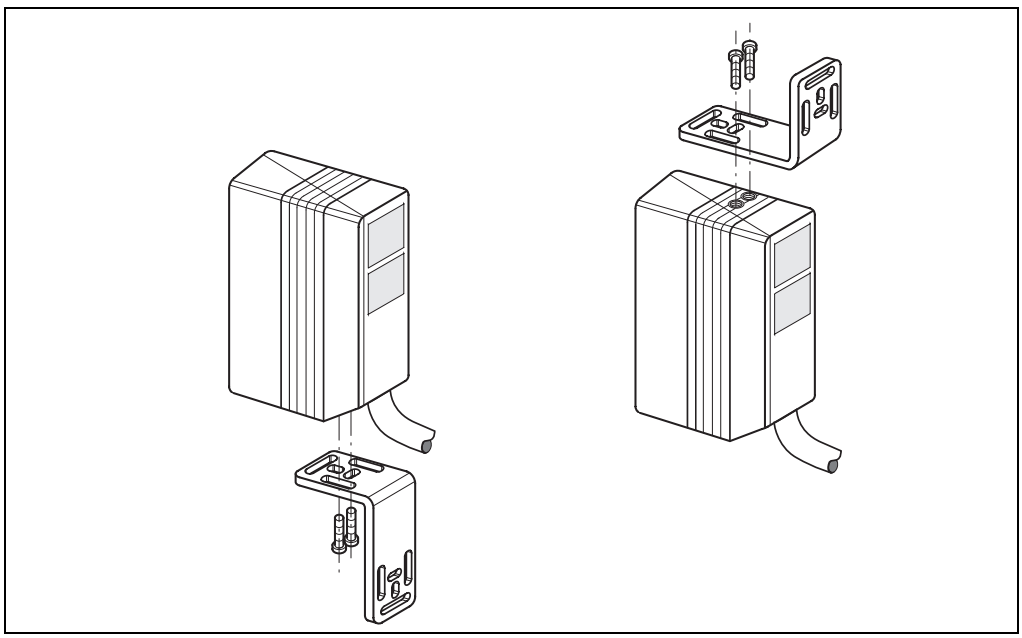


Fig. 4-3: Line scanner: Example of the mounting possibilities of the CLV with the mounting bracket No. 2 020 410

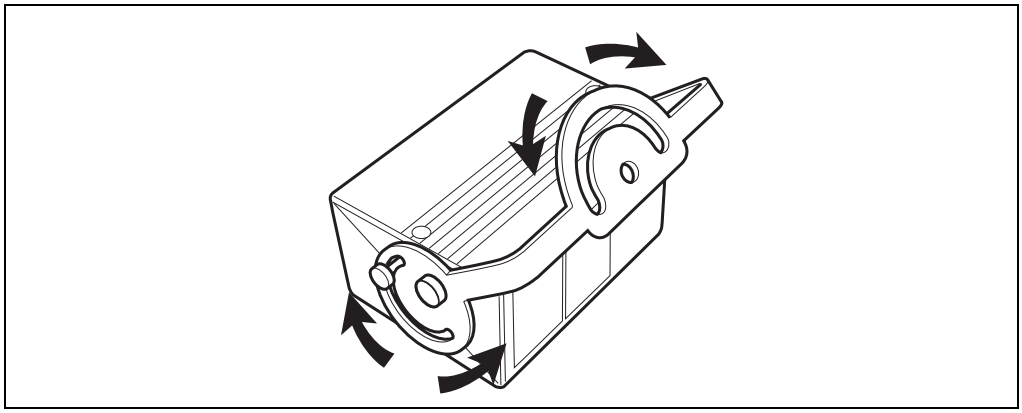


Fig. 4-4: Line scanner: Example of the mounting possibilities of the CLV with the mounting bracket No. 2 022 564

The dimensioning of the mounting brackets is shown in *Chapter 10.12 Dimensioned drawings of the accessories, Page 10-54*.

Hint For applications with strong mechanical vibrations applied to the CLV the mounting bracket with vibration damper No. 2 031 342 is available. See also *Chapter 10.11.1 Mounting accessories, Page 10-51*.

4.2.7 Distance between the CLV and the bar code

Theoretical positioning of the scan line to the bar code

Either a line scanner or a line scanner with oscillating mirror is used as the CLV, depending on the respective application. *Fig. 4-5* shows the theoretical positioning of the two scanning processes to the bar code on the object.

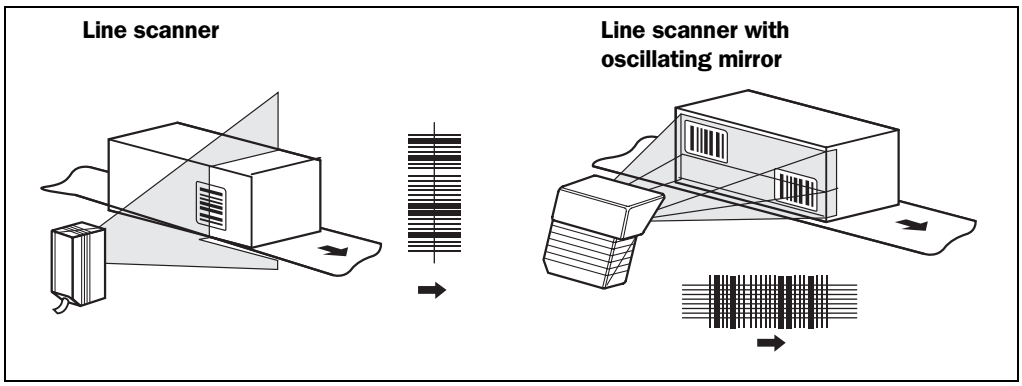


Fig. 4-5: Positioning of the scanning process to the bar code and to the conveyor direction

Reading distance to the bar code and the aperture angle α

The distance between the reading window of the CLV and the bar code may not exceed the limits imposed by the device. *Chapter 10.2.4 Depths of field for CLV 450 line scanner (front-end reading window), Page 10-5* to *Chapter 10.2.5 Depths of field for CLV 450 line scanner with oscillating mirror (side-end reading window), Page 10-9* shows the height of the reading field as a ratio of the reading distance for various resolutions (module widths).

Fig. 4-7 shows the definition of the reading distance a from the reading window and of the aperture angle α of both scanning processes.

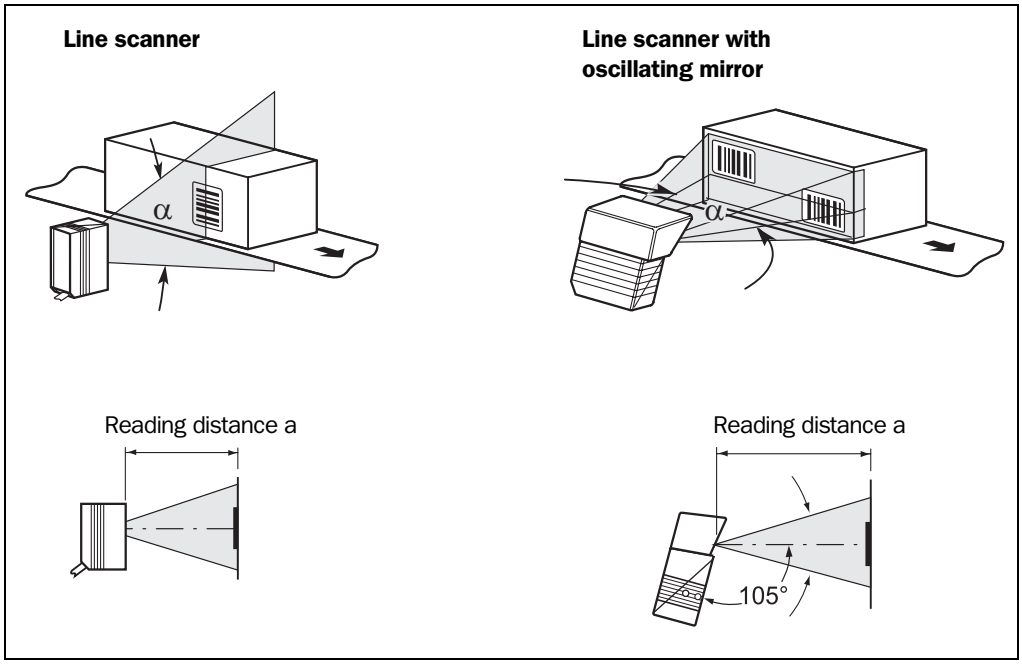


Fig. 4-6: Definition of the reading distance a and of the aperture angle α

The effective aperture angle α amounts for the CLV 450 to a **max. of 50**°, for the CLV 451 to a **max. of 55**° at both scanning processes. Due to the V principle of the beam deflection the reading field height (for evaluating the usable length of the scan line) depends on the reading distance.

Angle position of the CLV

The optimum position of the CLV is reached when the scan line passes over the bar code right-angled (90°) (*Fig. 4-5*). Possible reading angles which can occur between the scan line and the bar code have to be taken into consideration (*Fig. 4-7* and *Table 4-1*).

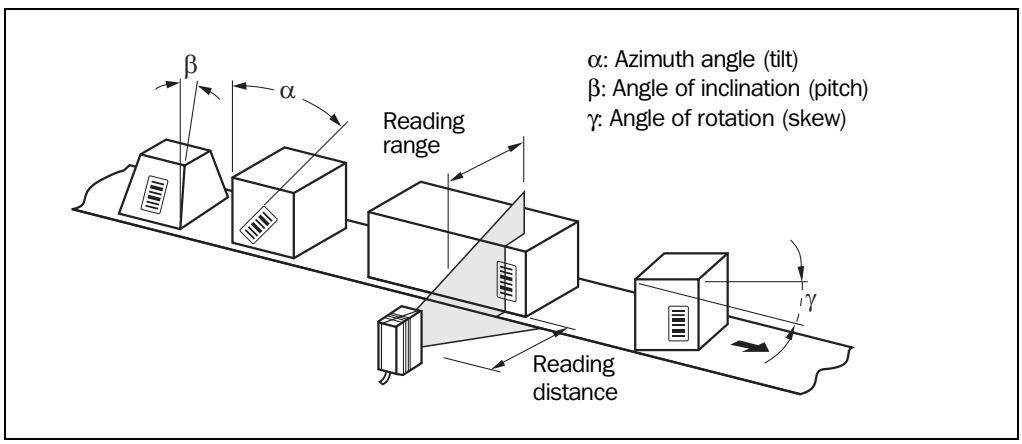


Fig. 4-7: Line scanner: Reading angle occurring between the scan line and the bar code

Angle	Limit
Azimuth α (tilt)	Max. ± 45° (in scan axis and at focal position 200 ... 900 mm for a modul width of 0.35 ... 1.0 mm)
Inclination β (pitch)	Max. ± 45° (depending on module width and focal position)
Rotation γ (skew)	Max. ± 45° (depending on module width and focal position)

Table 4-1: Permitted reading angle between the scan line and the bar code

Avoiding surface reflections

If the light of the scan line falls exactly vertically on the surface of the bar code, disturbing reflections can occur when the reflected light is received. In order to avoid this effect the CLV must be installed so that the emitted light is tilted relative to the perpendicular.

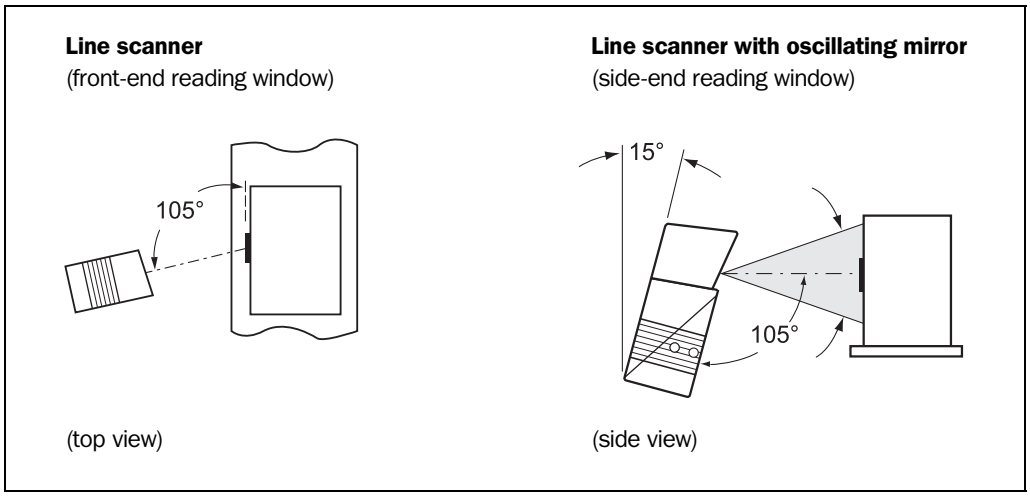


Fig. 4-8: Avoiding surface reflections: Angle between the emitted light and the bar code (tilted away from the perpendicular)

At the line scanner with oscillating mirror the laser beam is emitted during oscillating mode at an angle of 105° to the housing during the pass through the neutral position CW = 50). The device can only be mounted flush to the edge at the transport unit if the deflection ranges of the oscillating mirror is small. Otherwise the device also has to be mounted at an angle of inclination of 15 in order to attain symmetrical deflection ranges.

4.2.8 Counting direction of the code position CP and of the code angle CW

Explanation

The CLV can scan and decode several bar codes during every reading.
In the process it determines the local reading diagnostic data for each bar code:

- The position (CP value) of the bar code center within the scan line
- In addition in case of a scanning process with oscillating mirror the deflection angle of the scan line (CW value) under which the bar code center is detected

Fig. 4-9 shows the counting direction of the code position and of the code angle.

The determination of the two data allow identical bar codes (code type, code length and data contents) to be separated as well as the local assignment of the bar code data in the read result to its position on the object.

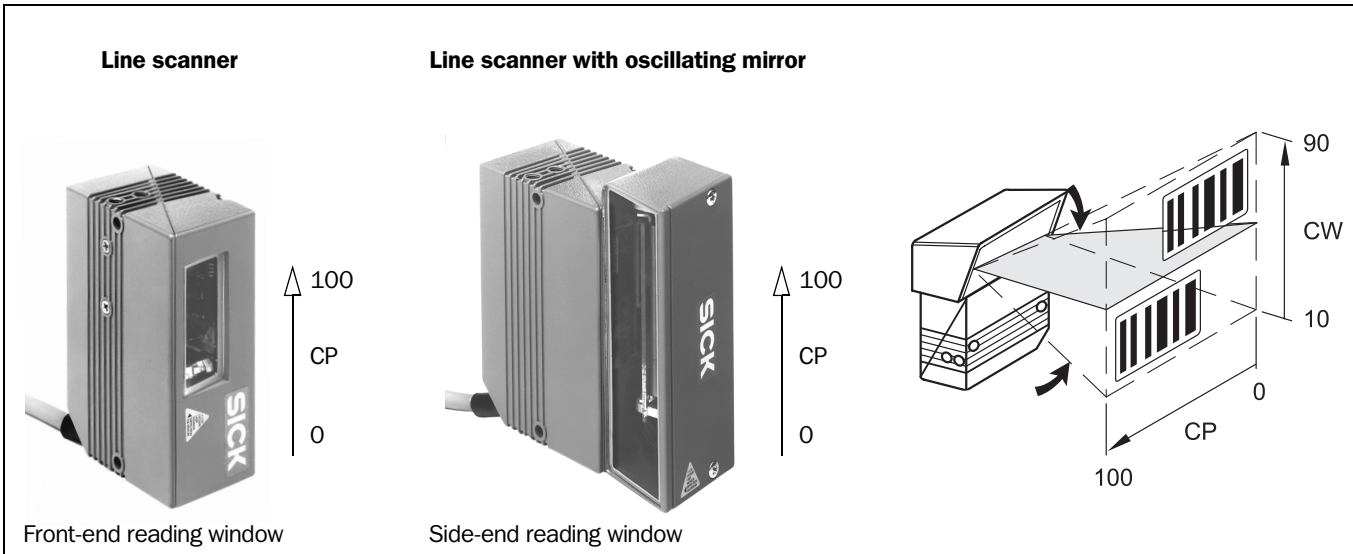


Fig. 4-9: Counting direction of the code position CP within the scan line and of the code angle CW at an oscillating mirror

Hint

In the default setting the CLV does not output the values CP and CW (CW only in case of line scanner with oscillating mirror) in the reading result of the host interface. If this is desired for the evaluation in the host, the output in the separator of the output string can be activated via the user interface of CLV-Setup.

Configuring the separator:

1. Select the DATA STRING tab card.
2. Click in the SEPARATOR input field.
   The EDIT PARAMETERS: TFS dialog box opens.
3. Click on the parameter CP and/or CW in the desired sequence in the list field.
   CP or CW is inserted in the top in the text line.
4. Confirm the dialog box with “OK“.
5. Carry out the download to the CLV. To do so, click on in the toolbar.
   The DOWNLOAD PARAMETERS dialog box is opened.
6. Confirm the dialog box with the saving option PERMANENT.
   The CLV outputs the CP value and the CW value for every bar code in the read result of the host interface. The values are displayed as 3-digit numbers each in the corresponding separator.

4.3 Installation and adjustment of the device

4.3.1 Installing the CLV

1. Prepare the base for mounting the CLV retainer as described in *Chapter 4.2.2 Laying out the accessories ready, Page 4-1*.
2. Place the object with the bar code at the planned position at which the reading is to be carried out within the visual range of the CLV (no transport movement).
3. Depending on the scanning process align the CLV by eye to the bar code so that
   – The narrow device rear with the LED display lies approximately parallel to the bar code surface at the line scanner
   – The wide side wall with the laser warning labels lies approximately parallel to the bar code surface at the line scanner with oscillating mirror

   Take the reading angles possibly occurring during later readings into account (refer to *Fig. 4-7, Page 4-5*).
4. If relevant for the evaluation, take the counting direction of the code position and the code angle into consideration (refer to *Fig. 4-9, Page 4-7*).
5. Mount the CLV retainer on the base.

Danger of damage to the housing!

The maximum screw-in depth of the two blind hole threads M 5 amounts to 5 mm. Longer screws damage the housing.

➢ Use screws with a suitable length.

6. Screw the screw M 5 through the retainer into the blind hole thread of the CLV.
7. Tighten the screws slightly.
8. Adjust the CLV as described in *Chapter 4.3.2 Adjusting the CLV, Page 4-8* .

4.3.2 Adjusting the CLV

The "Percentage evaluation" operating mode supports adjustment of the CLV. In this operating mode the CLV displays the quality of the readings of bar codes which are placed statically into the reading area of the CLV (no transport movement of the object). The CLV carries out 100 scans each free running and evaluates the reading quality statically. It outputs the read results continuously every 2 s via the terminal interface.

The display behavior of the "Result" LED provides additional optical information on the reading quality:

- If the LED does not light up, the CLV cannot read the bar code (reading quality < 30 %).
- If the LED flashes, the CLV can only read the bar code badly (reading quality 30 % ... 90 %).
- If the LED lights up continuously, the CLV is aligned optimally (reading quality > 90 %). In the default setting the scanning frequency amounts to 600 Hz.

1. Connect the CLV to the AMV/S 40 connection module and switch on the supply voltage of the module (refer to *Chapter 5.5.3 Connecting the supply voltage, Page 5-4*). After the start the CLV confirms the successful self-test with a beeper sound and shortly afterwards starting of the reading mode is signaled by two consecutive sounds. The "Device Ready" LED lights up.

2. Connect the PC to the terminal interface of the CLV. To do so connect the RS-232 data connection cable to the 9-pin "Service" connector of the module (refer to *Chapter 5.5.5 Connecting the CAN interface, Page 5-6*).
3. Start Windows and the "CLV-Setup" software on the PC (refer to *Chapter 10.4.3 Starting "CLV-Setup", Page 10-22*).

Select the standard decoder:

4. Select the CODE CONFIGURATION tab card.
5. Click on the STANDARD radio button in the DECODER section.
6. Carry out the download to the CLV. To do so, click on  in the toolbar.
   The DOWNLOAD PARAMETERS dialog box is opened.
7. Confirm the dialog box with the saving option TEMPORARY.
   The CLV operates with the standard decoder.

Activating the percentage evaluation:

8. Select the PERCENTAGE EVALUATION operating mode under VIEW in the menu bar.
   The dialog box for prompting the distance configuration is opened.
9. Click on the distance configuration which corresponds to the reading distance of the object. (Default setting: No. 1, focal position F = 900 mm for CLV 450).
10. Confirm the dialog box with "OK".
    The terminal emulator is opened and displays the reading result continuously (refer to *Chapter 6.5.2 Percentage evaluation, Page 6-21*).
    During all the further steps observe the behavior of the **reading quality** (as a %)!

    Line scanner with oscillating mirror:
    In the percentage evaluation mode the CLV behaves in the following manner:
    - in “Oscillating“ mode (default setting: oscillating with a fixed amplitude), the CLV shuts off oscillation and positions the scan line under the angle CW = 50 (corresponding to an angle of deflection of 105°). This position cannot be altered.
    - in “One-Shot“ mode, the CLV also positions the scan line under the angle CW = 50.
    - in “Set Position“ mode, the scan line’s selected position remains unchanged.

Carrying out fine adjustment:

11. Align the CLV so that the angle between the scan line and the bar code bars amounts to approximately 90°.
12. In order to avoid disturbing reflections, turn the CLV out of the perpendicular so that the emitted light impacts on the bar code at an angle of approx. 105° (line scanner) (*Fig. 4-8, Page 4-6*).
13. If necessary, position the center of the scan line exactly on the bar code (*Chapter 4.3.3 Auxiliary functions for adjusting, Page 4-10*).
14. Manually guide objects with bar codes successively under realistic conditions into the reading area of the CLV and check the read result. If the objects move loosely, check several different positions (angles) of the bar code and ensure that the limits of the permitted reading angle is not exceeded.
15. Adjust the CLV so the "Good Read" rate lies between **70 ... 100 %**.
    In case of different object sizes per defined reading range (distance configuration) check the selected focal position and if necessary correct the parameterization (refer to *Chapter 6.4.3 Guide to parameterization, Page 6-8*).

16. Tighten the screws at the CLV.

The CLV is aligned to the bar code.

4.3.3 Auxiliary functions for adjusting

Adjusting mode

The "Adjusting mode" operating mode supports the optimum positioning of the **center** of the scan line on the object. To the purpose the CLV hides half of the scan line from the center (code position CP = 50 to CP = 100). This is carried out irrespective of a selected distance configuration. *Fig. 4-10* shows the resulting appearance of the scan line at the line scanner.

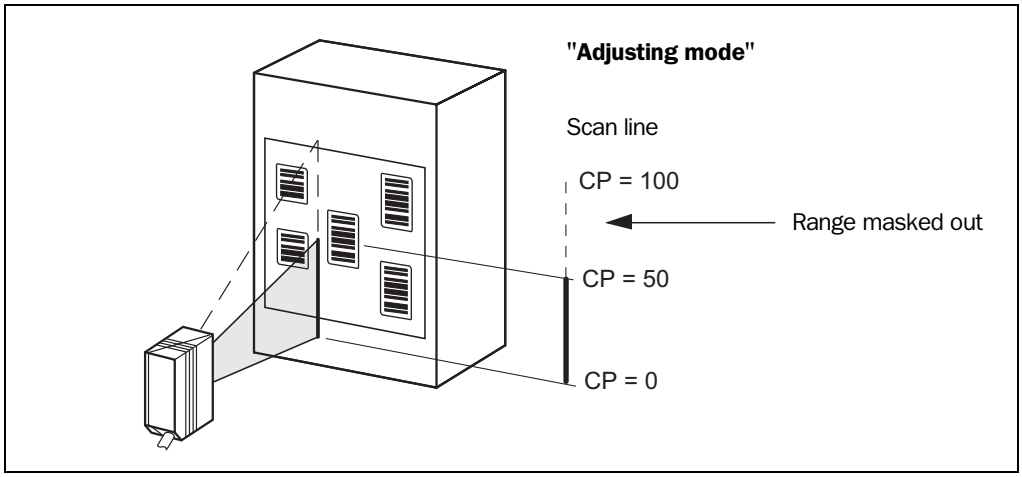


Fig. 4-10: Line scanner: Appearance of the scan line in the "Adjusting mode" operating mode

Line scanner with oscillating mirror:
In the adjusting mode the CLV behaves in the manner as decribed in the “percentage evaluation mode“ (see *Chapter Activating the percentage evaluation:, Page 4-9*).

1. Activate the operating mode in accordance with *Chapter 6.5.3 Adjusting mode, Page 6-23* .
2. Position the CLV so that the center of the scan line, symbolized by the end of the scan line (code position CP = 50), lies in the center of the bar code – in the case of several bar codes in the center of the field of all the codes.

Show CP Limits

The “Show CP Limits“ operating mode allows you to test whether the desired effect was produced by narrowing the scan line’s active evaluation range via parameterization. The CLV alternatively hides certains parts of the scan line in accordance with the selected min. and max. values of the code position.

For activation of this operating mode and for checking, see *Chapter 6.5.4 Show CP limits, Page 6-23*

4.4 Installing the external components

4.4.1 Installing the AMV/S 40 connection module

Terminal assignment

The terminal assignment printed on the board in the connection area of the AMV/S 40 is valid for the device types CLV 21x/22x/41x. If a CLV 45x is connected via the 15-pin socket, the resulting terminal assignment deviates from the printed terminal assignment. This also applies for the representation in the wiring diagram in the housing cover.

CAUTION

Danger of damage to the CLV and external I/O devices!

The deviating display of the terminal strip assignment means that external devices (e. g. PC) can be connected incorrectly to the CLV and possibly damaged.

➢ Before carrying out the installation stick the two enclosed labels for the CLV 43x/44x (also valid for CLV 45x) over the printed assignments in the connection area as well as the wiring diagram in the housing cover.

1. Apply the larger label in the connection area before the terminal strips so that the Terminals 2 and the Terminals 18 agree. *Fig. 4-11* shows the position of the label. Paste the smaller label correspondingly in the housing cover.

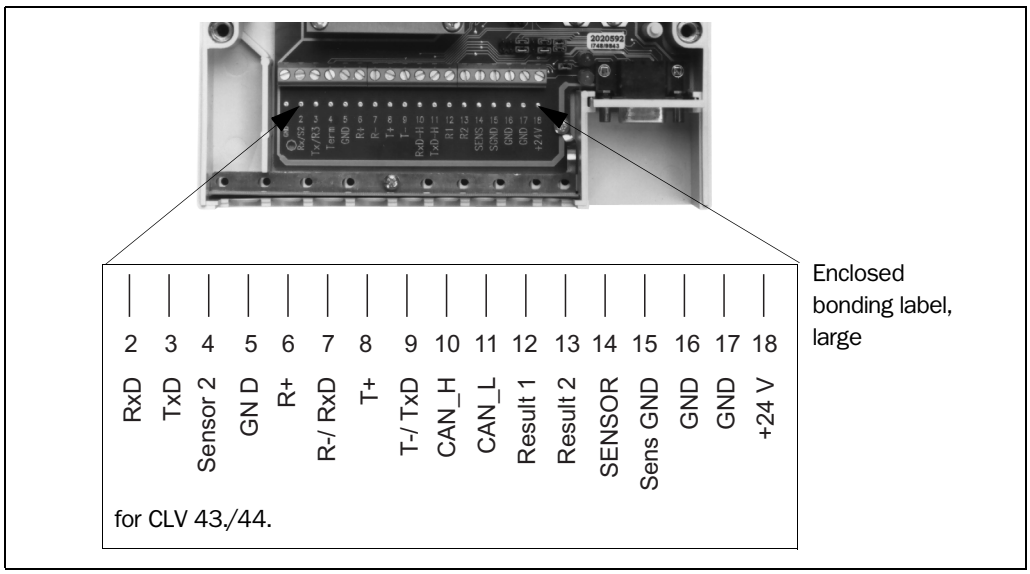


Fig. 4-11: Correction of the printed terminal assignment in the connection area of the AMV/S 40

2. Mount the AMV/S 40 connection module near the CLV. The maximum distance between the AMV/S 40 and the CLV should not exceed 10 m.
3. Mount the AMV/S 40 so that the access to the opened device is possible at all times. The terminal interface of the CLV is accessed via the internal "Service" plug.

For detailed information on the installation and electrical installation refer to the *operating instructions "AMV/S 40 connection module"* (Order No. 8 008 292, English edition).

4.4.2 Installing an external reading-pulse sensor

If the CLV is triggered by means of an external reading-pulse sensor, the sensor is installed near the CLV. In the default setting the "Sensor 1" switching input is selected as the trigger source for this triggering type.

Fig. 4-12 shows two examples of the installation site of a photoelectric reflex switch. This depends on the distance a of the bar codes to the front object edge. Depending on the application the sensor is to be installed so that bar codes on objects of different sizes can be read completely during the time window of the evaluation (reading interval).

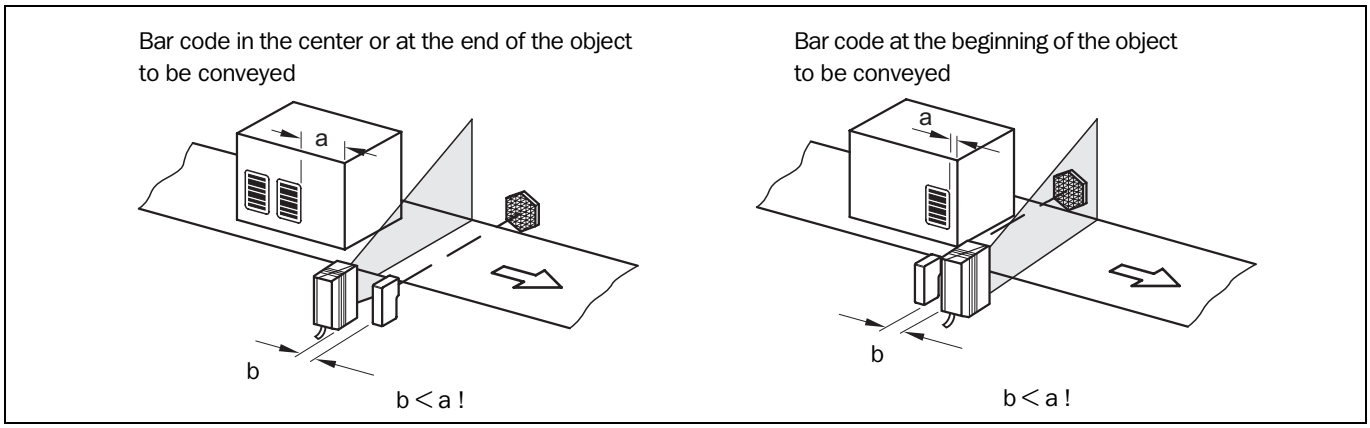


Fig. 4-12: Line scanner: Installation example for positioning the external reading-pulse sensor

1. Install the reading-pulse sensor at the installation site.
2. Connect the reading-pulse sensor via the AMV/S 40 connection module to the "Sensor 1" switching input of the CLV (refer to *Chapter 5.5.7 Wiring the "Sensor 1" switching input, Page 5-7*).
3. Connect the CLV to the AMV/S 40 connection module and switch on the supply voltage of the module (refer to *Chapter 5.5.3 Connecting the supply voltage, Page 5-4*).
   After the start the CLV confirms the successful self-test with a beeper sound and shortly afterwards starting of the reading mode is signaled by two consecutive sounds. The "Device Ready" LED lights up.
4. Connect the PC to the terminal interface of the CLV. To do so connect the RS-232 data connection cable to the 9-pin "Service" connector of the module (refer to *Chapter 5.5.5 Connecting the CAN interface, Page 5-6*).
5. Start Windows and the "CLV-Setup" software on the PC (refer to *Chapter 10.4.3 Starting "CLV-Setup", Page 10-22*).
6. Select the READING MODE menu item under VIEW in the menu bar.
   The terminal emulator window opens. The CLV is in reading mode.
   During all the further steps observe the behavior of the reading result!
   Line scanner with oscillating mirror:
   In reading mode the CLV deflects the scan line in the default setting with a frequency of 1 Hz around the position CW = 50 at a maximum angle of ±20°.
   50 CW corresponds to a light emission under 105°.
7. Manually guide objects with bar codes successively under realistic conditions into the reading area of the CLV.
8. Check that the cycle is triggered and the read result.
9. Repeat the procedure during transport mode.
10. Check whether the reading process is synchronized with arriving objects.

Parameterizing an external sensor as the trigger source (not at the default setting):

1. Select the DEVICE CONFIGURATION tab card.
2. Click on the EDIT READING TRIGGER command button.
   The EDIT READING TRIGGER dialog box is opened.
3. Select the SENSOR INPUT (ACTIVE HIGH) radio button and confirm the dialog box.
4. Carry out the download to the CLV. To do so, click on in the toolbar.
   The DOWNLOAD PARAMETERS dialog box is opened.
5. Confirm the dialog box with the saving option PERMANENT.
   The CLV operates with the "Sensor 1" switching input as the external trigger source. Current in the input starts the reading pulse.

4.4.3 Mounting the sensor for detecting the object distance

The CLV provides a dynamic focal position changeover for serial covering of a large reading range. To this purpose a changeover with a maximum of 2 stages can be implemented via the "Sensor 2" switching input. *Fig. 4-13* shows an example for reading from above. A photoelectric reflex switch is, for example, used for the detection of the object distance. This application is suitable for such object sizes whose difference can be covered by 2 changeover ranges. The distance sensor is to be positioned so that these object sizes are classified clearly and two overlapping reading ranges arise which can be formed with the depths of field of the CLV. The two distance configurations (reading ranges) are assigned from a maximum of 8 configurations by means of the internal assignment table (combinatorics). In the default setting the "Sensor 2" switching input is selected for the focal position changeover.

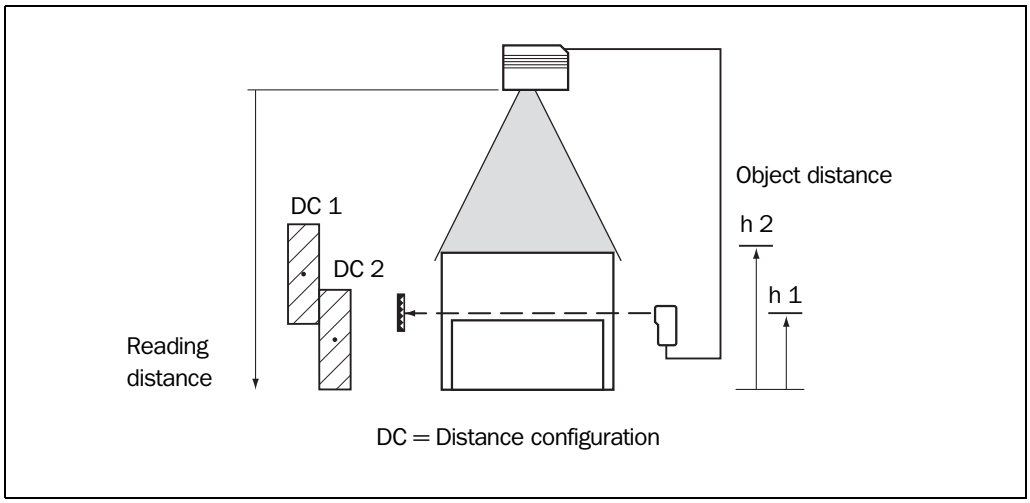


Fig. 4-13: CLV 44x: Installation example for positioning the object distance detection

1. Read the depths of field of the CLV for the specified resolution of the bar code manually from the diagrams in *Chapter 10.2.4 Depths of field for CLV 450 line scanner (front-end reading window), Page 10-5* or *Chapter 10.2.5 Depths of field for CLV 450 line scanner with oscillating mirror (side-end reading window), Page 10-9*. Search for and note suitable focal positions for overlapping reading ranges.
   – or –
   Have the depth of field determined automatically by means of the CLV Assistant in the CLV-Setup user interface (values are read automatically into the tab cards).

2. Install the distance sensor (photoelectric reflex switch) for the object height detection so that the optical path for the reading range 1 remains uncovered (also refer to *Table 5-8, Page 5-9*). It is advisable to install the distance sensor against the direction of travel of the conveyor unit approx. 100 mm before the reading-pulse sensor.
3. Connect the distance sensor via the AMV/S 40 connection module to the "Sensor 2" switching input of the CLV (refer to *Chapter 5.5.8 Wiring the "Sensor 2" switching input, Page 5-8*).

4. After you have manually determined the focal positions for the two required reading ranges use the READING CONFIGURATION tab card of the CLV-Setup user interface. To do so click on the DISTANCE CONFIGURATION/ASSIGNMENT TABLE command button and edit the dialog box correspondingly.
5. Select the standard decoder as described in *Chapter 4.3.2 Adjusting the CLV, Page 4-8* and call up the percentage evaluation temporarily.
6. Check the reading quality for the two distance configurations in static operation. (no transport movement of the objects).
7. Finally check the function of the distance detection realistically in reading mode. To this purpose observe the read result in the terminal emulator as described in *Chapter 4.4.2 Installing an external reading-pulse sensor, Page 4-12* .

Default setting of CLV 450: F1 = 900 mm, F2 = 500 mm, F3 = 200 mm

Note The integrated timer or the oscillating mirror inversion points can be used to change over the CLV for slow search runs between a maximum of 8 distance ranges.

Command strings can be used to change the CLV synchronously to the process over between 8 distance ranges.

4.5 Disassembling the device

1. Switch off the supply voltage of the AMV/S 40 connection module.
2. Pull the cable plug of the CLV off after loosening the fixing screws from the AMV/S 40 connection module.
3. Unscrew the CLV from the mounting device.

In order to dispose of the unit after final removal from service without damaging the environment proceed as described in *Chapter 7.3 Disposal, Page 7-2*.

5 Electrical installation

5.1 Overview of the installation step

- Connect the CLV to the SICK AMV/S 40 connection module
- Adapt the interconnection of the host interface in the module to the host interface of the CLV
- Wire the data and function interfaces of the CLV in the connection module
- Connect the PC to the connection module (at the terminal interface of the CLV)
- Connect the connection module to the supply voltage

5.2 Electrical connections and cables

The electrical connection of the CLV consists of a 15-pin D-Sub HD cable plug. The following interfaces are implemented via it:

- Three serial data interfaces (host interface, CAN interface and terminal interface)
- Two switching inputs (external reading-pulse as well as multifunctional input)
- Two switching outputs (output of result status functions, for connection e. g. to a PLC)
- Power supply

➢ Wire all the connections with copper wires with a minimum wire cross-section of 0.09 mm²!

5.2.1 Connections/Cables when the AMV/S 40 connection module is used

The AMV/S 40 connection module is suitable for industrial-type connection of the CLV to the I/O devices (distributor function) and the power supply. The direct connection to the host (point-to-point), the inclusion into the SICK network or into a daisy-chain set-up (pass-through or master/slave configuration) can be realized with it.

Fig. 5-1 shows the connecting principle of the AMV/S 40 for a CLV.

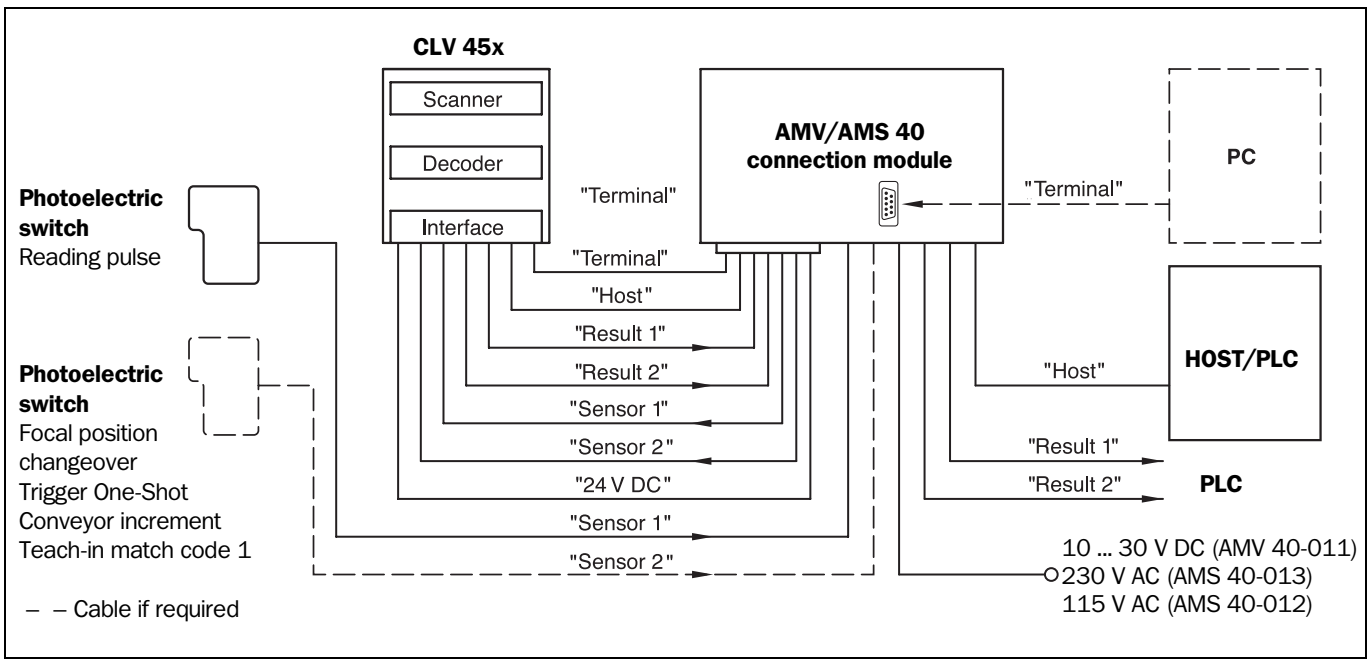
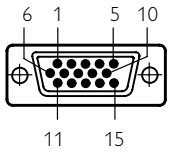


Fig. 5-1: Block diagram: Connection of the CLV to the AMV/S 40 connection module

1. Observe the modified terminal assignment for the CLV in the connection area of the AMV/S 40 (refer to *Chapter 4.4.1 Installing the AMV/S 40 connection module, Page 4-11*).

2. The wiring and configuration of the AMV/S 40 connection module is described in the *Operating instructions "AMV/S 40 connection module "* (Order No. 8 008 292, English edition).

5.3 Pin assignment of the connecting plug



Pin	Signal	Function
1	+10 ... +30 V DC	Supply voltage
2	RxD (terminal)	Terminal interface (receiver)
3	TxD (terminal)	Terminal interface (sender)
4	Sensor 2	Switching input, selectable function
5	GND	Ground (chassis ground)
6	RD+ (RS-422/485)	Host interface (receiver)
7	RD- (RS-422/485); RxD (RS-232)	Host interface (receiver)
8	TD+ (RS-422/485)	Host interface (sender)
9	TD- (RS-422/485); TxD (RS-232)	Host interface (sender)
10	CAN H	CAN bus (IN/OUT)
11	CAN L	CAN bus (IN/OUT)
12	Result 1	Switching output, selectable function
13	Result 2	Switching output, selectable function
14	Sensor 1	Switching input for external reading pulse
15	SensGND	Common ground for all inputs
–	–	Shield

Table 5-1: Pin assignment of the 15-pin D-Sub HD cable plug

5.4 Preparation of the electrical installation

5.4.1 Requirements for the host interface

The host interface of the CLV can be operated as an RS-422/485 unit or as an RS-232 unit. *Table 5-2* shows the recommended maximum cable lengths as a function of the data transmission rate.

Interface type	Transmission rate	Distance to the host
RS-232	Up to 19 200 bits/s	Max. 10 m
	38 400 ... 57 600 bits/s	Max. 3 m
RS-422/485[1)]	Max. 38 400 bits/s	Max. 1 200 m
	Max. 57 600 bits/s	Max. 500 m

1) If the cable is terminated correspondingly

Table 5-2: Maximum cables lengths between the CLV and the host

➢ In order to prevent interferences, do not lay the cable parallel to the power-supply and motor cables (for example in cable ducts) for a longer stretch.

5.4.2 Supply voltage

For operation the CLV requires an supply voltage of 10 ... 30 V DC in accordance with IEC 742 (functional extra-low voltage). Depending on the type it consumes the following power:

CLV type	Scanning process	Power consumption[1)]
CLV 450-0010 CLV 451-0010	Line scanner	Max. 6 W
CLV 450-6010 CLV 451-6010	Line scanner with oscillating mirror	Max. 7.2 W
1) At open-circuited switching outputs		

Table 5-3: Power consumption of the CLV

The CLV is supplied with 24 V DC ±20 % via the AMS 40-013, -012 connection module.

Power-up delay

The selection of the device number (default setting: 1) influences the power-up delay of the device. This is useful if a large number of CLVs (for example, in the SICK network) is to be supplied from one power source. *Table 5-4* lists the possible interval steps.

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 m	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 5-4: Power-up delay as a function of the device number GN

Hint

The device number can be selected by means of the DEVICE CONFIGURATION tab card of the CLV-Setup user interface.

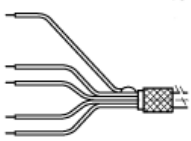
5.4.3 Non-SICK supply system device/wiring without SICK connection module

If a non-SICK supply system device is used instead of the AMV/S 40, it must be able to output at least 10 W continuously and must conform to the standard IEC 742 (functional extra-low voltage).

The output circuit must have a safety separation from the input circuit in accordance with IEC 742 through double isolation and safety isolating transformer.

The wire cross-section for the power supply (Pin 1/Pin 5) must amount to at least 0.15 mm^2.

➢ Use cable No. 6 010 137 with a 15-pin D-Sub HD cable socket and open wire ends to connect the CLV.
The wire color assignment is shown in *Table 5-5*.



Pin	Signal	Wire color
1	+10 ... +30 V DC	Red
2	RxD (terminal)	Violet
3	TxD (terminal)	Yellow
4	Sensor 2	Red-black
5	GND	Black
6	RD+ (RS-422/485)	Light blue
7	RD– (RS-422/485); RxD (RS-232)	Blue
8	TD+ (RS-422/485)	Turquoise
9	TD– (RS-422/485); TxD (RS-232)	Green
10	CAN H	Gray
11	CAN L	Pink
12	Result 1	Brown
13	Result 2	Orange
14	Sensor 1	White
15	SensGND	White-black
–	Shield	White-green

Table 5-5: Wire color assignment of cable No. 6 010 137 (open end)

5.5 Carrying out the electrical installation

5.5.1 Overview of the connection steps

- Connecting the supply voltage
- Wiring the host interface
- Connecting the PC (wiring the terminal interface)
- Wiring the "Sensor 1" and "Sensor 2" switching inputs
- Wiring the "Result 1" and "Result 2" switching outputs

5.5.2 Aids

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

5.5.3 Connecting the supply voltage

If the CLV is supplied with power via the AMV/S 40 connection module, the supply voltage does not have to be wired separately.

1. Ensure that the supply voltage of the AMV/S 40 is switched off.
2. Connect the 15-pin cable plug of the CLV to the corresponding socket of the AMV/S 40 and screw it tight. The connection cable can be extended by 2 m by using the extension cable No. 6 010 075.

The data and function interfaces of the CLV are contacted to the connection module.

– or –

In case of power supply via a non-SICK supply system device:

➢ Connect the power supply to the red wire (Pin 1, +10 ... +30 V DC) and the black wire (Pin 5, GND) of the Cable No. 6 010 137 (also refer to *Table 5-5*).

5.5.4 Wiring the host interface

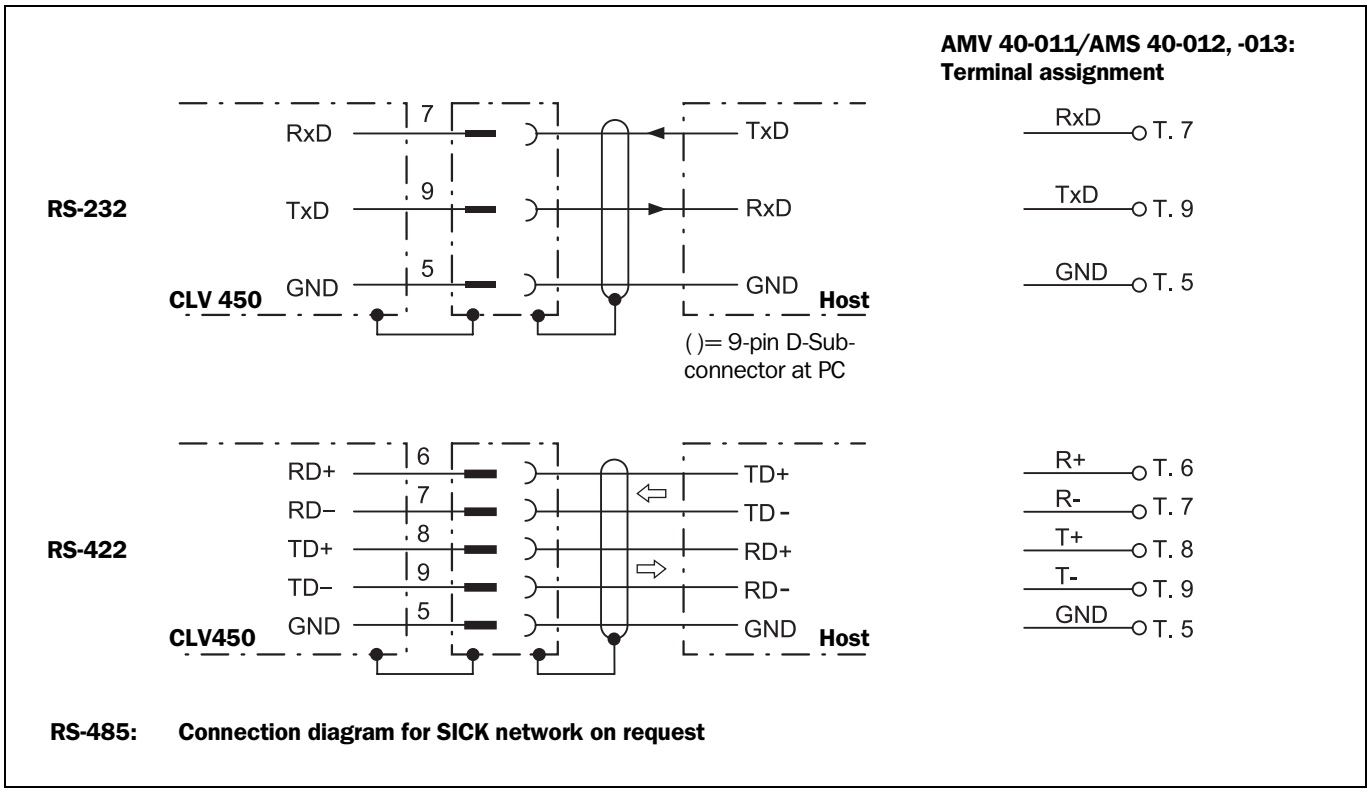


Fig. 5-2: Wiring the host interface

CAUTION

Damage to the interface module!

Electronic components in the CLV can be damaged if the host interface is wired incorrectly. This also applies for the adaptation of the host interface interconnection in the AMV/S 40 connection module (configuration).

- ➢ Wire the host interface correctly in accordance with *Fig. 5-2*.
- ➢ Check the wiring before switching on the CLV.

1. Connect the host interface of the CLV EMC-compatibly to the host by means of shielded cables. Observe the maximum cable lengths (*Table 5-2, Page 5-2*).

Recommendation

2. Apply the shielding at one end.

In the default setting the CLV communicates via the host interface with the host using the values listed in *Table 5-6*.

Parameter	Value
Physical design	RS-422/485
Data transmission rate	9 600 bits/s
Data bits	8
Parity	None
Stop bits	1
Protocol	SICK (Start characters STX, Stop characters ETX, No repeat request: None, Timeout: 50 ms)

Table 5-6: Communication parameters of the host interface (default setting)

The connection of the host interface via the AMV/S 40 connection module is described in the *operating instructions* "*AMV/S 40 connection module*" (Order No. 8 008 292, English edition).

Termination of the RS-422 type

The termination can be carried out in the AMV/S 40 connection module.
Refer to the *Operating instructions* "*AMV/S 40 connection module* ".

Connection to the CL 20 mA interface

In order to connect the RS-422 type to a CL 20 mA interface you can use the optional interface converter No. 2 020 825 for installation in the AMV/S 40 connection module. The wiring is described in the operating instructions "*AMV/S 40 connection module* ".

Activating the RS-232 type

The RS-232 type can be activated by means of the CLV-Setup user interface:

1. Select the HOST INTERFACE tab card.
2. Select the "RS-232" option in the "HARDWARE" list field in the "DATA FORMAT" section.
3. Carry out the download to the CLV. To do so, click on in the toolbar.
   The DOWNLOAD PARAMETERS dialog box is opened.
4. Confirm the dialog box with the saving option PERMANENT.

The CLV operates the host interface in the RS-232 type.

HINT The communication parameters can be changed if required via the HOST INTERFACE configuration tab.

To do so, edit the DATA FORMAT and INTERFACE PROTOCOL sections.

5.5.5 Connecting the CAN interface

Instructions for the connection and for configuration of the CLV to use the device in the SICK-specific CAN Scanner Network or in a CANopen network see the *operating instructions "Application of the CAN interface"* (no. 8 009 180, English edition)

5.5.6 Connecting the PC

The CLV is operated and configured with the "CLV-Setup" software. To this purpose it must be connected to the PC via the terminal interface (auxiliary data interface). In contrast to the host interface the terminal interface has a data format which cannot be modified and a fixed data transmission rate. *Fig. 5-3* shows the wiring of the terminal interface. The cable length should not exceed 10 m.

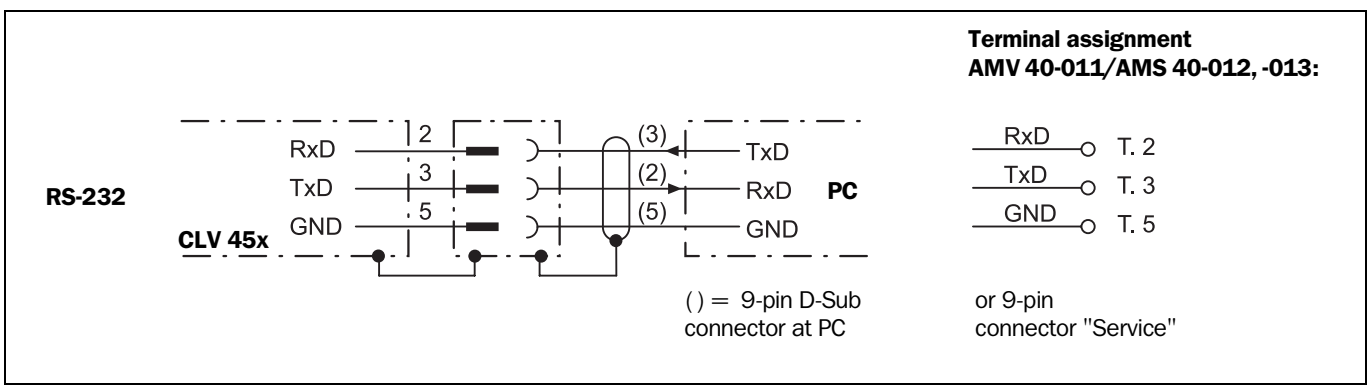


Fig. 5-3: Wiring the terminal interface

1. Switch off the PC and the supply voltage of the SICK connection module.
2. Connect the PC with the internal 9-pin connector "Service" of the connection module. To do so, use an RS-232 data connection cable, for example, No. 2 014 054 (RxD and TxD transposed).

   – or –

   If no SICK connection module is used:
   Connect the PC in accordance with *Fig. 5-3*.
3. Switch on the PC and the supply voltage of the SICK connection module.
4. Set the communication parameters (refer to *Chapter 10.4.3 Starting "CLV-Setup", Page 10-22*).

Hint

In the default setting the terminal interface operates in the READ DIAGNOSIS operating mode when outputting the read results.
The AUXILIARY INTERFACE configuration tab of the CLV-Setup user interface can be used to set the operating mode to MONITOR HOST INTERFACE or to AUXILIARY INPUT.

5.5.7 Wiring the "Sensor 1" switching input

If a reading process of the CLV is to be triggered by an external sensor, the reading pulse sensor is connected to the "Sensor 1" switching input. The triggering type is selected in the default setting of the CLV. *Fig. 5-4* shows the wiring of the "Sensor 1" switching input. *Table 5-7* lists the characteristic data for this input.

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

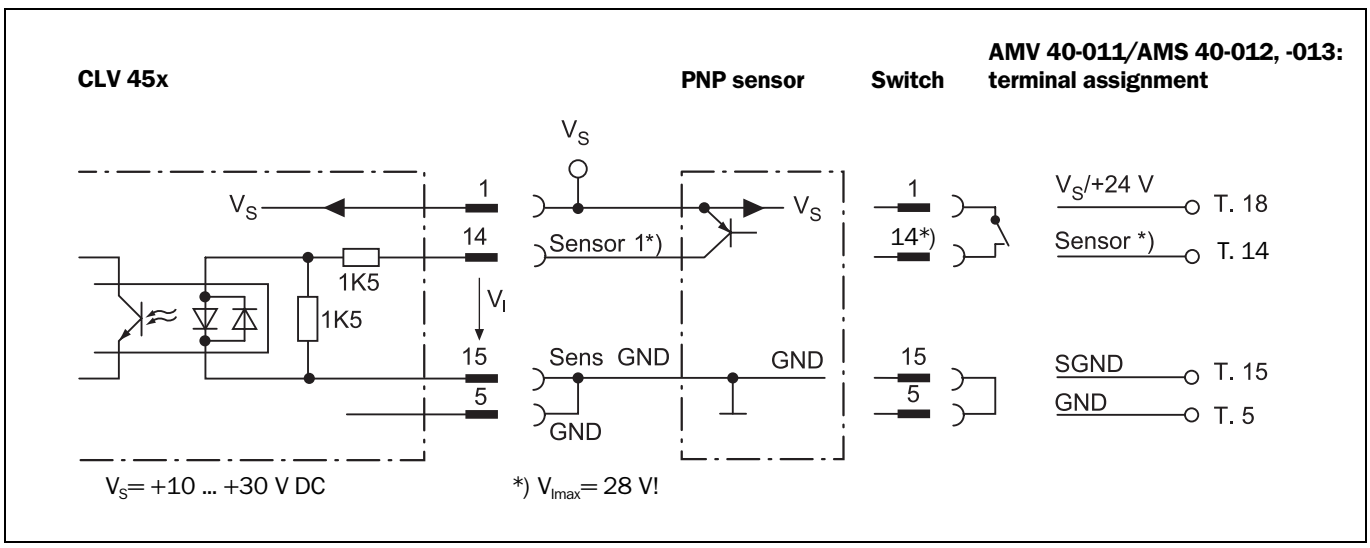


Fig. 5-4: Wiring of the "Sensor 1" switching input

Switching performance	Current on the input starts the reading interval of the CLV. (Default setting: Active high, debouncing: max. 30 ms (standard))
Properties	– opto-decoupled, non-interchangeable – can be wired to the PNP output of a sensor
Electrical values	Low: $-1\ V \le V_I \le +1\ V$ High: $+3\ V \le \lvert V_I \rvert \le +28\ V$ $-0.3\ mA \le I_I \le +0.3\ mA$ $+1.4\ mA \le \lvert I_I \rvert \le +18\ mA$

Table 5-7: Characteristic data of the "Sensor 1" switching input

Hint

The switching performance of the "Sensor 1" inputs can be changed via the DEVICE CONFIGURATION tab card of the CLV-Setup user interface (polarity, debouncing and behavior for the first cycle after switching on).

➢ Click on the EDIT READING TRIGGER command button. Edit the dialog box.

The wiring of the switching input via the AMV/S 40 connection module is described in the *operating instructions "AMV/S 40 connection module* " (Order No. 8 008 292, English edition).

Note No external pulsing is required for the "Percentage evaluation" operating mode.

5.5.8 Wiring the "Sensor 2" switching input

If the focal position changeover is to be triggered by an external sensor, the sensor is connected to the "Sensor 2" input. In combination with the internal assignment table (combinatorics) this implements the change between two distance configurations from a max. of 8 configurations.

The input optionally has the following function for all the CLVs:

- Trigger source for learning the match code 1 (teach-in)
- Conveyor increment input
- Trigger source of the One-Shot function of the oscillating mirror

In the default setting the "focal position changeover" function is selected.
The characteristic data are identical to those of the "Sensor 1" input (*Table 5-7*).

Fig. 5-5 shows the wiring of the switching input. *Table 5-8* shows the combinatorics of the input in relation to the distance configurations.

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

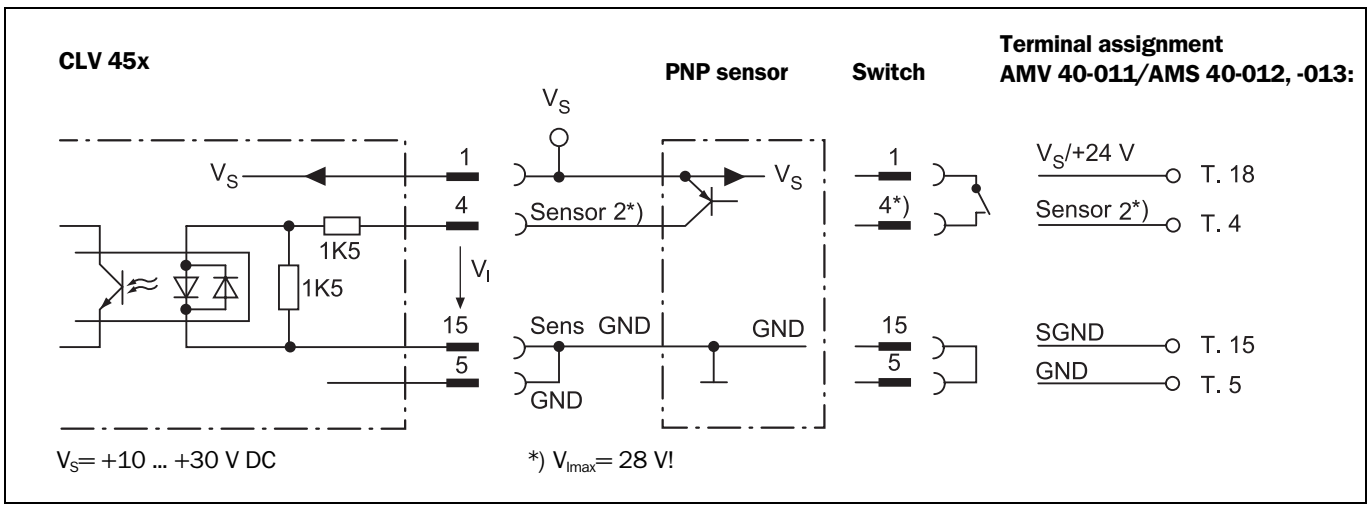


Fig. 5-5: Wiring of the "Sensor 2" switching input

The wiring of the switching input via the AMV/S 40 connection module is described in the *operating instructions "AMV/S 40 connection module*" (Order No. 8 008 292, English edition).

Switching input		**Contents assignment table distance config.**[1)]	
Logic state "Sensor 2" input	**Assignment table index**	**Default setting**	**Example: Photoelectric switches (bright switching)**
0	0	DC 1	DC 2
1	1	DC 2	DC 3
	2	DC 3	DC 3
	3	DC 4	DC 4
	4	DC 5	DC 5
	5	DC 6	DC 6
	6	DC 7	DC 7
	7	DC 8	DC 8
1) Distance configuration (DC): Record for a focal position			

Table 5-8: Focal position changeover: Assignment table switching input – distance configuration

Hint

The function assignment of the "Sensor 2" input can be modified via the DEVICE CONFIGURATION configuration tab of the CLV-Setup user interface.

➢ Click on the FUNCTION SENSOR 2 list box and select the desired function.

The wiring and the procedure for teaching in the match code 1 is described in *Chapter 10.9.1 Triggering the Teach-in match code 1 via the "Sensor 2" switching input, Page 10-40)*.

5.5.9 Wiring the "Result 1" and "Result 2" switching outputs

The two switching outputs can have various functions for the result status output assigned independently of each other. If the assigned event occurs in a reading process, the corresponding switching output becomes live for the selected pulse duration after the end of the reading pulse. The pulse duration is the same for both outputs.

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

Fig. 5-6 shows an example of the wiring of the "Result 1" switching output. *Table 5-9* describes the characteristic data for the outputs. The characteristic data of the two outputs are identical.

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

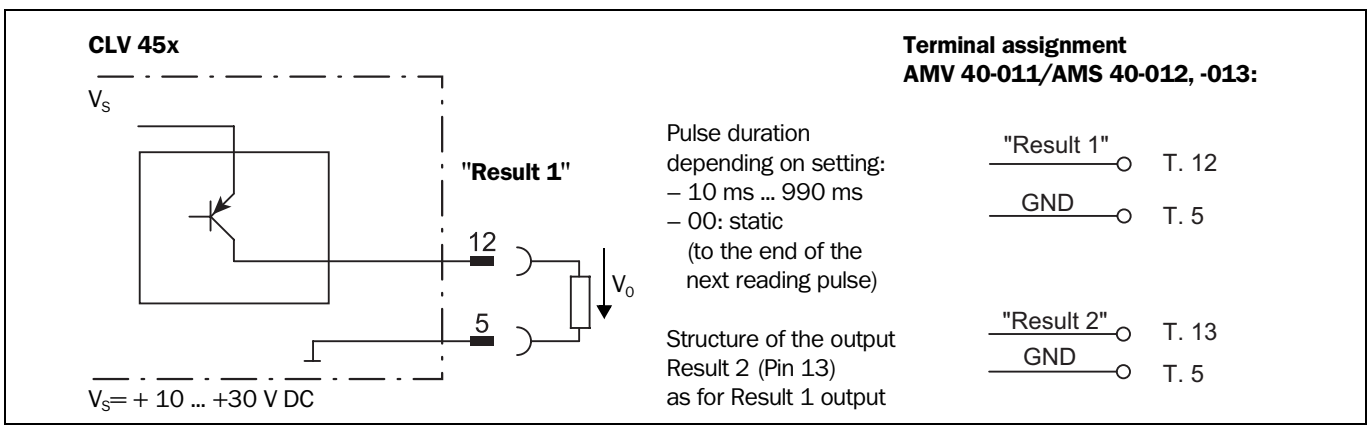


Fig. 5-6: Wiring of the "Result 1" switching output

The wiring of the switching outputs via the AMV/S 40 connection module is described in the *operating instructions "AMV/S 40 connection module" (Order No. 8 008 292, English edition).*

Switching performance	PNP-switching against the supply voltage V_s
Properties	short-circuit-proof + temperature-protected, not electrically isolated from V_s
Function assignment (default setting)	Result 1: "Device Ready (static)", Polarity: Not inverted Result 2: "Good Read", Polarity: Not inverted Pulse duration: 100 ms
Electrical values	$(V_s - 1.5\ V) \leq V_0 < V_s$ at $I_0 \leq 100$ mA

Table 5-9: Characteristic data of the switching outputs "Result 1" and "Result 2"

Note In the "Device Ready" function the output delivers a static pulse, if the CLV is in reading mode.

Hint The output function, the pulse duration (timer) and the polarity of the signals can be modified by using the DEVICE CONFIGURATION configuration tab of the CLV-Setup user interface.

- Click on the EDIT RESULT OUTPUTS command button. Edit the dialog box.

Recommendation

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

6 Operation

6.1 Overview of the startup steps

- Start up the CLV with the factory default setting (Quick-Start).
  With this configuration, the CLV can be operated without being connected to a PC
- Connect the PC (refer to *Chapter 5.5.5 Connecting the CAN interface, Page 5-6*) and install the CLV-Setup PC software (refer to *Chapter 10.4 Installing and operating the "CLV-Setup" PC software, Page 10-20*)
- Configure (parameterize) the CLV for the desired application.

6.2 Default setting

Table 6-1 and *Table 6-2, Page 6-2* contain an overview of the factory default setting for the CLV. The default parameters are such that the CLV can be put into operation either straight away or following a few minor adjustments. With the default setting no PC is required for starting up.

The default settings are stored permanently both in the CLV (ROM) and in the CLV-Setup database. They can be downloaded at any time into the RAM of the CLV or displayed in the tab cards of the CLV-Setup.

Displaying and printing out the complete default setting in CLV-Setup

1. In order to save the current settings in the parameter record, select the SAVE AS menu item under FILE in the menu bar and enter a file name in the dialog box.
   CLV-Setup saves the current settings in a configuration file with the extension "*.scl".
2. Click on  in the toolbar.
   CLV-Setup loads the default setting from its internal database and displays them in the tab cards.
3. Click on  in the toolbar.
   The PRINT FILE dialog box is opened.
4. If desired, a comment can be entered in the input field for the header of the printout. Confirm the dialog box with "OK".
   The PRINT dialog box for configuring the printer is then displayed.
5. Edit the dialog box correspondingly and confirm.

CLV-Setup prints out the complete default setting 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 setting of line scanner

Parameter	**CLV 450**	**CLV 451**
Decoder	SMART decoder	
Active code types	Code 39, 2/5 Interleaved, Code 128	
Code length	Freely assignable (2/5 Interleaved: Interval 4 ... 50 characters)	
Segmentation	Start/stop ratio, automatic	
Min./max. code position	0/100 CP	
Multiple reading	3	
Min./max. no. of codes	1	
Scanning frequency	600 Hz	800 Hz
Resolution (min. bar width)	0.35 mm	0.5 mm
Focus control	8 distance configurations	
Focal positions	DC 1: 900 mm, DC 2: 500 mm, DC 3: 200 mm, DC 4 ... DC 8: 200 mm	AK 1: 550 mm
Trigger	"Sensor 2" switching input/serial interface	
Reading pulse source	Start: "Sensor 1" switching input (active high); End: "Sensor 1" switching input	
"Sensor 2" switching input	Focal control changeover	
"Sensor 1" switching input	Start and end of reading pulse (level: active high), debouncing 20 ... 30 ms	
Switching outputs	Not inverted; pulse duration: 100 ms	
Status output function	Result 1: "Device Ready" (static), Result 2: "Good Read"	
Beeper	Status output function: "Good Read", Beeper "ON"	
Configuration to host	Stand-alone	
Destination of result data strings	Host interface	
Device number	1	
Host interface (type)	RS-422/485	
Protocol	NAK; Start character: STX, Stop character: ETX	
Transfer rate	9 600 bits/s	
Data format	8 data bits, no parity, 1 stop bit	
Output format	Header: blank; Separator: blank; Terminator: blank; Error string: NO READ + separator	
Output sorting	In accordance with code position	
Output time	Read result: end of reading intervall Separator: after code	
Test string	Not activated	
Terminal interface	RS 232, 9 600 bits/s, 8 data bits, no parity, 1 stop bit (values cannot be changed)	
Function	Reading diagnosis	

Table 6-1: Extract: Default setting of the line scanner parameter values

6.2.2 Default setting of line scanner with oscillating mirror

Default setting as for line scanner, with following additions

Parameter	**Default setting**
Oscillating amplitude	± 40 CW (corresponds to an angle of deflection of –20° ... + 20°)
Operating mode	Oscillating with maximum amplitude
Oscillating frequency	1 Hz
Fixed position	50 CW (corresponds to a light emission under 105°)

Table 6-2: Extract: Default setting of additional parameter values of the line scanner with oscillating mirror

6.3 Quick-Start

A PC does not have to be connected if the CLV is operated with the factory default setting.

6.3.1 Starting up the line scanner/line scanner with oscillating mirror with the factory default setting

1. Connect the CLV to the SICK AMV/S 40 connection module.
2. Connect the reading-pulse sensor (e. g. photoelectric reflex switch or switch) to the "Sensor 1" switching input of the CLV via the AMV/S 40 (refer to *Chapter 5.5.7 Wiring the "Sensor 1" switching input, Page 5-7*).
3. Switch on the supply voltage of the AMV/S 40.
   After the start the CLV confirms the successful self-test with a beeper sound and shortly afterwards starting of the reading mode is signaled by two consecutive sounds. The "Device Ready" LED lights up. The "Result 1" ("Device Ready") output switches.

   Line scanner with oscillating mirror:
   In reading mode the CLV deflects the scan line in the default setting with a frequency of 1 Hz around the position CW = 50 at a maximum angle of ± 20°. 50 CW corresponds to a light emission under 105°.
4. Start the reading pulse: Block the light path of the photoelectric switch or close the switch.
   The "Laser On" LED lights up. The CLV switches the laser diode on and the scan line appears.
5. Present the bar code pattern in *Fig. 6-1* to the CLV 450 respectively the bar code pattern in *Fig. 6-2, Page 6-4* at the reading distance specified in *Table 6-3, Page 6-4*.
6. Align the bar code in such a way that the red scan line is almost at a 90° angle to the bars (line scanner) or that the red scan line sweeps the bars at a 90° angle when it is deflected (oscillating mirror).
7. End the reading pulse: Unblock the light path of the photoelectric switch or open the switch.
   The "Laser On" LED is extinguished. The CLV switches off the laser diode.
   The CLV confirms that the bar code was read successfully by outputting an acoustic signal via the beeper. The "Result" LED lights up for duration of 100 ms. The "Result 2" ("Good Read") output switches for the duration of 100 ms.

The CLV can now be operated with the factory default setting.

The device can be switched off without the configuration data being lost as no changes have been made to the parameter record.

Fig. 6-1: Bar code patter for CLV 450 (Code 39; module width 0.35 mm; Print ratio 2:1)

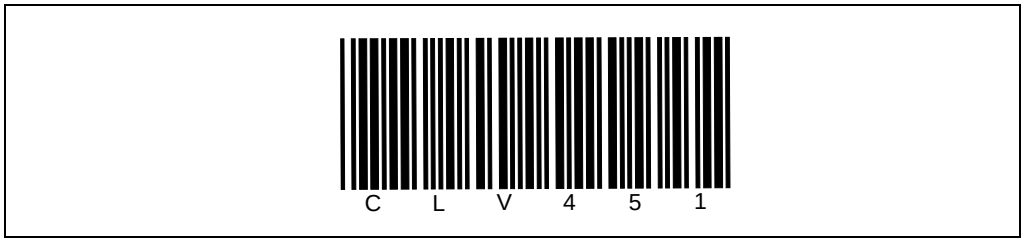


Fig. 6-2: Bar code patter for CLV 451 (Code 39; module width 0.5 mm; Print ratio 2:1)

Device type	Scanning process	Reading distance
CLV 450-0010	Line scanner	approx. 900 mm (DC 1)
CLV 450-6010	Line scanner with oscillating mirror	approx. 900 mm (DC 1)
CLV 451-0010	Line scanner	approx. 550 mm (DC 1)
CLV 451-6010	Line scanner with oscillating mirror	approx. 550 mm (DC 1)

Table 6-3: Reading distances of CLV 450 and CLV 451 (default) for quick start

6.4 Configuration (parameterizing)

The CLV is configured locally to suit the local reading situation. This ensures that the reading, evaluation and output properties can be parameterized as required. The initial base is the factory default setting or an application-specific parameter record already created for the CLV.

The CLV supports four different configuration methods:

- Configuration by means of the "CLV-Setup" PC software and the CLV assistant (parameter values are set via the serial interface)
- Configuration by means of Auto Setup (reading and code configurations for one bar code are adapted automatically via the optical interface (reading window)) (refer to *Chapter 6.4.4 Configuring the CLV with Auto Setup, Page 6-14*)
- Configuration by means of Profile bar codes (parameter values are set via the optical interface (reading window)) (refer to *Chapter 10.5 Configuring the CLV by means of Profile bar codes, Page 10-28*)
- Configuration by means of command strings (parameter values are set via the serial interface) (refer to *Chapter 10.5.2 Profile progamming, Page 10-30*)

The CLV does not output any read results in parameterization mode with the exception of Auto Setup.

6.4.1 Configuring the CLV by means of the CLV-Setup user interface

In order to be able to use the "CLV-Setup" software, a PC has to be connected and the software installed on it. Connection of the PC to the CLV is described in *Chapter 5.5.5 Connecting the CAN interface, Page 5-6*. Installing and starting the "CLV-Setup" software as well the handling of the user interface are described in the Appendix (*Chapter 10.4 Installing and operating the "CLV-Setup" PC software, Page 10-20*).

Transferring a parameter record between CLV-Setup and the CLV

CLV-Setup runs in **offline** mode while the CLV is being parameterized. In order to be able to modify the current parameter record of the CLV, this first has to be loaded to CLV-Setup

from the CLV. This process is designated as **uploading** ("Upload from CLV"). During it CLV-Setup always loads a complete copy of the current parameter record from CLV. This remains unchanged there until it is overwritten by the CLV-Setup. On the other hand, the pop-up menu (right-hand mouse button) is used to load only the parameter currently being edited from the RAM of the CLV ("Upload parameter").

Changes made to the current parameter record in CLV-Setup do not take effect until the parameter record has been transferred to the CLV. CLV-Setup always loads a copy of the complete parameter record to the CLV, so that all the previous parameter values are overwritten in the CLV. Transferring and saving the parameter values in the CLV is designated as **downloading** ("Download to CLV"). On the other hand, the pop-up menu (right-hand mouse button) is used to load only the parameter currently being edited temporarily into the RAM of the CLV ("Download parameter").

Loading a complete parameter record from the CLV (uploading)

➢ Click on  in the toolbar.
CLV-Setup loads the current CLV parameter record from the RAM of the CLV to its database and displays the values in the tab cards.
The "Device Ready" LED is extinguished during the transfer process.

If the “CLV-Setup“ program does not recognize the parameters transferred during the upload, it outputs a warning message. Unknown parameters can be edited in the EXTRAS tab card if the conventions for command strings are observed. These parameters are also taken into consideration when the parameter record is saved.

Transferring a complete parameter record to the CLV and saving it (downloading)

1. Click on  in the toolbar.
   The "Device Ready" LED is extinguished.
   CLV-Setup copies the parameter record to the RAM of the CLV.
   The DOWNLOAD PARAMETERS dialog box with the storage options is then displayed.
   - PERMANENT: CLV-Setup copies the parameter record to the RAM and to the EEPROM of the CLV.
   - TEMPORARY: CLV-Setup copies the parameter record to the RAM only. The changes are lost when the CLV 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 record is saved in the CLV.

Saving the parameter record in the CLV-Setup

1. In order to save the modified parameter record as a new configuration file in CLV-Setup, or to overwrite an existing file, select FILE and SAVE AS.
   The CLV FILE SELECTOR 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 record is now stored in CLV-Setup in the subdirectory "data".

6.4.2 Function of the tab cards in CLV-Setup (overview)

Reading configuration

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

- Scanning frequency
- Focal position changeover (min. reading distance, focal position, evaluation range of the scan line, deflection range of the oscillating mirror, assignment table of the distance configuration)
- Trigger source of the focal position changeover
- Start/stop ratio
- Adapting the reading function to the quality of the bar codes

Device configuration

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

- Device number
- Source of the reading pulsing
- Output time of the read result referenced to the start of the reading pulse
- Spatial parameters
- Output filter
- Laser timeout
- Physical arrangement for data output via the host interface (Stand-alone, master/slave)
- Functional assignment of the "Sensor 2" switching input
- Functional assignments of the "Result 1" and "Result 2" switching outputs
- Functional assignment and activity of the beeper
- Mode for programming match code 1 (teach-in) via the "Sensor 2" switching input
- Match code comparison

Code configuration

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

- Type of active decoder (SMART and/or standard decoder)
- Activation of the evaluation routines for individual code types
- Number of identical reads (multiple reads)
- Minimum and maximum number of bar codes to be read/output
- Activation of the code position comparison for separation of identical bar codes

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

Host interface

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

- Target of the result output
- Active physical interface (RS 422/485 or RS 232)
- Data format and transfer rate
- Data transfer protocol
- Start and stop characters of the interface protocol

Data string

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

- Data output format of the host interface
- Constants and reading diagnosis data in the header, separator and terminator
- Arrangement of the separators in the data string
- Output format for no reads and contents of the error string
- Test string function
- Output sequence and sort criteria for reading more than one bar code per reading pulse
- Activating and structure of the format mask

CAN interface

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

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

Auxiliary interface

This tab card is used to set the following:

- Operating mode of the terminal interface

Oscillating mirror

This tab card is used to set the following:

- Operating mode of the oscillating mirror
- Oscillating frequency
- Deflection range (oscillating amplitude)
- Instant of activity of the oscillation mode referenced to the reading pulse
- Trigger source for One-Shot

Extras

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

Note The "CLV-Setup Help" online help contains a detailed description of the functions of the parameters and their valid entries (for calling the help refer to *Chapter 10.4.6 "CLV-Setup Help" online help, Page 10-25*).

6.4.3 Guide to parameterization

Overview of parameterization steps

- Adjusting the optical read properties of the scanner
- Configuring a reading trigger
- Adjusting the decoder's evaluation properties
- Adjusting the output properties (data, result status)
- Specifying the terminal interface function (auxiliary data interface)

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

a) Adjusting the optical reading properties

- Scanning frequency ⇨ READING CONFIGURATION tab card ⇨ Reading parameters
- Blank zone ⇨ READING CONFIGURATION tab card ⇨ Segmentation
- Poor quality bar code print ⇨ READING CONFIGURATION tab card ⇨ Code label quality

Setting up the focal position changeover

Action	Line scanner	Line scanner with oscillating mirror
1. Activate changeover of distance configuration/focal position (select trigger source)	⇨ READING CONFIGURATION tab card ⇨ FOCUS TRIGGER SOURCE – Inputs/Serial or – Timer ⇨ TIMER or – Static/no triggering	⇨ READING CONFIGURATION tab card ⇨ FOCUS TRIGGER SOURCE – Inputs/Serial or – Timer ⇨ TIMER or – Static/no triggering or – *Oscillating mirror extrema*
2. Select the changeover point (referenced to reading pulse)	FOCUS TRIGGER SOURCE ⇨ Inputs/Serial – Immediate or synchronous – Latched	FOCUS TRIGGER SOURCE ⇨ Inputs/Serial – Immediate or synchronous – Latched
3. Set up distance configurations/focal positions	DISTANCE CONFIGURATION/ASSIGNMENT TABLE ⇨ Distance configuration – Minimum distance – Focus position – Minimum code position CP – Maximum code position CP ⇨ Assignment table – Index – Number of valid configurations	DISTANCE CONFIGURATION/ASSIGNMENT TABLE ⇨ Distance configuration – Minimum distance – Focus position – Minimum code position CP – Maximum code position CP – *Oscillating mirror amplitude CW* ⇨ Assignment table – Index – Number of valid configurations
4. At triggering mode INPUTS/SERIAL: Select function for "Sensor 2" switching input	⇨ DEVICE CONFIGURATION tab card ⇨ ASSIGNMENT SENSOR 2 – Focus control	⇨ DEVICE CONFIGURATION tab card ⇨ ASSIGNMENT SENSOR 2 – Focus control

Table 6-4: Guide: Parameterizing the changeover of the distance configuration/focal position

Note The limitation of the active evaluation range of the scan line (MIN. AND MAX. CODE POSITION) can be checked in the SHOW CP LIMITS mode (refer to *Chapter 6.5.4 Show CP limits, Page 6-23*).

Setting up the oscillating mirror functions

Action	Line scanner with oscillating mirror
1. Select the "Oscillating with constant maximum amplitude" operating mode (identical deflection ranges at changeover of the distance configurations/focal positions) **– or –**	⇨ OSCILLATING MIRROR tab card ⇨ OSCILLATING MIRROR – Oscillating mode ⇨ OSCILLATING MODE – Frequency
2. Select "Oscillating with variable amplitude" mode (Deflection range can be selected for each distance configuration at a changeover of the distance configurations/focal positions) **– or –**	⇨ OSCILLATING MIRROR tab card ⇨ OSCILLATING MIRROR – Oscillating with variable amplitude ⇨ OSCILLATING MODE – Frequency ⇨ READING CONFIGURATION tab card ⇨ DISTANCE CONFIGURATIONS – Oscillating mirror amplitude
3. Select "Fixed position" mode **– or –**	⇨ OSCILLATING MIRROR tab card ⇨ OSCILLATING MIRROR – Fixed position ⇨ FIXED POSITION – Stationary position CW
4. Select "One-Shot" mode	⇨ OSCILLATING MIRROR tab card ⇨ OSCILLATING MIRROR – One-Shot ⇨ ONE-SHOT ⇨ PHASE 1 – Mirror Speed – Start Position – Distance configuration (No.) ⇨ PHASE 2 – Mirror Speed – Start position – Distance configuration (No.)
5. With One-Shot: Select trigger source	⇨ OSCILLATING MIRROR tab card ⇨ ONE-SHOT ⇨ TRIGGER MODE – Reading Trigger Pulse or – "Sensor 2" switch input or – Serial interface
6. At One-Shot and trigger source "Sensor 2" switching input: Select function for switching input	⇨ DEVICE CONFIGURATION tab card ⇨ ASSIGNMENT SENSOR 2 – One-Shot
7. Select instant of activity of the "Oscillating with ..." operating mode	⇨ OSCILLATING MIRROR tab card ⇨ OSCILLATING MIRROR ACTIVE – Continuous – During reading gate

Table 6-5: Guide: Parameterizing the oscillating reading mirror functions

Explanation of oscillating mirror functions

"Oscillating with fixed amplitude" operating mode

The oscillating mirror deflects the scan line up to the maximum deflection range of ± 40 CW (corresponding to ± 20°). *Fig. 6-3* displays the scheme at a reading from above.

"Oscillating with Variable Amplitude" operating mode

The deflection range can be parameterized separately for each of the maximum of 8 distance configurations/focal positions. The limitation of the deflection range for fast applications ensure that the scan line only sweeps areas that contain bar codes during the time available. At the same time this allows an almost constant scan line density on the object. *Fig. 6-4* shows the application at a reading from above.

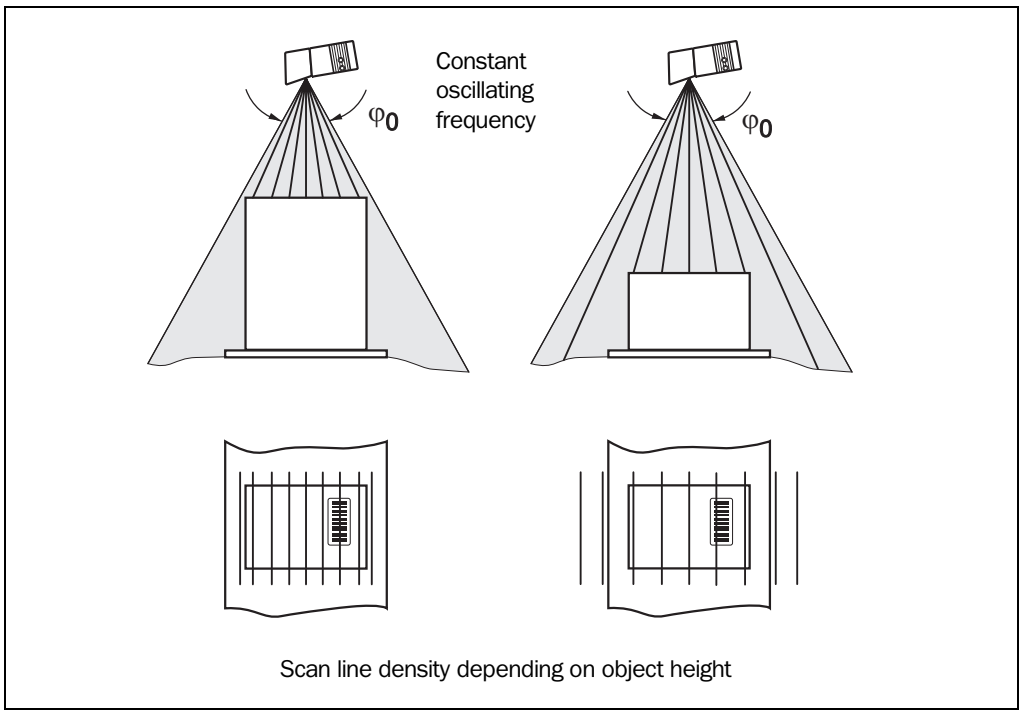


Fig. 6-3: "Oscillating with fixed amplitude" operating mode

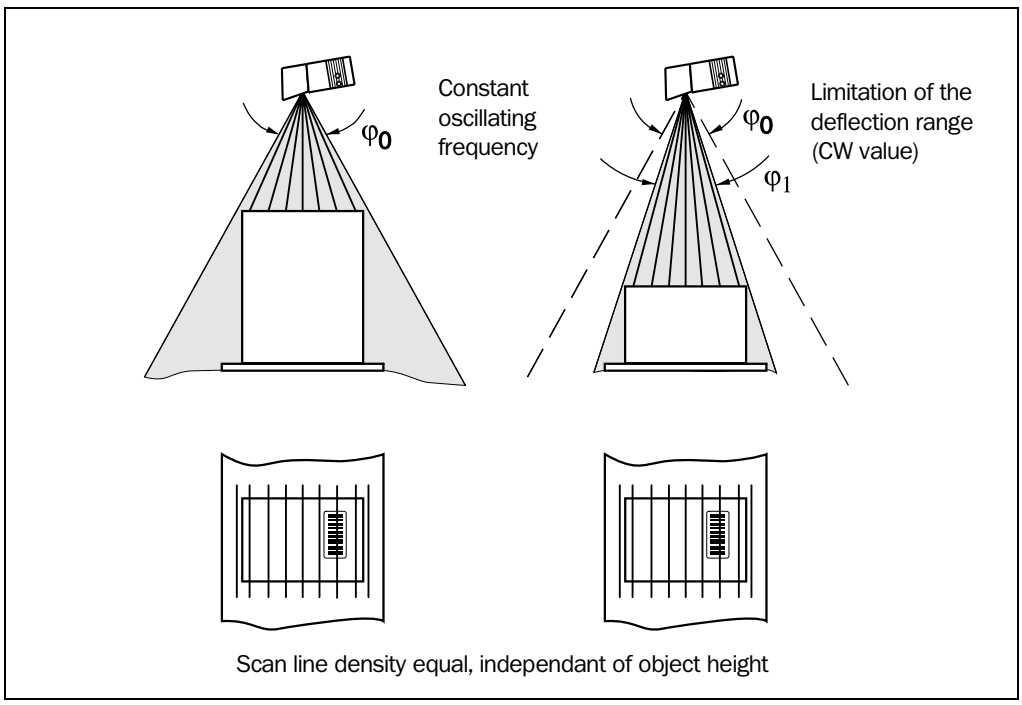


Fig. 6-4: "Oscillating with variable amplitude" operating mode

"Fixed position" operating mode

The CLV parks the oscillating mirror at the desired position. 10 CW correspond to –20°, and 90 CW to +20° (*Fig. 4-8, Page 4-6*). In the default setting, the fixed position is set to 50 CW (angle of deflection of 105°). The oscillating mode is switched off.

"One-Shot" mode

In the "One-Shot" mode the oscillating mirror only performs one specific oscillating movement per reading interval. This movement consists of a forward phase and a return phase. The start position of the scan line, the mirror speed and the valid distance configuration can be parameterized separately for each phase. The end position of the one phase forms the start position of the other phase. *Fig. 6-5* shows an example for the application in object tracking. During the forward phase, the front of the object that moves towards the oscillating mirror is swept once by the scan line from top to bottom in accordance with the conveyor speed. Multiple focus position switchovers are not necessary as the required reading range (DOF) is much smaller than with the line scanner. *Chapter 10.7.2 Calculating the start position and mirror speed for the forward and return phase of the One-Shot function, Page 10-37* explains how the start position and mirror speed are calculated for a given conveyor speed.

Possible trigger sources for One-Shot:

- "Sensor 2" switching input
- Command string (via serial interface)
- Start of the reading interval

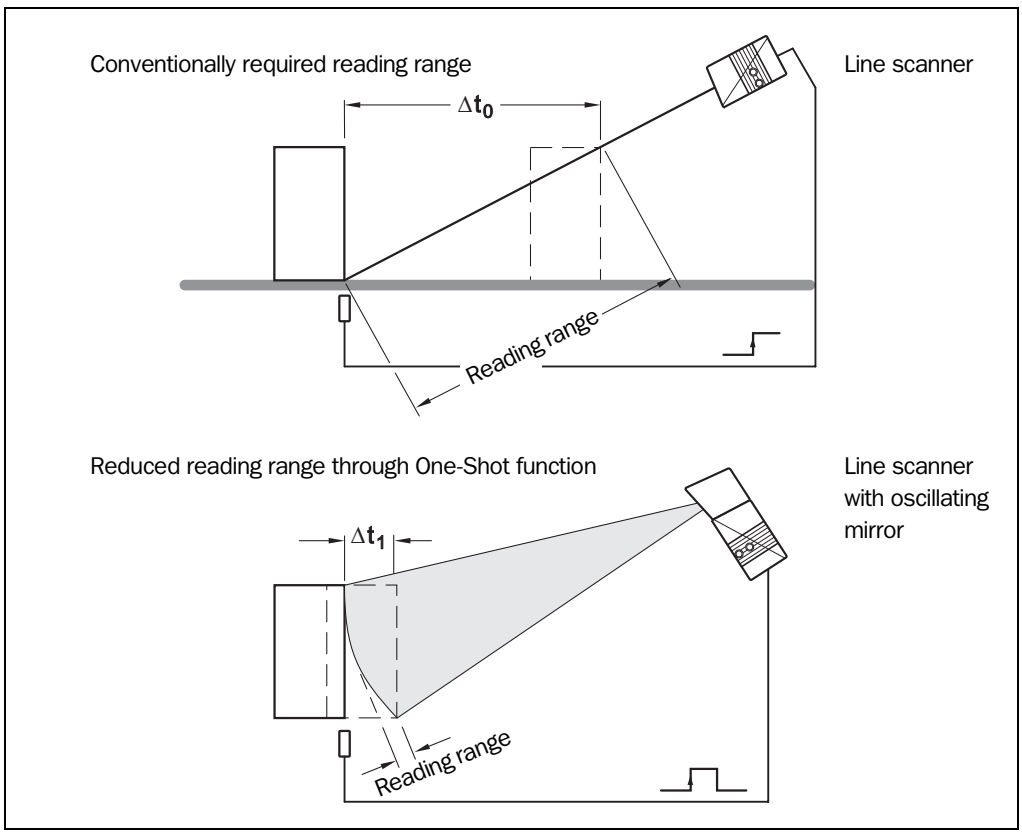


Fig. 6-5: One-Shot: Object tracking (bar code read from front)

b) Parameterizing the reading trigger source

Action	Settings
1. Reading pulse: Select source for start	⇨ DEVICE CONFIGURATION tab card ⇨ EDIT READING TRIGGER – Sensor input active high or – Sensor input active low or – Serial interface or – Free-running with timeout
2. At pulse source "Sensor Input 1": Select debouncing and response at first trigger	⇨ EDIT READING TRIGGER ⇨ DEBOUNCING SENSOR – Standard or – Fast ⇨ FIRST TRIGGER – Dynamic or – Static
3. For pulse source "Serial interface": Select trigger character	⇨ EDIT READING TRIGGER ⇨ SERIAL INTERFACE – Standard trigger or – Single character
4. Pulse source "Free-running": Select timeout	⇨ EDIT READING TRIGGER ⇨ END OF LABEL/FREE-RUNNING – Timeout
5. Reading pulse: Select source for end	⇨ EDIT READING TRIGGER ⇨ END OF READING INTERVAL – By reading pulse source or – Timer

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

c) Parameterizing the laser timeout

Action	Settings
1. Select duration for laser-timeout **– or –**	⇨ DEVICE CONFIGURATION tab card ⇨ EDIT READING TRIGGER ⇨ LASER TIMEOUT – Duration
2. De-activate laser timeout (Laser diode always active at pulsing irrespective of the pulse duration)	⇨ LASER TIMEOUT – Click on the INTERVAL ACTIVE check box (de-activated)

Table 6-7: Guide: Parameterizing the laser timeout

d) Parameterizing the evaluation characteristics

- Select the decoder type ⇨ CODE CONFIGURATION tab card ⇨ "Decoder"
- Enable the code type for evaluation ⇨ CODE CONFIGURATION tab card ⇨ "Codes" and "Edit codes"
- Activate the code comparison ⇨ DEVICE CONFIGURATION tab card ⇨ "Code comparison"
- Teach-in mode for the match code 1 via "Sensor 2" switching input" ⇨ DEVICE CONFIGURATION tab card ⇨ "Teach-in"
- Specify the output instance of the read result
  ⇨ DEVICE CONFIGURATION tab card ⇨ EDIT READING TRIGGER ⇨ Output at "Good Read".

Number of bar codes per object	**Line scanner**	**Line scanner with oscillating mirror**	
	Stationary/moving conveyor object	**Stationary conveyor object**	**Moving conveyor object**
1. Number n = 1	⇨ CODE CONFIGURATION tab card ⇨ CODE POSITION – **De-activate** "Compare"!	⇨ CODE CONFIGURATION tab card ⇨ CODE POSITION – **De-activate** "Compare"!	⇨ CODE CONFIGURATION tab card ⇨ CODE POSITION – **Activate** "Compare"! ⇨ NUMBER OF CODES – Minimum – Maximum ⇨ DEVICE CONFIGURATION tab card ⇨ EDIT OPC SPATIAL PARAMETERS – Label distance – Length increment vector – Angle increment vector
2. Number n > 1: – Same code type – Contents different or identical	⇨ CODE POSITION – **Activate** "Compare"! ⇨ NUMBER OF CODES – Minimum – Maximum	⇨ CODE POSITION – **Activate** "Compare"! ⇨ NUMBER OF CODES – Minimum – Maximum	
3. Number n > 1: – Code type different – Contents different or identical	⇨ CODE POSITION – **De-activate** "Compare"! ⇨ NUMBER OF CODES – Minimum – Maximum	⇨ CODE POSITION – **De-activate** "Compare"! ⇨ NUMBER OF CODES – Minimum – Maximum	

Table 6-8: Guide: Settings to be carried out for evaluating identical bar codes

e) Parameterizing the output characteristics

Result status

- Define function of result status output of "Result 1" and "Result 2" switching outputs: ⇨ DEVICE CONFIGURATION tab card ⇨ "Edit result outputs"
- Define function of result status output and activity of beeper: ⇨ DEVICE CONFIGURATION tab card ⇨ "Edit result outputs"

Main Data Interface general

- Target of the read result ⇨ HOST INTERFACE ⇨ "Destination of result data strings"
- Filter read result ⇨ DEVICE CONFIGURATION tab card ⇨ "Odette filter"
- Sort reading result ⇨ DATA STRINGS tab card ⇨ "Output sequence sort"
- Mask reading result ⇨ DATA STRINGS tab card ⇨ "Format mask"

Host interface

- Arrangement in data network ⇨ DEVICE CONFIGURATION ⇨ "CLV Arrangement"
- Active physical interface ⇨ HOST INTERFACE ⇨ "Data format"
- Communication parameters ⇨ HOST INTERFACE ⇨ "Data format"
- Protocol ⇨HOST INTERFACE ⇨ "Interface protocol"

Function of the CAN interface (alternative)

See the *operating instructions "Application of the CAN interface"* (no. 8 009 180, English edition)

Data output string of host interface

- Select contents of header, separator and terminator ⇨ DATA STRINGS tab card ⇨ "Output format"
- Position of separator in data output string ⇨ DATA STRINGS tab card ⇨ "Separator output"

- Set wrong read format ⇨ DATA STRINGS tab card ⇨ "Wrong read format", "Number of characters" and "Error string"
- If necessary, parameterize/activate test string ⇨ DATA STRINGS tab card ⇨ "Test string"
- Parameterize special functions ⇨ DATA STRINGS tab card ⇨ "Specials"

f) Parameterizing the auxiliary interface function

- AUXILIARY INTERFACE tab card

6.4.4 Configuring the CLV with Auto Setup

Auto Setup enables the reading and code configurations of the CLV to be adapted automatically to the existing read situation. The following conditions must be fulfilled for the execution:

- **One** bar code (code type, code length)
- Fixed reading distance
- No transport movement (static reading)

The CLV determines the code type, code length, the optimum focal position and the most favorable scanning rate for the bar code presented. This takes place in Free running mode with the standard decoder even if the SMART decoder may have been preselected beforehand for the Reading mode. Once Auto Setup has been completed successfully, the CLV copies the parameter values determined to its parameter record. **All other code types and code lengths are disabled for further readings.** If Auto Setup was not completed successfully, the parameter record is not changed. In Auto Setup the CLV does not read a Pharmacode or an EAN or UPC attachments. It does not react to an external reading pulse.

Auto Setup can be activated in three different ways in the CLV:

- By means of the CLV-Setup user interface
- By presenting Profile bar code No. 10 on the card supplied to the optical interface (reading window)
  See *Chapter 10.5.1 Activate Auto Setup with Profile bar code, Page 10-28*.
- By means of a command string (via the serial interface)
  See *Chapter 10.6 Configuring the CLV with command strings, Page 10-33*.

While Auto Setup is running, the CLV outputs the step-by-step changes made to the parameter values in the search mode as well as the determined diagnostic data via the terminal interface in the form of a list. The list can be displayed, for example, in the terminal emulator of CLV-Setup. Once Auto Setup has been completed, appropriate error messages are output for diagnosed malfunctions in the event of a no read.

Explanation **Auto Setup procedure**

1. The CLV moves across the entire focal position range in steps of 25 mm from F = 200 mm to 1 200 mm at a scanning frequency of 600 Hz. It evaluates the reading quality of 100 scans at each focal position.
2. When it reaches the part of the focal position range with the highest reading quality, the CLV determines 5 positions from which it then mathematically calculates the maximum reading quality and the focal position.
3. The CLV approaches this calculated focal position and performs a verification read.
4. If the reading quality is >75 %, the CLV increases its scanning frequency in steps of 100 Hz, starting at 400 Hz, up to 1 000 Hz. Once again, it evaluates the reading quality

of 100 scans for each step. If the reading quality is lower, the CLV changes further parameter values internally.

5. The CLV performs verification reads around the scanning frequency with the highest reading quality at a scanning frequency lying 50 Hz above and 50 Hz below it.
6. It then copies the optimum scanning frequency, the focal position, as well as the code type and code length in its parameter record.

Activating Auto Setup by means of the CLV-Setup user interface

In CLV-Setup, Auto Setup can be started by selecting the appropriate menu path, via the terminal emulator or as an executable device function (interactively). We recommend starting the Auto Setup by means of the terminal emulator since the progress display is better.

Preparing Auto Setup

1. Switch on the supply voltage of the AMV/S 40 connection module (of the CLV).
   After the start the CLV confirms the successful self-test with a beeper sound and shortly afterwards starting of the reading mode is signaled by two consecutive sounds. The "Device Ready" LED lights up.

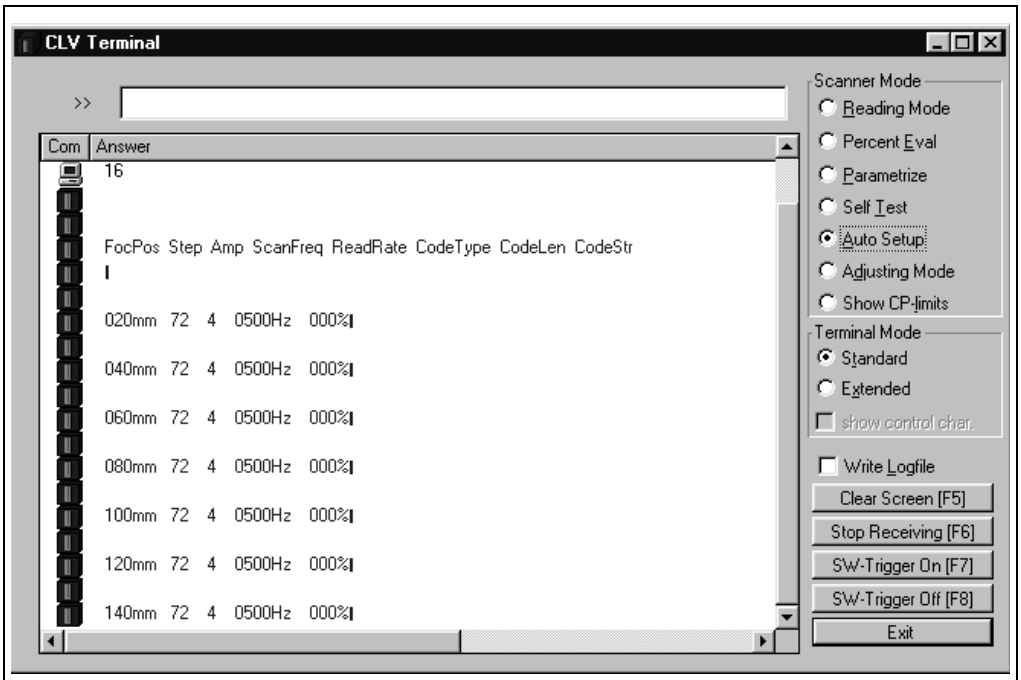
   Line scanner with oscillating mirror:
   In the Auto Setup mode the CLV behaves in the following manner:
   - in “Oscillating“ mode (default setting: oscillating with a fixed amplitude), the CLV shuts off oscillation and positions the scan line under the angle CW = 50 (corresponding to an angle of deflection of 105°). This position cannot be altered.
   - in “One-Shot“ mode, the CLV also positions the scan line under the angle CW = 50.
   - in “Set Position“ mode, the scan line’s selected position remains unchanged.
2. Upload the current parameter record from the CLV with CLV-Setup (the parameter records initially contains the factory default settings).
   CLV-Setup displays the values in the tab cards of the user interface.
3. Auto Setup overwrites important values in the current parameter record of the CLV. Save the existing parameter record as a configuration file "*.scl" in CLV-Setup before you change the parameter recordings (refer to *Chapter 6.4.1 Configuring the CLV by means of the CLV-Setup user interface, Page 6-4*).

Carrying out the Auto Setup

1. Click on in the toolbar.
   The terminal emulator is then opened. The CLV is in the Reading mode.
2. Present the application-specific bar code to the CLV at the maximum reading distance for the application. Take the limit values of the CLV into consideration (refer to the reading field diagrams in *Chapter 10.2 Specification diagrams, Page 10-2*).
   In order to avoid surface reflections, rotate the bar code towards the CLV approximately 15° away from the vertical axis (refer to *Fig. 4-7, Page 4-5*).
3. Click on the AUTO SETUP radio button under DEVICE MODE.
   The CLV aborts reading mode. The "Device Ready" LED is extinguished.
   The CLV then starts Auto Setup and temporarily activates the standard decoder. The scan line appears when the "Laser On" LED lights up.
4. The CLV then runs Auto Setup and continuously displays the changes to the parameter values in the terminal emulator. *Fig. 6-6* contains an example of this.
5. The CLV confirms that Auto Setup has been completed successfully by outputting two consecutive acoustic signals via the beeper and activating the "Result" LED for 100 ms

(default setting). To begin with it only overwrites the appropriate parameter values in the RAM.
The CLV returns to the Reading mode with the decoder parameterized for this purpose. The "Device Ready" LED lights up. The READING MODE radio button in the terminal emulator is not, however, displayed as the active device mode again.
The CLV only evaluates the presented code type and length in further readings.

6. Uploading from the CLV To do so, click on in the toolbar.
   CLV loads the current parameter record from the RAM of the CLV and displays the new values in the tab cards.
7. Carry out the download to the CLV. To do so, click on in the toolbar.
   The DOWNLOAD PARAMETERS dialog box is opened.
8. Confirm the dialog box with the saving option PERMANENT.
   The CLV saves the changes made to the parameter record permanently in the EEPROM.
9. Close the terminal emulator.



With:

FocPos	=	Focal position
Step	=	Motor step for focal position adjustment
Amp	=	Amplifier setting
ScanFreq	=	Scanning frequency
ReadRate	=	Reading quality
CodeType	=	Code type
CodeLen	=	Code length
CodeStr	=	Data contents of the bar code

Fig. 6-6: CLV-Setup: Displaying the course of the Auto Setup in the terminal emulator

Terminating Auto Setup by the CLV in the event of a no read

If the CLV was not able to execute Auto Setup successfully, it terminates the search mode after the last increase made to the parameter values by outputting a long acoustic signal via the beeper.

Depending on the reason for Auto Setup being terminated, it outputs one of the following error messages via the terminal interface:

"No valid code found" (No valid bar code found or reading quality under 75 %)

"Cancel Auto Setup" (Auto Setup terminated)

– or –

"More than one code found"

“Cancel Auto Setup" (Auto Setup terminated)

The current parameter record in the CLV does not change.
The CLV returns to the Reading mode with the decoder parameterized for this purpose.
The "Device Ready" LED lights up.

Repeating the Auto Setup

1. Click on the READING MODE radio button under DEVICE MODE.
   The CLV switches to the Reading mode.
2. Click on AUTO SETUP under DEVICE MODE again.
   The CLV starts the Auto Setup.
3. If Auto Setup is unsuccessful again, check whether the CLV is able to read the bar code correctly (reading distance, tilt, more than one bar code in the reading area).

Terminating Auto Setup prematurely

It is here not possible to abort Auto Setup.

➢ In order to prevent parameter values in the RAM of the CLV from being overwritten, move the bar code away from the reading area and wait for the CLV to output an error message (Auto Setup must not supply valid settings).

Check the determined parameter values in CLV (after permanent saving)

1. Switch the supply voltage of the connection module (of the CLV) off and on again.
2. Carry out an upload from the CLV. To do so, click on  in the toolbar.
3. View the values in the READING CONFIGURATION and CODE CONFIGURATION tab cards.
   Only one code type may be active in the CODE CONFIGURATION tab card.

Note The CLV does not enter any real values in the parameter record for the parameters "Minimum distance" or "Minimum bar width" as it is not able to determine any absolute dimensions. The values displayed in the READING CONFIGURATION tab card or the DISTANCE CONFIGURATIONS dialog box do not, therefore, reflect the actual situation.

Checking the determined read and code configurations

Once Auto Setup has been completed successfully, check the CLV settings as follows:

1. Click  in the toolbar.
   The terminal emulator is then opened. The CLV is in the Reading mode.
2. Click on the PERCENTAGE EVALUATION radio button under DEVICE MODE.
   The dialog box for prompting the distance configuration is opened.
3. Click on the relevant distance configuration for reading the bar code.
4. Confirm the dialog box with "OK".
   The CLV starts the percentage evaluation and displays the reading quality of each set of 100 scans continuously (refer to *Chapter 6.5.2 Percentage evaluation, Page 6-21*).
5. Present the application-specific bar code at the teach-in distance (at the minimum and maximum reading distance if the bar code in the application is in a variable reading range).

6. Monitor the display of the reading quality in the terminal emulator. This should be between 70 and 100 %.

6.5 Operating modes and output of the read result

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

Standard operating mode:

- Reading mode

For startup

- Percentage evaluation
- Adjusting mode

For adapting to the reading situation

- Auto Setup (automatic adaptation to reading conditions)
  (refer to *Chapter 6.4.4 Configuring the CLV with Auto Setup, Page 6-14*)
- Profile programming (configuration)
  (refer to *Chapter 10.5.2 Profile progamming, Page 10-30*)
- Parameterization (configuration)
  (refer to *Chapter 6.4.1 Configuring the CLV by means of the CLV-Setup user interface, Page 6-4*)
- Teach-in match code 1/activate match code comparison with "Sensor 2" switching input (refer to *Chapter 10.9.1 Triggering the Teach-in match code 1 via the "Sensor 2" switching input, Page 10-40*)
- Show CP limits

For monitoring purposes/correcting faults

- Displaying and editing operating data
- Reading diagnosis
- Monitor host interface
- Auxiliary input
- Self-test

6.5.1 Reading mode (Standard mode)

The CLV performs a self-test after it has been switched on. It is then set to the Reading mode and confirms this by outputting two consecutive acoustic signals via the beeper. In the default setting the "Sensor 1" switching input is the (external) trigger source of the reading pulse. The read result is output by the CLV at the end of the reading pulse via the host interface (default) and terminal interface.

The read result of the terminal interface can be displayed in the CLV-Setup terminal emulator. Prerequisite for display is that the CLV terminal interface must be set to the READING DIAGNOSIS mode. This mode is selected for the default setting. The read result of the terminal 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.

Line scanner with oscillating mirror:
In reading mode the CLV deflects the scan line in the default setting with a frequency of 1 Hz around the position CW = 50 at a maximum angle of ±20°. 50 CW corresponds to a light emission under 105°.

Displaying the read result in the terminal emulator

1. Click on in the toolbar.
   The terminal emulator dialog box is opened.
2. Click on the READING MODE radio button under DEVICE MODE.
3. Present the bar code pattern from *Fig. 6-1, Page 6-3* to the CLV 450 respectively the bar code pattern from *Fig. 6-2, Page 6-4* to the CLV 451 and activate the reading pulse. The "Laser On" LED lights up. The scan line then appears. Also refer to *Chapter 6.3.1 Starting up the line scanner/line scanner with oscillating mirror with the factory default setting, Page 6-3*.
4. Terminate reading pulse.
   The CLV outputs an acoustic signal via the beeper to indicate that the reading result is displayed in the window of the terminal emulator. The "Result" LED lights up for a duration of 100 ms (default setting).

Fig. 6-7 shows two examples of the output of a read result: “Good Read“ and “No Read“. The read result comprises the data contents of the bar code(s) and the reading diagnosis data. *Fig. 6-8* explains the structure and function of the reading diagnosis data for Good Read, and *Fig. 6-9* for No Read.

Note The CLV only outputs several bar codes in the read result if the parameterized minimum and maximum number of bar codes is >1, and several bar codes have been presented. The number of bar codes to be read/output for each read port can be selected in the CODE CONFIGURATION tab card in the NUMBER OF CODES section.

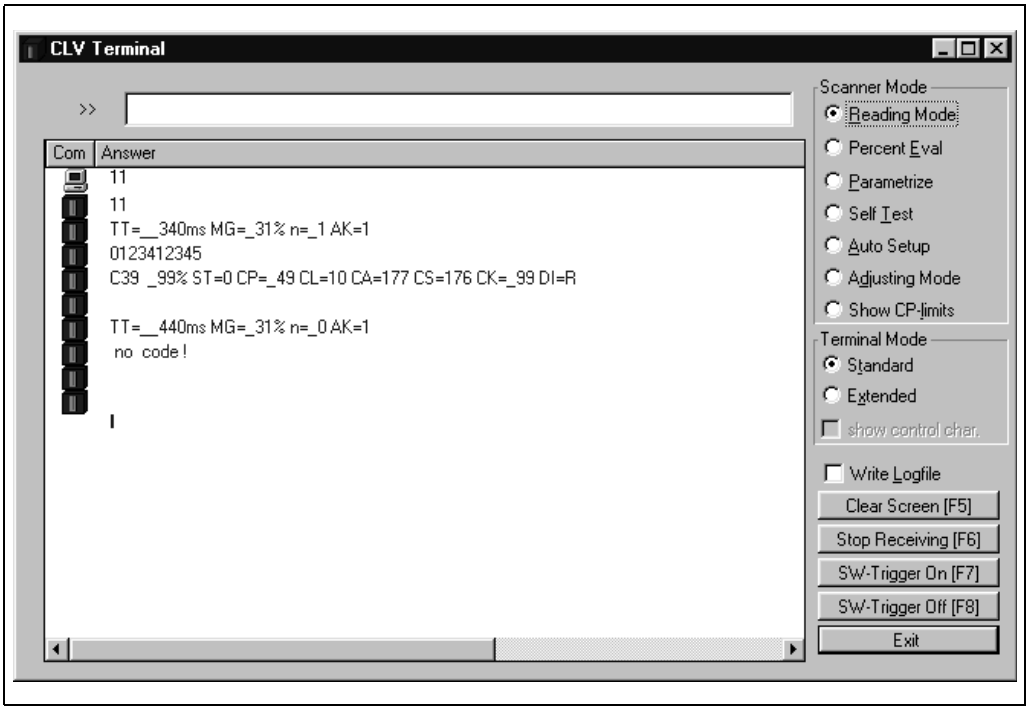


Fig. 6-7: CLV-Setup: Displaying the read result of the terminal interface in the terminal emulator

Successful reading (Good Read):

```
TT=_340 ms   MG=_31 %   n=_1   AK=1
0123412345
C39   _99%   St=0   CP=_49   CL=10   CA=177   CS=176   CK=99   DI=R
```

With:

1st. line :	TT	=	Duration of the reading interval
	MG	=	Temporal mean value of the identification quality
	n	=	Number of recognized codings
	AK	=	No. of the used distance configuration
2nd. line:	0123412345	=	Data contents of the bar code
3rd. line:	C39	=	ID: Code type Code 39
	_99%	=	Identification quality
	ST	=	Read status (ST = 0: Good Read)
	CP	=	Code position
	CL	=	Code length (number of characters)
	CA	=	Scan effort
	CS	=	Code reliability
	CK	=	Code continuity
	DI	=	Decoding direction (F = in scanning direction, R = against scanning direction)

Fig. 6-8: Read result of the terminal interface: Structure for “Good Read“

Reading fault (No Read):

```
TT=__440 ms   MG=_31 %   n=_0   AK=1
no code!
```

With:

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

Fig. 6-9: Read result of the terminal interface: Structure for “No Read“

The read result of the **host interface** can also be displayed.
Chapter 6.5.7 Host interface monitoring, Page 6-26 describes the procedure and the structure of the read result in the default setting.

Triggering the reading pulse via the terminal emulator

In the default setting the "Sensor 1" 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 CLV.

1. Select the DEVICE CONFIGURATION tab card.
2. Click on the EDIT READING TRIGGER command button.
   The EDIT READING TRIGGER dialog box is opened.
3. Click on the SERIAL INTERFACE radio button.
4. Confirm the dialog box with "OK".
5. Carry out the download to the CLV. To do so, click on in the toolbar.
   The DOWNLOAD PARAMETERS dialog box is opened.
6. Confirm the dialog box with the saving option TEMPORARY .
   The serial interface has been activated as the trigger source of the reading pulse and is ready to receive appropriate commands.
7. Click on in the toolbar.
   The terminal emulator dialog box is opened. The CLV is in the Reading mode.
8. Click on the SW-TRIGGER ON command button or press [F7].
   CLV-Setup sends a start command to the CLV.
   The "Laser On" LED lights up and the scan line appears.
9. Present the bar code pattern from *Fig. 6-1, Page 6-3* to the CLV 450 respectively the bar code pattern from *Fig. 6-2, Page 6-4* to the CLV 451.
10. Click on the SW-TRIGGER OFF command button or press [F8].
    CLV-Setup sends a stop command to the CLV.
    The "Laser On" is extinguished. The CLV switches off the laser diode.
    The CLV outputs an acoustic signal via the beeper to indicate that the reading result is displayed in the window of the terminal emulator. The "Result" LED lights up for a duration of 100 ms (default setting).

6.5.2 Percentage evaluation

In the Percentage evaluation mode, the quality is assessed of the readings of bar codes which are placed statically into the reading area of the CLV (no transport movement of the object).

The CLV performs 100 scans in the Free-running mode and evaluates the reading quality. It outputs the read results continuously every 2 s via the **terminal interface**. The read results can be displayed in the terminal emulator of CLV-Setup.
The standard decoder has to be set temporarily for the percentage evaluation.

The Percentage evaluation mode can be called up via VIEW in the menu bar or via the terminal emulator.

Line scanner with oscillating mirror:
In the Percentage evaluation mode the CLV behaves in the following manner:

– in “Oscillating“ mode (default setting: oscillating with a fixed amplitude), the CLV shuts off oscillation and positions the scan line under the angle CW = 50 (corresponding to an angle of deflection of 105°). This position cannot be altered.
– in “One-Shot“ mode, the CLV also positions the scan line under the angle CW = 50.
– in “Set Position“ mode, the scan line’s selected position remains unchanged.

1. Select the CODE CONFIGURATION tab card.
2. Click on the STANDARD radio button in the DECODER section.
3. Carry out the download to the CLV. To do so, click on in the toolbar.
   The DOWNLOAD PARAMETERS dialog box is opened.
4. Confirm the dialog box with the saving option TEMPORARY .
   The CLV operates with the standard decoder.
5. Click on in the toolbar.
   The terminal emulator window opens. The CLV is in the Reading mode.
6. Click on the PERCENTAGE EVALUATION radio button under DEVICE MODE.
   The dialog box for selecting the distance configuration is then displayed.
7. Click on the distance configuration which corresponds to the reading distance of the object.
   (Default setting: No. 1, focal position F = 900 mm for CLV 450, F = 550 mm for CLV 451).
8. Confirm the dialog box with "OK".
   The "Device Ready" LED is extinguished. The CLV initiates the percentage evaluation and outputs the reading results continuously. An example is shown in *Fig. 6-10*.
9. Present the bar code pattern from *Fig. 6-1, Page 6-3* to the CLV 450 respectively the bar code pattern from *Fig. 6-2, Page 6-4* to the CLV 451 and monitor the read results in the terminal emulator window.

The "Result" LED provides additional optical information on the reading quality reached:

– LED extinguishes if the reading quality < 30 %
– LED flashes twice per second if the reading quality is 30 % ... 70 %
– LED flashes five times per second if the reading quality is 70 % ... 90 %
– LED lights up constantly, if reading quality > 90 %

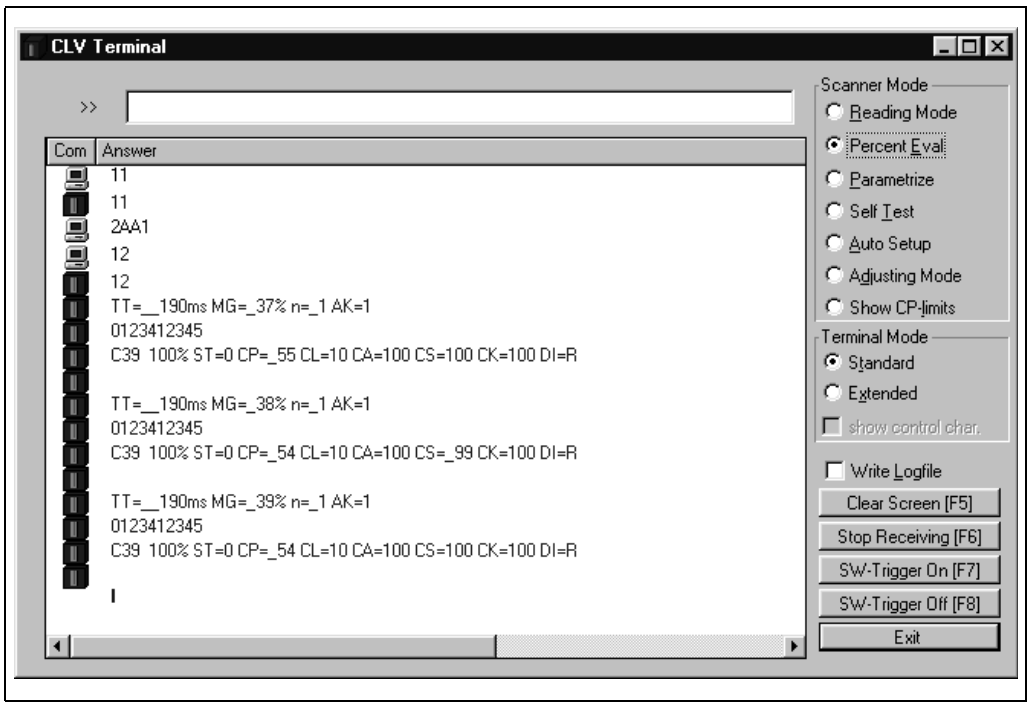


Fig. 6-10: CLV-Setup: Displaying the percentage evaluation in the terminal emulator

The output format of the read result is the same as that of the Reading mode. *Fig. 6-8* explains the structure and function of the reading diagnosis data.

Note Profile bar codes read by the CLV during the percentage evaluation do not cause any changes to be made to the parameter record and do not, therefore, affect the reading process either.

The match codes cannot be programmed (teach-in) in the Percentage evaluation mode. The codes are entered in the DEVICE CONFIGURATION tab card. Match code 1 can, however, also be programmed using the teach-in method.

6.5.3 Adjusting mode

The "Adjusting mode" enables the center of the scan line to be optimally positioned on the bar code. *Chapter 4.3.3 Auxiliary functions for adjusting, Page 4-10* describes the procedure after the adjusting mode has been called up. The CLV does not output a read result in this mode.

The Adjusting mode can be called up under VIEW, under TOOLS as a device function (in the dialog box) or via the terminal emulator.

Line scanner with oscillating mirror:
In the Adjusting mode the CLV behaves in the following manner:

– in “Oscillating“ mode (default setting: oscillating with a fixed amplitude), the CLV shuts off oscillation and positions the scan line under the angle CW = 50 (corresponding to an angle of deflection of 105°). This position cannot be altered.
– in “One-Shot“ mode, the CLV also positions the scan line under the angle CW = 50.
– in “Set Position“ mode, the scan line’s selected position remains unchanged.

1. Click on in the toolbar.
   The terminal emulator window opens. The CLV is in the Reading mode.
2. Click on the ADJUSTING MODE radio button under DEVICE MODE.
   The "Device Ready" LED is extinguished. The CLV aborts the Reading mode and blanks the scan line as of position CP = 50 to position CP = 100.
3. Click on the READING MODE radio button in order to terminate the Adjusting mode.
   The CLV then returns to the Reading mode and the "Device Ready" LED lights up.

6.5.4 Show CP limits

In this mode, the CLV blanks certain parts of the scan line so that any limit values defined for the active evaluation range of the scan line can be checked directly during parameterization. The restricted active evaluation range shortens the evaluation time for fast applications, for example, because the evaluation routine only has to take account of unblanked parts of the scan line. The range is restricted by entering appropriate values for MINIMUM CODE POSITION and MAXIMUM CODE POSITION in the EDIT DISTANCE CONFIGURATIONS dialog box in the READING CONFIGURATION tab card.

"Show CP limits" is used to check whether the limit per activated distance configuration is adapted distance-specifically for the selected setting at the focal position changeover ("Christmas tree effect"). The CLV does not output a read result.

"Show CP limits" can be called up under VIEW, under TOOLS as a device function (in the dialog box) or via the terminal emulation.

Line scanner with oscillating mirror:
In the „Show CP limits“ mode the CLV behaves in the following manner:

– in “Oscillating“ mode (default setting: oscillating with a fixed amplitude), the CLV shuts off oscillation and positions the scan line under the angle CW = 50 (corresponding to an angle of deflection of 105°). This position cannot be altered.

– in “One-Shot“ mode, the CLV also positions the scan line under the angle CW = 50.
– in “Set Position“ mode, the scan line’s selected position remains unchanged.

The CLV blanks the scan line alternately as of the set value for CP_{min} and as of the set value for CP_{max}. *Fig. 6-11* shows an example of this. The changeover is carried continuously at a second interval. The part of the scan line that remains active for the reading procedure is the section between the shielding of CP_{min} and the shielding of CP_{max}.

Example:
Default setting: Evaluation set for the range of $CP_{min} = 5$ to $CP_{max} = 95$.
The CLV blanks the line as of $CP_{min} = 5$ (short scan line) and as of $CP_{max} = 95$ (long scan line).

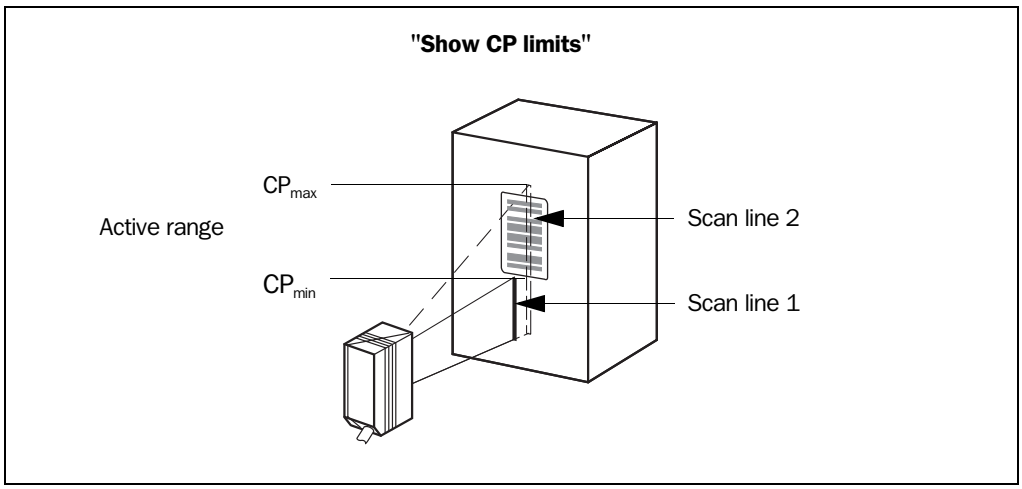


Fig. 6-11: Appearance of scan line in the "Show CP-limits" mode

Proceed as follows to check the restricted evaluation range:

1. Click on in the toolbar.
   The terminal emulator window opens. The CLV is in the Reading mode.
2. Click on the SHOW CP LIMITS radio button under DEVICE MODE.
   The dialog box for prompting the distance configuration is opened.
3. Click the distance configuration for which the active evaluation range of the scan line has been restricted (DC-specific).
   The "Device Ready" LED is extinguished. The CLV aborts the Reading mode and blanks the scan line alternately as described above as of CP_{min} and CP_{max}.
4. Use Steps 2 and 3 to check for each active distance configuration whether the bar code is in the center of the range between the end of the shorter scan line (CP_{min}) and the end of the longer scan line (CP_{max}) or, if there are several bar codes, to determine whether the center of the field of all the codes is within the range.
5. If necessary, correct CP_{min} and CP_{max} accordingly. Carry out a download to the CLV!
6. Click on the READING MODE radio button to exit the SHOW CP LIMITS mode.
   The CLV then returns to the Reading mode and the "Device Ready" LED lights up.

Note In the Reading mode, the CLV does not actually blank the scan line visually, but instead takes the values specified for the restricted evaluation range mathematically into account when the data contents are decoded.

6.5.5 Displaying and editing operating data

This function enables statistical operating data, which the CLV maintains in the form of counters during the reading procedure, to be sampled and reset.
The CLV does not output a read result in this mode.

1. Click in the toolbar.
   The CLV aborts reading mode. The "Device Ready" LED is extinguished.
   The OPERATING DATA dialog box is opened (*Fig. 6-12*).
2. After reading/resetting the desired counters, click on "OK" to confirm the dialog box.
   The CLV then returns to the Reading mode and the "Device Ready" LED lights up.

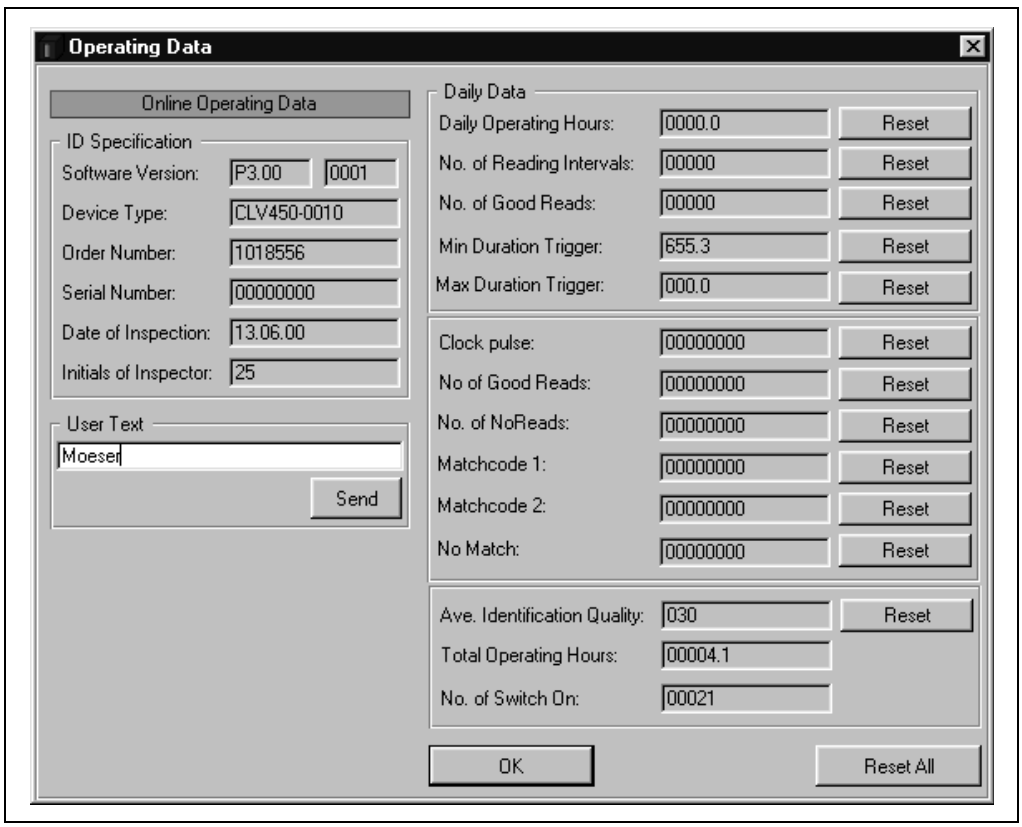


Fig. 6-12: CLV-Setup: "Operating Data" dialog box

6.5.6 Reading diagnosis

Function of the **terminal interface**. In this mode the CLV 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 terminal 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 read result. In the default setting this mode is selected for the terminal interface.
Fig. 6-7, Page 6-19 shows the corresponding output format of the terminal interface.

In the default setting the CLV does not output any reading diagnosis data via the host.

Should the reading diagnosis be not activated, it can be selected via the AUXILIARY INTERFACE tab card.

1. Select the READ DIAGNOSTICS option in the AUXILIARY INTERFACE list field.
2. Carry out the download to the CLV. To do so, click on in the toolbar.
   The DOWNLOAD PARAMETERS dialog box is opened.
3. Confirm the dialog box with the saving option PERMANENT.

The terminal interface is now set to the "Read diagnostics" mode.

6.5.7 Host interface monitoring

Function of the **terminal interface**. In this mode the CLV outputs the data traffic of its host interface via the terminal interface. Repeat requests of the protocol driver and protocol-specific data, such as start and stop characters, are suppressed here (*Table 6-9*). Each data string is displayed in a separate line on the screen.

Direction of data	Output format	Display on screen
CLV receives from host	<STX> I data <CR> <LF> <ETX>	I data
CLV sends to host	<STX> O data <CR> <LF> <ETX>	O data

Table 6-9: "Host interface monitoring" function

The “host interface monitoring“ is activated by means of the AUXILIARY INTERFACE tab card.

1. Select the MONITOR HOST INTERFACE option in the AUXILIARY INTERFACE list field.
2. Carry out the download to the CLV. To do so, click on in the toolbar.
   The DOWNLOAD PARAMETERS dialog box is opened.
3. Confirm the dialog box with the saving option TEMPORARY .

The terminal interface is then set to the "Monitor host Interface" until the CLV is switched off again.

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. *Table 6-13* shows an example of how the read result can be output.

1. Select the serial interface as the external trigger source for the reading pulse.
   Refer to *Chapter 6.51, „Triggering the reading pulse via the terminal emulator“*, Page *6-21*.
2. Click on in the toolbar.
   The terminal emulator window opens. The CLV is in the Reading mode.
3. Click on the SW-TRIGGER ON command button or press [F7].
   The scan line then appears.
4. Present the bar code pattern from *Fig. 6-1, Page 6-3* to the CLV 450 respectively the bar code pattern from *Fig. 6-2, Page 6-4* to the CLV 451.
5. Click on the SW-TRIGGER OFF command button or press [F8].
   CLV-Setup outputs the read result in the terminal emulator.
   Example: "O 0123412345".

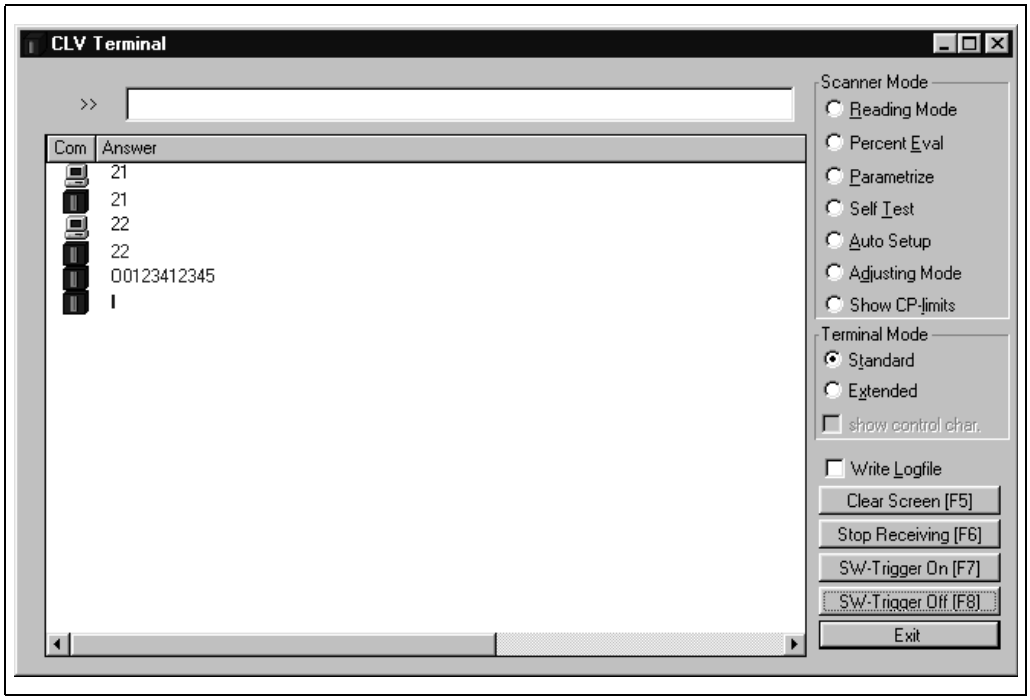


Fig. 6-13: CLV-Setup: Output of the read result of the host interface in the terminal emulator at the beginning (in this case: O = Output)

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 traffic may not longer be completely displayed on the terminal interface (display: " ... "). This is due to the slower transmission rate of the terminal interface (9 600 bits/s).

In the default setting the CLV only sends the data contents of the bar code in the data output string of the host interface.

The header, separator and terminator are empty.

Hint The structure of the data output string of the host interface can be configured via the DATA STRINGS tab card. Up to 10 elements, consisting of constants and/or reading diagnosis data, can be entered in the header, in the separator and in the terminator.

1. Select the DATA STRINGS tab card.
2. Click on the HEADER list field.
   The EDIT PARAMETER: TFH dialog box is opened.
3. Click on the desired constants or placeholders for the reading diagnosis data.
   The selected elements appear in the text line at the top of the dialog box in the sequence in which they were selected.
4. Confirm the dialog box with "OK".
5. Repeat this procedure for the separator and terminator.
6. Carry out the download to the CLV. To do so, click on in the toolbar.
   The DOWNLOAD PARAMETERS dialog box is opened.
7. Confirm the dialog box with the saving option PERMANENT.
   The CLV outputs the selected elements in the data output string of the host interface with the next read result.

6.5.8 Auxiliary input

Function of the **terminal interface**. In this mode the CLV accepts a bar code entered at the terminal 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 transferring missing bar codes subsequently.

Chapter 10.9.2 Auxiliary input via terminal interface, Page 10-45 describes this function and the associated procedure in greater detail.

6.5.9 Self-test

After the CLV has been switched on, it performs a self-test before it is initialized with the parameter record. The test can be called up explicitly at any time via CLV-Setup. During the self-test the CLV checks that its hardware components are functioning correctly. A final message via the terminal interface provides information on the test result. The CLV does not output a read result during the test routine.

1. Click on in the toolbar.
   The terminal emulator window opens.
   The CLV is in the Reading mode.
2. Click on the SELF TEST radio button under DEVICE MODE.
   The "Device Ready" LED is extinguished. The CLV cancels the Reading mode and starts the test routine.
   After a few seconds, the CLV outputs the encoded test result in the form of a code (refer to *Fig. 6-14*).
3. To return to the Reading mode, click on the READING MODE radio button or close the terminal emulator.
   The CLV then returns to the Reading mode and the "Device Ready" LED lights up.

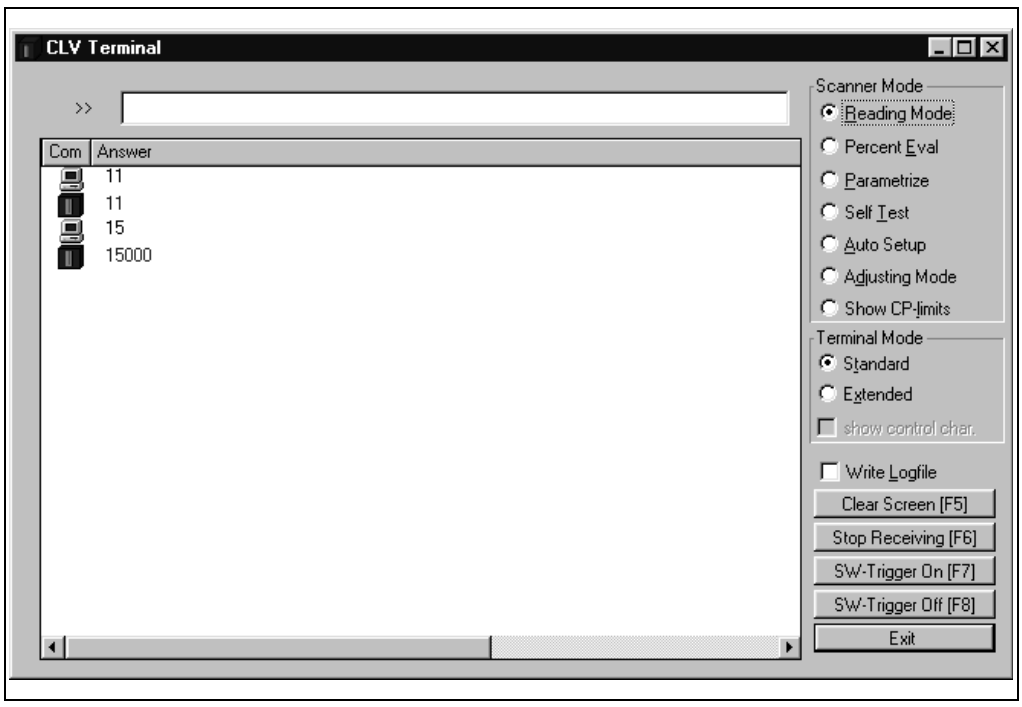


Fig. 6-14: CLV-Setup: Outputting the self-test result in the terminal emulator

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

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

6.5.10 Carrying out device functions of the CLV in the dialog box

CLV-Setup allows a number of device functions of the CLV to also be executed in the dialog box. 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:

- Auto Setup
- Match code teach-in
- Show CP limits
- Adjusting mode
- Analyse scanner network (only for application of the CAN interface)

➢ Select the desired function under TOOLS, DEVICE FUNCTIONS in the menu bar.
– or –
Press [F2].
The EXECUTE DEVICE FUNCTIONS dialog box is opened.
Select the desired function in the EXECUTE menu.
CLV-Setup starts the function and, where appropriate, prompts the user to carry out the necessary actions.

Fig. 6-15 shows an example of the dialog box that appears after Auto Setup has been started.

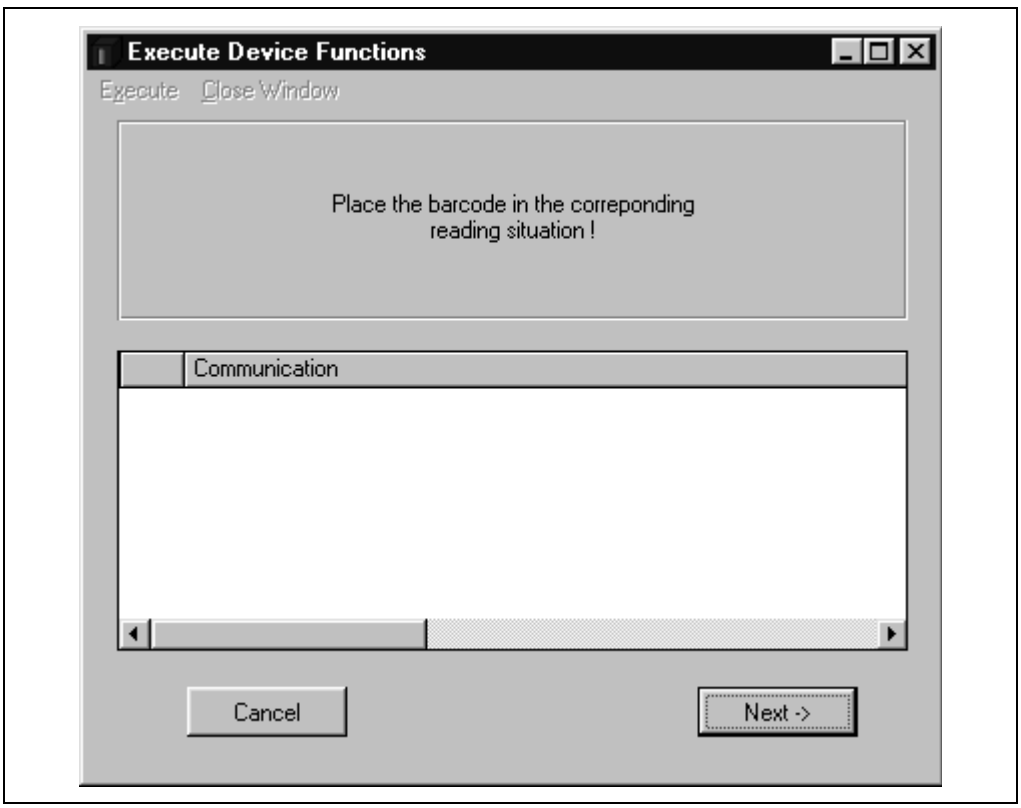


Fig. 6-15: CLV-Setup: Dialog box for executing the Auto Setup

6.6 Messages of the CLV

The CLV outputs system, warning and error messages in English in response to the actions carried out by the user for the firmware. The messages are output in plain text via the terminal interface only.

6.6.1 Displaying messages

Proceed as follows in order to display messages on the screen of the PC in the CLV-Setup user interface:

1. Click on  in the toolbar.
   The terminal emulator window opens.
2. Click on the EXTENDED radio button in the TERMINAL MODE section.

The CLV then outputs messages in response to events that occur while the bar code is being read. The messages are only output in the **extended mode** of the terminal emulator!

6.6.2 System messages

System messages confirm that an action has been carried out successfully, e. g. changing the operating mode. No further messages are required.

Chapter 10.3 System messages, Page 10-19 explains the contents of the messages.

6.6.3 Warnings

Warning messages indicate that it was not possible to perform an action or that the values set for the parameters can cause an error while the bar code is being read.

Table 6-10 lists the warning messages in alphabetical order together with the associated corrective measures.

Message	Meaning	Remedy
"Warning: Master Timeout"	The duration of the selected master timeout is too short	Optimize the master timeout using the DEVICE CONFIGURATION tab card in the user interface of CLV-Setup. Download to the CLV! (also refer to the special *Technical information "Master/Slave with bar code scanners of CLV Series", No. 8 007 675, English edition*)

Table 6-10: Warning

6.6.4 Error messages

Error messages indicate the following types of error:

- A device defect
- Incorrect parameter settings
- Errors during data transmission to the host

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

6.7 Switching off the CLV

1. If the parameter record was modified in CLV-Setup or was only stored temporarily in CLV via a download, the parameter record must be stored permanently in the CLV by choosing the PERMANENT storage option.
2. Save the parameter record as a configuration file "*.scl" in CLV-Setup.
3. Switch off the supply voltage of the AMV/S 40 connection module or pull the plug of the CLV out of the connection module.

The last parameter record stored permanently in the CLV connection module remains valid.

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

1. Click on  in the toolbar.
   The PRINT FILE dialog box is opened.
2. Enter a comment in the input field in order to assign the printout to the CLV.
   Confirm your entry with "OK".
   The PRINT dialog box for configuring the printer is then displayed.
3. Edit the dialog box correspondingly and confirm.
   CLV-Setup prints out the actual configuration file in the form of a table.

Notes

7 Maintenance

7.1 Maintenance during operation

A clean reading window is required to maintain the full reading performance of the CLV.

It is therefore advisable to check the reading window regularly for dirt, in particular in rough operating environments (dust, abrasion, moisture, fingerprints).

Laser radiation may cause damage to your eyes!

The CLV operates with a Class 2 red-light laser. The retina can be damaged if you look too long into the laser beam.

- ➢ Never look directly into the laser beam (comparable with sunlight).
- ➢ Switch off the device for the duration of cleaning.
- ➢ Never look into the reading window while the device is in operation.

Damage to the reading window!

The reading window consists of glass. The reading performance is reduced by scratches and streaks on the reading window.

- ➢ Use a mild detergent without power admixture.
- ➢ Avoid scratching and scouring movements on the reading window.

Cleaning the reading window

- ➢ Clean the reading window at regular intervals with a mild detergent without powder admixture, for example an anti-static window liquid detergent. *Fig. 7-1* shows the surfaces to be cleaned.

Use a soft lintfree cloth for cleaning.

- ➢ If required, also clean the LEDs of the device rear.

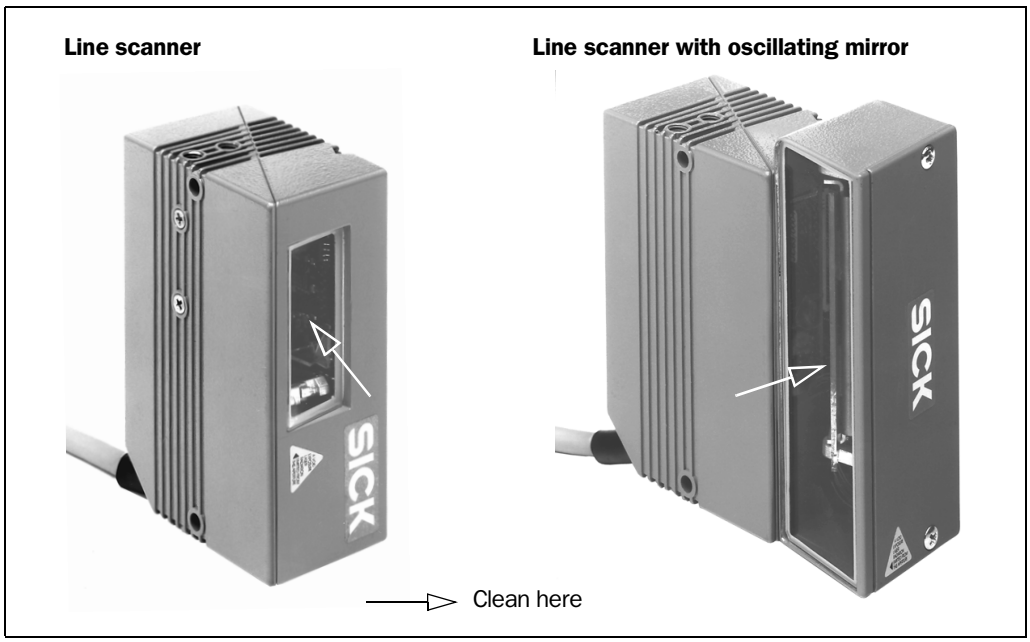


Fig. 7-1: Cleaning the reading window

Cleaning the further optically effective surfaces:

➢ In the case of external reading cycle generation and/or object height detection with sensors (e. g. reflection photoelectric switches) clean their optically effective surfaces (*Fig. 7-2*). Dirt and impurity can cause faulty switching performance.

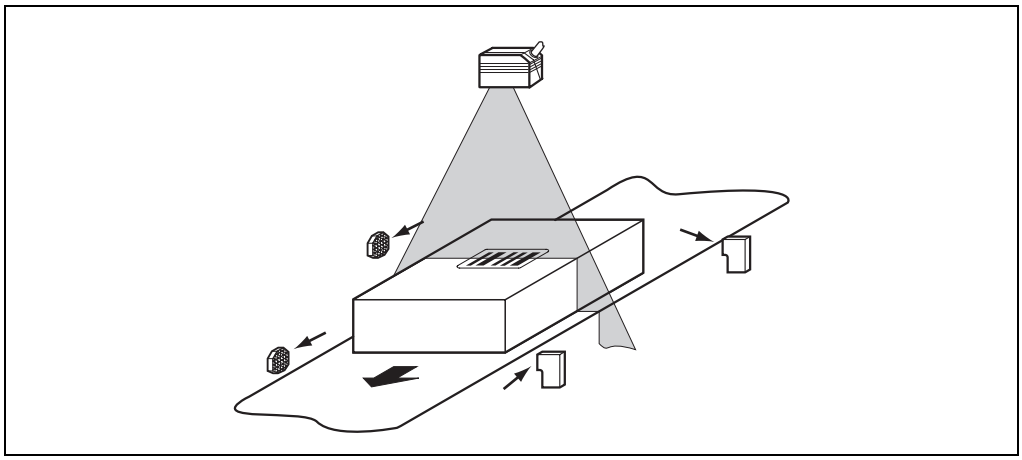


Fig. 7-2: Cleaning the external optical sensors (reading clock generator, object height detection)

7.2 Maintenance

The CLV operates maintenance-free. Its self-monitoring functions allow long, trouble-free operation.

The CLV outputs device and function errors in the form of messages via the terminal interface. As far as they exist in clear text, they are displayed on the screen of the PC in extended mode of the terminal emulator of the CLV-Setup user interface. Further errors are displayed as a numerical combination in the 4th field from the bottom left in the status bar (Refer to *Chapter 8.3 Error messages, Page 8-2*).

7.3 Disposal

After having shut down unusable or irreparable devices dispose of them in a manner which does not damage the environment.

1. Observe the country-specific guidelines on waste disposal.
2. Dismantle the CLV housing.
3. Remove the electronic modules and connection cable.
4. Remove the glass pane of the reading window and dispose of the glass as waste glass.
5. Dispose of the chassis frame and cover in the disposal for zinc diecasting.
6. Dispose of electronic modules and connection cables as hazardous waste.

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

8 Troubleshooting

8.1 Overview of the possible errors and malfunctions

8.1.1 Mounting errors

- CLV aligned incorrectly to the object with the bar code (e. g. blanking)
- Reading-pulse sensor positioned incorrectly
- With focal position changeover: Sensor for object height detection positioned incorrectly

8.1.2 Faults during the electrical installation

- Interfaces on the CLV wired incorrectly (wiring error in AMV/S 40)
- Host interface on AMV/S 40 configured incorrectly

8.1.3 Parameterization 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 Faults during operation

- Laser timeout for laser diode expired
- Device fault (hardware/software)

8.2 Monitoring error and fault signs

The CLV is self-monitoring:

- After the supply voltage has been switched on, the CLV automatically carries out a self-test, in which it checks important hardware components, before it is initialized (parameter record loaded and device functions initialized). The self-test can be repeated at any time after the reading mode has been canceled.
  For the call-up refer to the *Chapter 6.5.9 Self-test, Page 6-28*.
- If the CLV detects an error during the self-test/self-diagnosis, it outputs the error status ST = 3 via the host interface. Prerequisite: The error status is enabled for transfer. In the default setting transfer is disabled.
  The CLV displays the diagnosed error in code form as a numerical combination in the 4th field from the bottom left in the status bar of the CLV-Setup user interface via the terminal interface (*Table 8-1*).
- While it is in operation, the CLV constantly monitors the laser diode and speed of the polygon mirror wheel. In addition, a watchdog circuit reacts to incorrect device states.
- A timer automatically de-activates the laser diode in reading mode at the "Sensor input" and "Serial interface" trigger mode 10 minutes (default setting) after the beginning of a lasting reading pulse. However, it does not end the reading interval. The CLV outputs the following message via the terminal interface: "Laser safety timeout". The reading pulse is to be terminated by resetting the trigger signal. The next reading pulse re-activates the laser diode.

8.3 Error messages

The CLV only outputs error messages of the firmware in clear text via its **terminal interface** in English. Others are output as numerical combinations in the status bar of the CLV-Setup user interface. *Table 8-1* contains a list of the messages in alphabetical order.

For warnings refer to *Chapter 6.6.3 Warnings, Page 6-30*.

Displaying messages:

Proceed as follows in order to display the messages on the PC screen in the CLV-Setup user interface:

1. Click on  in the toolbar.
   The terminal emulator window opens.
2. Click the EXTENDED radio button in the TERMINAL MODE section

Message	Meaning	Possible cause	Remedy
"CLV SYS-Failure: xxx" 011 RAM error 012 RAM error 013 RAM error 051 Mirror wheel speed out of tolerance 061 Mirror interval out of tolerance 071 Error laser shutter 091...095 Error focus adjustment 201...215 DSP error	The CLV has diagnosed a system error. The "Device Ready" LED does not light up or extinguishes. The CLV tries a new system start.	Defective device	If the system error occurs repeatedly after the CLV is restarted: Contact the SICK Service department
"EEPROM Check fault, default parameters loaded"	The CLV has diagnosed an irregularity in the EEPROM and downloads the entire default setting to the RAM instead of the last permanently stored parameter record.	Defective device	Contact the SICK Service department
"EEPROM - reading fault"	The CLV cannot download the parameter record stored in the EEPROM to the RAM.	Defective device	Contact the SICK Service department
"EEPROM - writing fault"	The CLV cannot write the current parameter record from the RAM to the EEPROM.	Defective device	Contact the SICK Service department
"Focus table inconsistent: defaults loaded"	The CLV has diagnosed an irregularity in the internal reference table for the focus positions selected by the user. It therefore downloads the default setting of the distance configurations.	Defective device	Contact the SICK Service department

Table 8-1: Error messages output via the terminal interface

Message	Meaning	Possible cause	Remedy
"Host – receive fault"	The host has requested the data output string last sent by the CLV three times; NAK has been issued with each attempt.	• Receipt of the host set incorrectly • Data transfer interrupted e. g. by cable break	• Check the host • Check connecting cables and monitor data transfer of the host interface. To do so, select upload from the CLV by using the CLV-Setup user interface, select the AUXILIARY INTERFACE tab card and select HOST INTERFACE in the MONITOR list field. Download to the CLV! Call up the terminal emulator.
"Host – transfer too slow"	In the CLV, data is available for output faster than it is transferred to the host.	• Baud rate too low • Incorrect protocol type selected • Protocol timeout too long for the reading pulse frequency	Check the configuration of the host interface
"Host – transmit fault"	The CLV cannot correctly receive the data sent by the host	• Host interface of the CLV configured incorrectly • Data transfer interrupted e. g. by cable break	• Check the CLV and host. • Check connecting cables and monitor data transfer of the host interface. To do so, select upload from the CLV by using the CLV-Setup user interface, AUXILIARY INTERFACE tab card and select HOST INTERFACE in the MONITOR list field. Download to the CLV! Call up the terminal emulator.
"Master/slave – trigger too soon"	The new reading pulse for the master is received before its timeout has elapsed	Timeout for the master is too long	Check the coordination between reading pulse and timeout. To do so, select upload from the CLV by using the CLV-Setup user interface, DEVICE CONFIGURATION tab card and change the MASTER TIMEOUT in the CLV ARRANGEMENT section. Download to CLV!
"More than one code found"	Auto Setup was not successful	More than one bar code was presented to the CLV	Repeat the Auto Setup. Ensure that only one bar code is in the visible range of the CLV (in particular with oscillating mirror!)
"No polls?"	Network operation: the CLV is waiting for polls by the CLX 200 network controller	• Data connecting cables interrupted • CLX 200 not ready • Incorrect device number parameterized • Inadvertently parameterized for network mode	• Check cables • Switch on CLX 200 • Device number: Parameterize 01 to 31 • Check the configuration of the host interface. To do so, select upload from the CLV by using the CLV-Setup user interface, HOST INTERFACE tab card and check the settings in the INTERFACE PROTOCOL section. Download any changes to the CLV!

Table 8-1: Error messages output via the terminal interface

Message	Meaning	Possible cause	Remedy
"No valid code found"	The Auto Setup was not successful	No bar code was presented to the CLV or the reading quality did not reach 75 %	Repeat the Auto Setup. Ensure that the bar code lies within the reading range of the CLV.
"Oscillating mirror faulty“	The CLV cannot operate the oscillating mirror or cannot initialize the mirror	Defective device	Contact the SICK Service department
"Slave string faulty"	Data transfer error between a slave and the master	Data connecting cables interrupted	If the error occurs repeatedly, check the data connecting cables between all CLVs.
"Wrong number of slaves"	During the master timeout, the master receives more or fewer reading results from the slaves than expected from the number of slaves entered.	• Parameterized number of slaves does not agree with the number of connected slaves • Master timeout too short • Data connection between the slaves interrupted	• Check the entered number of slaves. To do so, select upload from the CLV by using the CLV-Setup user interface, DEVICE CONFIGURATION tab card and check the number of slaves in the CLV ARRANGEMENT section. Download any changes to the CLV! • As above, but check the time-out defined for the master • Check the connecting cables
"Wrong parameters - master/ slave"	After selection of the master/ slave function, individual parameter values, which are not compatible with the automatic settings defined for this function by the CLV, were changed subsequently.	Deviations from the following values: • Test string: no (slaves) • Auxiliary input: no (slaves) • Pulse: Serial interface or switching input • RK 512: without reaction message	Use the CLV- Setup user interface to check that the settings on the DATA STRING, TERMINAL INTERFACE, DEVICE CONFIGURATION , and HOST INTERFACE tab cards are correct.

Table 8-1: Error messages output via the terminal interface

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

Value	Meaning	Possible cause	Remedy
0	"Good Read"	–	Not applicable
1	Incorrect check digit	The check digit calculated by the CLV during the reading process does not match that in the bar code.	Check whether the check digits in the bar code field and generated by the print process are correct
2	No bar code of the enabled code type conforming to the evaluation criteria found	• No bar code in the CLV's reading area during the reading pulse • Code type/length in the CLV not enabled for decoding • Reading window obstructed/dirty	• Synchronize the pulse of the CLV with the occurrence of a bar code in the reading range • Parameterize the code configuration correctly • Check the reading window
3	Device fault	Defective device	Call up the self-test! (refer to *Chapter 6.5.9 Self-test, Page 6-28*). If result ≠ 000: Contact the SICK Service department
5	Required number of identical multiple reads for the bar code not reached	• Conveyor speed of the object too high • Scanning frequency is too low • In case of ladder-type positioning of bar code relative to conveyor direction: code height (bar length) too small • Print quality poor	• Check the conveyor speed • Adjust the scanning frequency • Check code height. • Check print quality
6	Master: Number of slave read results does not match the parameterized number of slaves	• Parameterized number of slaves does not match actual number of slaves available • Timeout for the master is too short • Data connection between 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 read result is the auxiliary input via the terminal interface	The bar code was not detected by the reading function of the CLV, but was entered subsequently with the auxiliary function of the terminal interface and transferred to the host in a separate data string.	–
9	The "OUTPUT FILTER" function is activated for the code comparison. The CLV has detected valid bar codes. However, these do not match the active set code(s).	The scanned object does not have a bar code that matches the specified set code	–
A	The CHECK MAX. NUMBER OF CODES function is active. The number of valid bar codes detected by the CLV 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 CLV 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 CLV outputs the defined error string instead	–

Table 8-2: Meaning of the ST error status in the read result

8.5 Troubleshooting

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

- These operating instructions
- Tool
- Measuring tape (up to 2000 mm)
- A digital measuring device (ammeter/voltmeter)
- A PC running "CLV-Setup"
- RS 232 data connection cable (Pin 2 and Pin 3 transposed), e. g. No. 2 014 054

8.5.1 General malfunctions: CLV not ready

Fault	Possible cause	Remedy
1. The "Device Ready" LED does not light up. The "Result 1" switching output (default setting: "Device ready) is not outputting a pulse.	After the supply voltage has been switched on (10 ... 30 V DC):	
	• The CLV has no operating voltage	• Check the wiring (power connector fitted securely to the AMV/S 40 connection module). Measure voltage at Pin 1 and Pin 5.
	• The CLV diagnosed a device error during the self-test	• Switch the CLV off and on again. Does the LED light up? If not, contact the SICK Service department.
	During operation:	
	• The CLV is not in "Reading" mode	• Return to Reading mode using the CLV-Setup user interface. (refer to *Chapter 6.5.1 Reading mode (Standard mode), Page 6-18*).
	• The CLV has deactivated the laser diode 10 min. (default setting) after the start of the current reading pulse (pulse type: sensor input/ serial interface)	• Terminate reading pulse. Check the reading pulse function. Pulse again or adjust the laser timeout duration by means of the CLV-Setup user interface (refer to *Chapter 6.4.3 Guide to parameterization, Page 6-8*).

Table 8-3: Troubleshooting: Restoring operation (Reading mode)

8.5.2 Malfunction in Reading mode: Reading pulsing errors

The "Device Ready" LED lights up. If not, refer to measures in *Table 8-3, Page 8-6*.

Fault	Possible cause	Remedy
1. Pulsing type: **Sensor input** (external sensor). The CLV cannot be pulsed: – The "Laser On" LED does not light up – The scan line does not appear	• Sensor not connected or connected to incorrect switching input	• Connect sensor to "Sensor 1" switching input. Check sensor wiring (refer to *Chapter , Page 5-2*). Measure output signal on sensor
	• If sensor supplied by the CLV: Sensor not connected to frame potential	• Insert jumper between Pin 5 and Pin 15
	• Incorrect reading pulse source parameterized on the CLV	• Select checking by means of the CLV-Setup user interface, DEVICE CONFIGURATION tab card, click on the EDIT READING TRIGGER command button. Sensor input selected? (active high: Reading pulse starts when power applied)
	• Photoelectric switch not aligned to the reflector (photoelectric proximity switch or inductive sensor not dampened)	• Align sensor. Check functioning
2. Pulse type: **Serial interface** The CLV cannot be pulsed: – The "Laser On" LED does not light up – The scan line does not appear	• Incorrect reading pulse source parameterized on the CLV	• Select checking by means of the CLV-Setup user interface, DEVICE CONFIGURATION tab card, click on the EDIT READING TRIGGER command button. MODE section: Is serial interface selected? SERIAL INTERFACE section: Triggering type selected correctly?
	• The CLV is not receiving any command strings to start the reading interval.	• Check data connection to host. Select checking by means of the CLV-Setup user interface, HOST INTERFACE tab card. 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 user interface to check the host command strings: Select the TERMINAL INTERFACE tab card. Select MONITOR HOST INTERFACE function (refer to *Chapter 6.5.7 Host interface monitoring, Page 6-26*). Download temporarily to the CLV

Table 8-4: Troubleshooting: Reading pulsing errors in Reading mode

Fault	Possible cause	Remedy
3. CLV does not react to an external signal that ends the reading pulse (sensor input, serial interface)	Incorrect end of reading pulse parameterized in CLV	Select checking by means of the CLV-Setup user interface, DEVICE CONFIGURATION tab card, click on the EDIT READING TRIGGER command button. END OF READING INTERVAL section: Is "Generated by trigger source" selected?

Table 8-4: Troubleshooting: Reading pulsing errors in Reading mode

8.5.3 Malfunctions in Reading mode: Result output errors

The "Device Ready" LED lights up. If not, refer to measures in *Table 8-3, Page 8-6*.
here: Number of bar codes: 1

Fault	Possible cause	Remedy
1. The "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") does not output a pulse – The CLV outputs the status ST = 2 in the read 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 area during the reading pulse	• Synchronize read with presence of an object in the reading field (refer to *Chapter 8.5.2 Malfunction in Reading mode: Reading pulsing errors, Page 8-7*)
	• Scan line positioned incorrectly	• Align CLV. Is bar code at center of scan line? Check the reading quality with the CLV-Setup user interface. To this purpose call up PERCENTAGE EVALUATION (refer to *Chapter 6.5.2 Percentage evaluation, Page 6-21*)
	• Evaluation range of the scan line is limited unfavorably (CP values)	• Select checking by means of the CLV-Setup user interface, DEVICE CONFIGURATION tab card, click on the DISTANCE CONFIGURATION command button. Are the min. and max. code position values selected correctly? Check with SHOW CP LIMITS (refer to *Chapter 6.5.4 Show CP limits, Page 6-23*)
	• Bar code presented at incorrect reading distance	• Check whether reading distance of bar code is in the specified reading range?
	• Incorrect focal position selected in the distance configuration	• Select checking by means of the CLV-Setup user interface, DEVICE CONFIGURATION tab card, click on the DISTANCE CONFIGURATION command button. Does the focal position match the distance of the object?
	• At dynamic focal position changeover: Trigger source parameterized incorrectly	• Select checking by means of the CLV-Setup user interface, READING CONFIGURATION, FOCUS TRIGGER SOURCE section. a) Trigger source: "Sensor 2" switching input: Check functional assignment and connection of sensor (refer to *Fig. 5-5, Page 5-8*).

Table 8-5: Troubleshooting: Result output errors in Reading mode

Fault	Possible cause	Remedy
1. The "Result" LED does not light up at the end of the reading pulse. (Default setting: "Good Read") – Continued –	• At dynamic focal position changeover: Trigger source parameterized incorrectly – Continued –	• b) Trigger source: "Serial interface": Check the data connection to the host. Use the CLV-Setup user interface to check the host command strings: Select the TERMINAL INTERFACE tab card. Select the MONITOR HOST INTERFACE function (refer to *Chapter 6.5.7 Host interface monitoring, Page 6-26*). Download temporarily to CLV! c) Trigger source: "Timer": Check the changeover time setting.
	• The bar code is tilted strongly with respect to the scan line (large tilt)	• Select CLV-Setup user interface: CODE CONFIGURATION tab card, DECODER section. Select the SMART decoder. Download to CLV!
	• The reading angles at which the bar code appears to the CLV are too large	• Select CLV-Setup user interface: CODE CONFIGURATION tab card, DECODER section. Select the standard decoder. Download temporarily to the CLV! Call up PERCENTAGE EVALUATION, select distance configuration. Monitor reading quality (reading quality > 70 %!). If necessary, realign CLV and/or reconfigure the distance configuration. If "OK", choose SMART decoder. Download to the CLV!
	• Bar code is in total reflection zone	• Optimize CLV alignment (scan line should strike the bar code at an angle of approx. 15°) Check the reading quality with the CLV-Setup user interface. Call up PERCENTAGE EVALUATION (refer to *Chapter 6.5.2 Percentage evaluation, Page 6-21*)

Table 8-5: Troubleshooting: Result output errors in Reading mode

Fault	Possible cause	Remedy
1. The "Result" LED does not light up at the end of the reading pulse. (Default setting: "Good Read") – Continued –	• Evaluation criteria for bar code not set correctly	• Select CLV-Setup user interface: CODE CONFIGURATION tab card, CODES section. Enable all code types (except Pharmacode), set code lengths to FREE. Download temporarily to CLV! Call up PERCENTAGE EVALUATION. Code type and length are displayed in the read result. Enable the determined code type in the CODES section and disable all other types. Enter the code length in the code type tab under FIXED. Download to CLV!
	• Bar code quality inadequate	• Check: Sufficient idle zones present? Print contrast sufficient? Specified print tolerances exceeded? Select checking by means of the CLV-Setup user interface, READING CONFIGURATION tab card, SEGMENTATION section. Is "Start/Stop automatic" selected? Carry out read with faultless reference code as a test.
2. The CLV is not transferring any read results to the host.	• Reading pulse is not functioning correctly	• Refer to *Chapter 8.5.2 Malfunction in Reading mode: Reading pulsing errors, Page 8-7*
	• Wiring fault in data connection	• Check wiring as shown in *Fig. 5-2, Page 5-5*.
	• Voltage level incorrect	• Measure voltages.
	• Host interface in CLV parameterized incorrectly	• Select checking with CLV-Setup user interface, HOST INTERFACE tab card, DATA FORMAT: section. Correct interface type (hardware) and data format selected? Check settings in INTERFACE PROTOCOL section.
3. The CLV transfers the status ST = 3 to the host in the read result. (If ST is enabled for the separator; this is not selected by default setting)	The CLV has diagnosed a device error in the self-test	Switch the CLV off and on again. Does the "Device Ready" LED light up? If not, contact the SICK Service department.

Table 8-5: Troubleshooting: Result output errors in Reading mode

Fault	Possible cause	Remedy
4. The data content of the bar code output by the CLV is incorrect or incomplete.	• The data format on the host interface is parameterized incorrectly in the CLV • The CLV suppresses the last character in the bar code	• Select checking by means of the CLV-Setup user interface, HOST INTERFACE tab card, DATA FORMAT section. Are the values correct? • Select checking by means of the CLV-Setup user interface, CODE CONFIGURATION tab card. Click the EDIT CODES command button. Select the tab card for the respective code type. Is the output check digit enabled? Change if necessary. Download to CLV!

Table 8-5: Troubleshooting: Result output errors in Reading mode

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

The "Device Ready" LED lights up. If not, refer to measures in *Table 8-3, Page 8-6*.

Fault	Possible cause	Remedy
1. The "Result 1" (default setting: Device Ready) and "Result 2" (default setting: Good Read) switching outputs are not outputting any pulses	• Event of the assigned function for outputting the result status of the reading does not occur in the reading process. • Incorrect switching behavior parameterized in CLV	• Not applicable • Select checking by means of the CLV-Setup user interface, DEVICE CONFIGURATION tab card. Click on the EDIT RESULT OUTPUTS command button. Are the outputs set to „No“ inverted output? Change, if necessary. Download to CLV!
2. The beeper is not confirming the output of the read result. (Default setting: "Good Read")	Beeper de-activated	Select checking by means of the CLV-Setup user interface, DEVICE CONFIGURATION tab card, BEEPER section: "Beeper active" selected?

Table 8-6: Troubleshooting: Errors in the result status output in Reading mode

8.5.5 Malfunctions in Reading mode: Oscillating mirror operation errors

The "Device Ready" LED lights up. If not, refer to measures in *Table 8-3, Page 8-6*.

Fault	Possible cause	Remedy
1. The oscillating mirror does not move.	• Incorrect operating mode parameterized in the CLV	• Select checking by means of the CLV-Setup user interface, OSCILLATING MIRROR tab card, OSCILLATING MIRROR section. Is OSCILLATING MODE WITH FIXED AMPLITUDE or OSCILLATING WITH VARIABLE AMPLITUDE selected?
2. The oscillating mirror oscillates with the maximum deflection (40 CW), although a variable amplitude of e. g. 10 CW is set in the Distance Configuration 1.	• OSCILLATING MODE WITH FIXED AMPLITUDE parameterized in the CLV by mistake • The oscillating amplitude is parameterized in the wrong distance configuration (here: No. 2) • Distance configuration not changed over	• From the OSCILLATING MIRROR tab card select the OSCILLATING WITH VARIABLE AMPLITUDE mode. Download to CLV! • Select checking by means of the CLV-Setup user interface, DEVICE CONFIGURATION. Click on the DISTANCE CONFIGURATION command button. Is the amplitude value set in the correct distance configuration (here: No. 1)? • Select checking by means of the CLV-Setup user interface, DEVICE CONFIGURATION tab card. Function Sensor 2: Is focal control changeover selected? Connect sensor to "Sensor 2" switching input. Check sensor wiring (refer to *Fig. 5-5, Page 5-8*). Measure output signal of sensor
3. One-Shot: The One-Shot function cannot be triggered (sensor correctly connected to the "Sensor 2" switching input)	Trigger source incorrectly parameterized and/or "Sensor 2" switching input has not been assigned this function.	Select checking by means of the CLV-Setup user interface, OSCILLATING MIRROR tab card. Trigger mode OK? Select DEVICE CONFIGURATION tab card. Function Sensor 2: Is trigger One-Shot selected?

Table 8-7: Troubleshooting: Oscillating mirror errors in Reading mode

8.5.6 Malfunctions: Configuration errors (parameterization)

Fault	Possible cause	Remedy
1. **Auto Setup:** The CLV does not read the presented, application-specific bar code (no confirmation from beeper)	• CLV not in "Auto Setup" mode	• Check: Does the "Device Ready" LED light up? If so, the CLV is in "Reading" mode again. CLV-Setup user interface: Call up the Auto Setup function again via the VIEW pull-down menu
	• If Auto Setup is started with Profile bar code No. 10: Wait time of 5 s after power-up has been exceeded	• Switch the CLV off and on again. Present the Profile bar code No. 10 within 5 s. Then the applicationspecific bar code.
	• Bar code presented at incorrect reading distance	• Check whether the reading distance of the bar code lies within the specified reading range?
	• Bar code is in total reflection zone	• Optimize bar code alignment (scan line should strike the bar code at a skew of approx. 15)
	• Bar code quality not adequate	• Refer to *Fault 1*, *Table 8-5, Page 8-9*).
2. **Profile programming:** CLV does not read the presented Profile bar code (no confirmation by the beeper)	• Wait time of 5 s after power-up has been exceeded	• Switch the CLV off and on again. Present Profile bar code within 5 s.
	• Wait time of 10 s after the first Profile bar code was presented has been exceeded	• Once the first Profile bar code has been read successfully, present the next bar code within 10 s, etc.
	• In Reading mode: CLV not pulsed	• Pulse the CLV accordingly and present the first Profile bar code. Present the next bar code within 10 s, etc.

Table 8-8: Troubleshooting: Configuration errors (parameterization)

8.6 SICK Support

If a system error occurs repeatedly ("CLV SYS failure: xxx", xxx = 000...299) or if you cannot correct an error using the above measures, the CLV may be defective. The CLV does not have any system components whose functionality can be restored by the user after a failure.

Please contact our local SICK office or subsidary:

- The telephone and fax numbers are listed on the *back page* of this manual.

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

9 Technical data

9.1 Data sheet CLV 45x line scanner

Type	**CLV 450-0010** **CLV 451-0010**
Reading window	On front
Laser diode (wavelength)	Red light (λ = 650 nm)
Operating life of the laser diode	MTBF 20 000 h
Laser class of the device	Class 2 (to DIN EN 60825-1), de-activation of the laser diode after 10 min[1)]
Effective aperature angle	Max. 50°
Scan/decoding frequency	400 ... 1000 Hz
Resolution	0.25 ... 1.0 mm 0.5 ... 1.0 mm
Focus control	Dynamic focal position changeover
Number of distance configurations (DC)[2]	Max. 8
Focus adjustment time	≤ 50 ms (from minimum to maximum focal position)
Focus triggering source	Switching input "Sensor 2"/Serial interface/Timer
Reading ranges	Refer to the reading area diagrams *Chapter 10 Appendix, Page 10-1*
Bar code printing contrast (PCS)	≥ 60 %
Ambient light compatibility	2000 lx (on bar code)
Number of bar codes per scan	1 ... 20 (standard decoder), 1 ... 6 (SMART decoder)
Number of bar codes per read port[3)]	1 ... 50 (auto-discriminating)
Bar code types (SMART decoder)[4)]	Code 39, Code 128, Code 93, Codabar, EAN, EAN 128, UPC, 2/5 Interleaved
Bar code length	Max. 50 characters[5)] (max. 500 characters across all bar codes per reading interval)
Printing ratio	2:1 ... 3:1
Number of multiple readings	1 ... 99
Optical displays	4 x LEDs (status indicators)
Acoustic display	Beeper, interruptible, can have function for result status display assigned
Reading pulsing	Switching input "Sensor 1"/ free running/serial interface
Data interface "Host"	RS-232 or RS-422/485, data output format can be set
Data transmission rate	300 ... 57 600 bits/s
Protocols	SICK standard, SICK network and 3964(R)
Physical configurations	Stand-alone, SICK network (bus), daisy chain (pass-through or master/slave)
Data interface "CAN"	10 kbits/s ... 1 Mbits/s
Data interface "Terminal"	RS-232, 9 600 bits/s, 8 data bits, no parity, 1 stop bit, fixed output format
Function switching inputs	2 ("Sensor 1", "Sensor 2") – Opto-decoupled, V_{Imax} = 28 V, non-interchangeable, can be wired to PNP outputs – "Sensor 1" (reading pulse): Internal delay time max. 30 ms/reduced max 0.6 ms – "Sensor 2" (function selectable): Internal delay time max. 30 ms
Function switching outputs	2 ("Result 1", "Result 2") – PNP, I_{omax} = 100 mA, short-circuit-proof, adjustable pulse duration (stat., 10 ... 990 ms) – Output function of the result status selectable
Electrical connection	15-pin D-Sub HD plug, cable length 0.9 m
Operating voltage/power consumption	10 ... 30 V DC/6 W
Housing	Zinc diecast, no source of faults for coating wetting

Table 9-1: Technical specifications line scanner

Type	**CLV 450-0010** **CLV 451-0010**
Enclosure rating/Protection class	IP 65 (to DIN 40 050)/Class 3 (to VDE 0106/IEC 1010-1)
EMC/Vibration/Shock test	To EN 50081-2, EN 50082-1, EN 61000-6-2/to EN 61010-1/to EN 60068-2-27
Weight	530 g with connection cable
Ambient operating/storage temperature	0 ... +40 °C/ –20 ... +70 °C
Max. relative humidity	90 %, non-condensing

1) (default setting), in reading mode at the pulsing mode "Switching input Sensor 1" and "Serial interface"
2) DC = Distance configuration (limitation of the active evaluation range of the scan line by selection of the min. and max. value of the code position)
3) Reading interval: Time window of the code evaluation generated by the reading pulse
4) Standard decoder: Additionally pharmacode
5) SMART decoder: Code 39: Max. 30 characters. Code bar: Max. 30 characters. Code 128, EAN 128: Max. 48 characters (max. 96 "half-characters"). Code 93: Max. 47 characters

Table 9-1: Technical specifications line scanner

9.2 Data sheet CLV 45x line scanner with oscillating mirror

Technical data such as line scanners, however, with the following deviations

Type	**CLV 450-6010** **CLV 451-6010**
Reading window	Lateral
Light emission	At an angle of 105° (neutral position CW = 50)
Trigger source for DC changeover[6)]	Additionally Oscillating mirror extrema
Effective opening angle	Max. 50°
Oscillating mirror functions	Fixed (position adjustable)/oscillating (amplitude per DC variable or fixed)/One-Shot[7)]
Oscillating frequency	0.5 ... 4 Hz
Max. deflection angle	+20° ... –20° (can be set per software)
Reading ranges	Refer to *Chapter 10 Appendix, Page 10-1*
Deflection ranges	Refer to *Fig. 10-16, Page 10-18*
Operating voltage/power consumption	10 ... 30 V DC/max. 7.2 W
Weight	700 g with connection cable

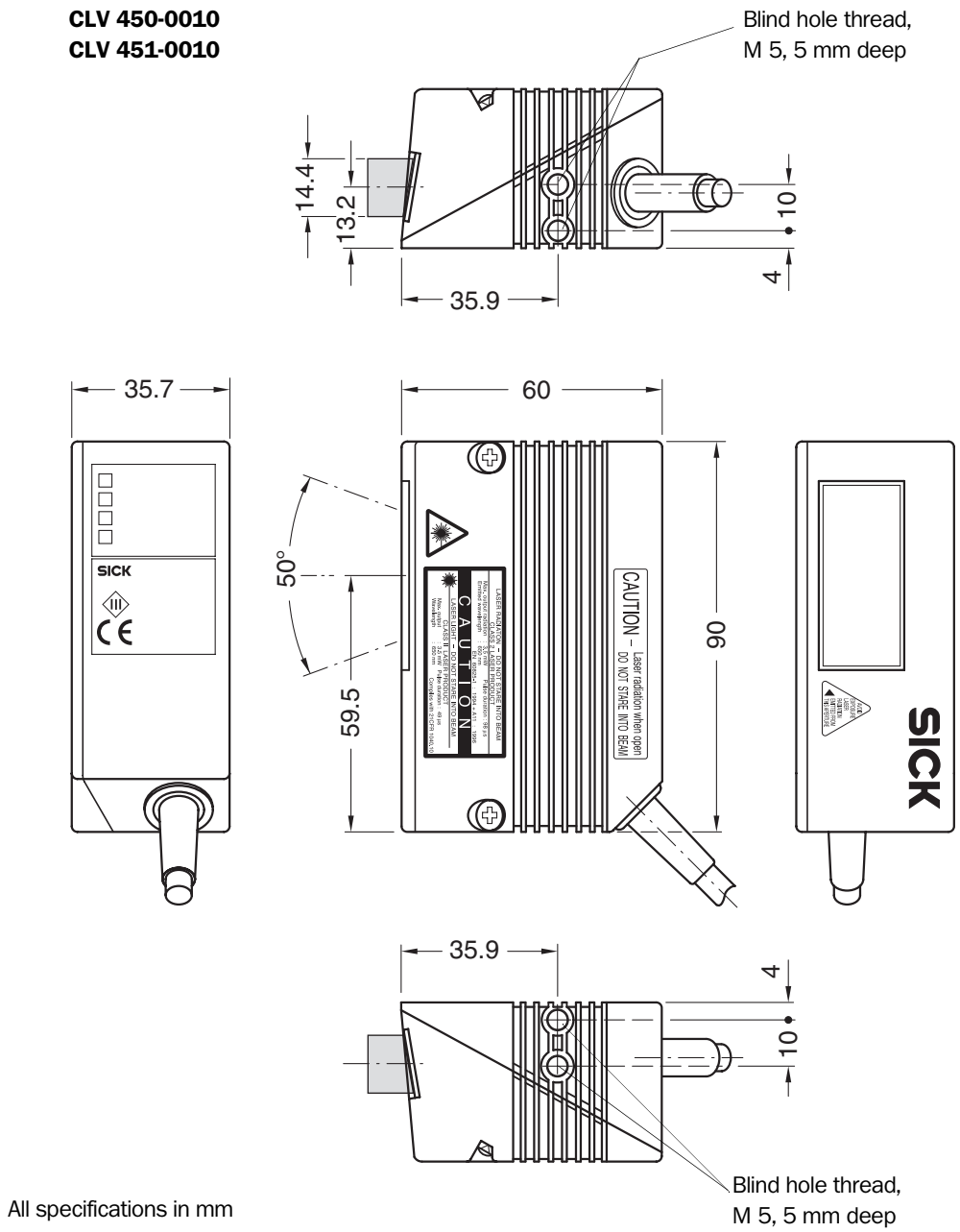
6) DC = Distance configuration (limitation of the active evaluation range of the scan line by selection of the min. and max. value of the code position as well as the oscillating amplitude by selecting the CW value)
7) One-Shot: Single oscillating movement per reading pulse (starting position and speed for forward and reverse movement can be selected)

Table 9-2: Technical specifications line scanner with oscillating mirror

9.3 Dimensional drawings CLV

9.3.1 Line scanner

CLV 450-0010
CLV 451-0010

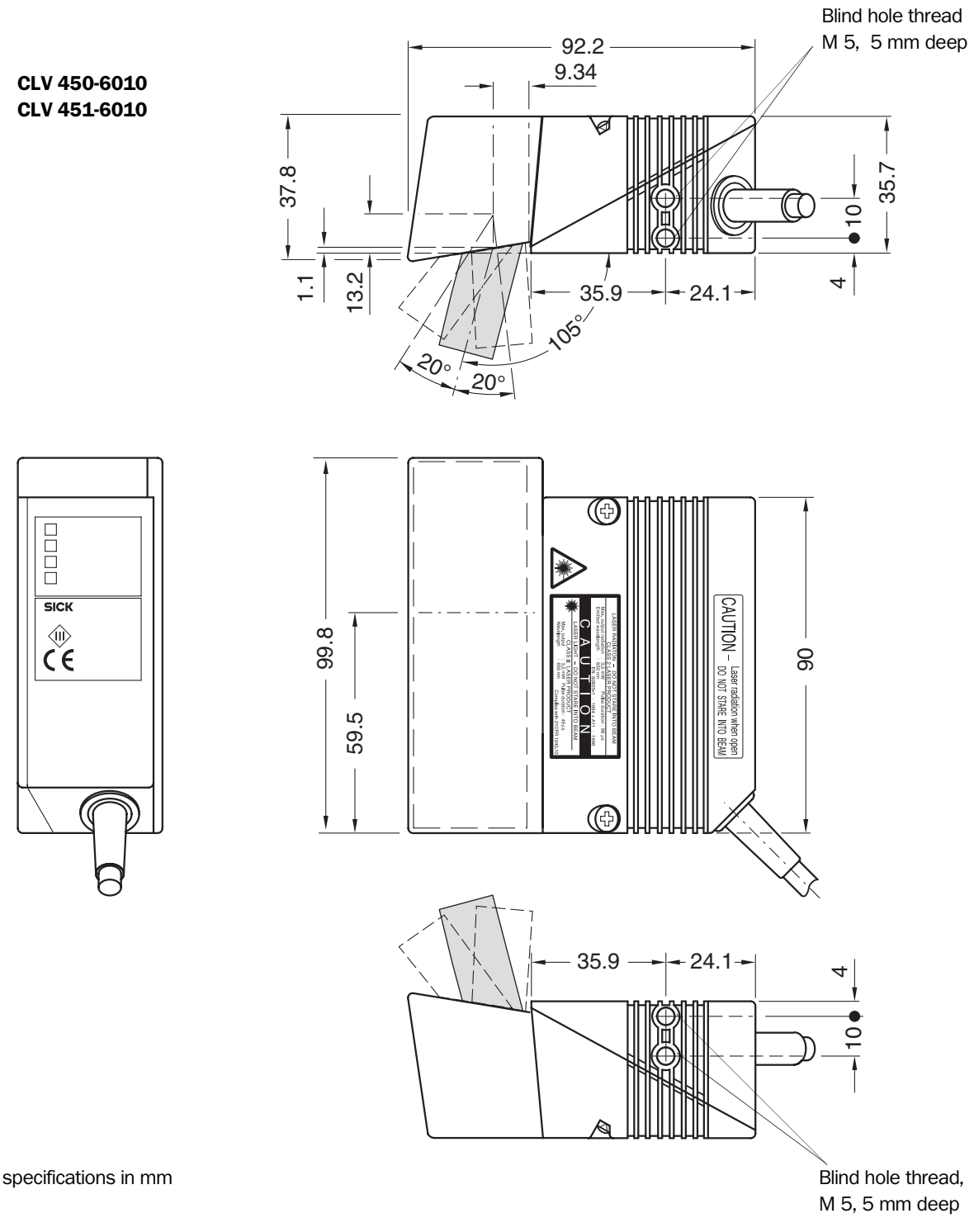


All specifications in mm

Fig. 9-1: Dimensions of the line scanner

9.3.2 Line scanner with oscillating mirror

CLV 450-6010
CLV 451-6010



All specifications in mm

Fig. 9-2: Dimensions of the line scanner with oscillating mirror

10 Appendix

10.1 Appendix overview

The Appendix contains the following additional information:

- Specification diagrams
  - Line scanner
  - Line scanner with oscillating mirror
- System messages
- Installing and operating the "CLV-Setup" PC software
- Configuring the CLV by means of Profile bar codes
- Configuring the CLV with command strings
- Calculating parameter values for setting the CLV
- Auxiliary tables
- Special applications and procedures
- Replacing a CLV (copying the parameter record)
- Available accessories
- Dimensioned drawings of the accessories
- Supplementary documentation (overview)
- 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 39/ITF
Printing ratio	2 : 1
Print contrast	> 90 %
Tilt	typical ± 30° up to focal position 750 mm and resolution 0.35 ...1.0 mm
Ambient light	< 2 000 lx
Good read rate	> 75 %

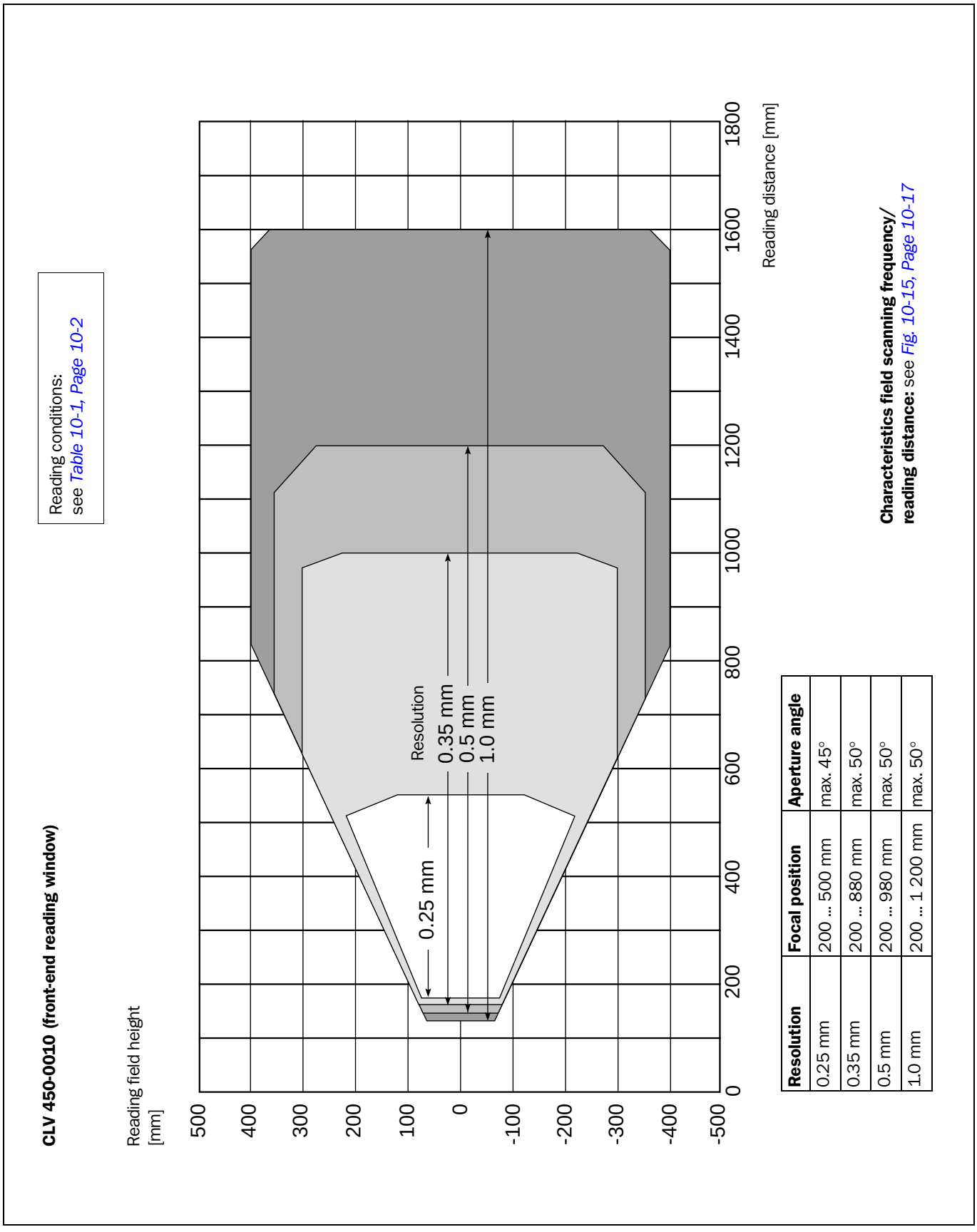
Table 10-1: Reading conditions for specification diagrams

10.2.2 Overview of diagrams

CLV type	**Scanning process**	**Diagram**	**Page**
CLV 450-0010	Line scanner	Reading ranges about all focal postions	*10-3*
CLV 450-6010	Line scanner with oscillating mirror	Reading ranges about all focal postions	*10-4*
CLV 450-0010	Line scanner	Min. and max. reading distance (DOF) for 0.25 mm	*10-5*
CLV 450-0010	Line scanner	Min. and max. reading distance (DOF) for 0.35 mm	*10-6*
CLV 450-0010	Line scanner	Min. and max. reading distance (DOF) for 0.50 mm	*10-7*
CLV 450-0010	Line scanner	Min. and max. reading distance (DOF) for 1.00 mm	*10-8*
CLV 450-6010	Line scanner with oscillating mirror	Min. and max. reading distance (DOF) for 0.25 mm	*10-9*
CLV 450-6010	Line scanner with oscillating mirror	Min. and max. reading distance (DOF) for 0.35 mm	*10-10*
CLV 450-6010	Line scanner with oscillating mirror	Min. and max. reading distance (DOF) for 0.50 mm	*10-11*
CLV 450-6010	Line scanner with oscillating mirror	Min. and max. reading distance (DOF) for 1.00 mm	*10-12*
CLV 450-0010 CLV 450-6010	Line scanner Line scanner with oscillating mirror	Characteristics field scanning frequency	*10-17*
CLV 450-6010	Line scanner with oscillating mirror	Deflection range	*10-18*
CLV 451-0010	Line scanner	Min. and max. reading distance (DOF) for 0.50 mm/ aperture angle 25°	*10-13*
CLV 451-0010	Line scanner	Min. and max. reading distance (DOF) for 0.50 mm/ aperture angle 55°	*10-14*
CLV 451-6010	Line scanner with oscillating mirror	Min. and max. reading distance (DOF) for 0.50 mm/ aperture angle 25°	*10-15*
CLV 451-6010	Line scanner with oscillating mirror	Min. and max. reading distance (DOF) for 0.50 mm/ aperture angle 55°	*10-16*
CLV 451-6010	Line scanner with oscillating mirror	Deflection range	*10-18*

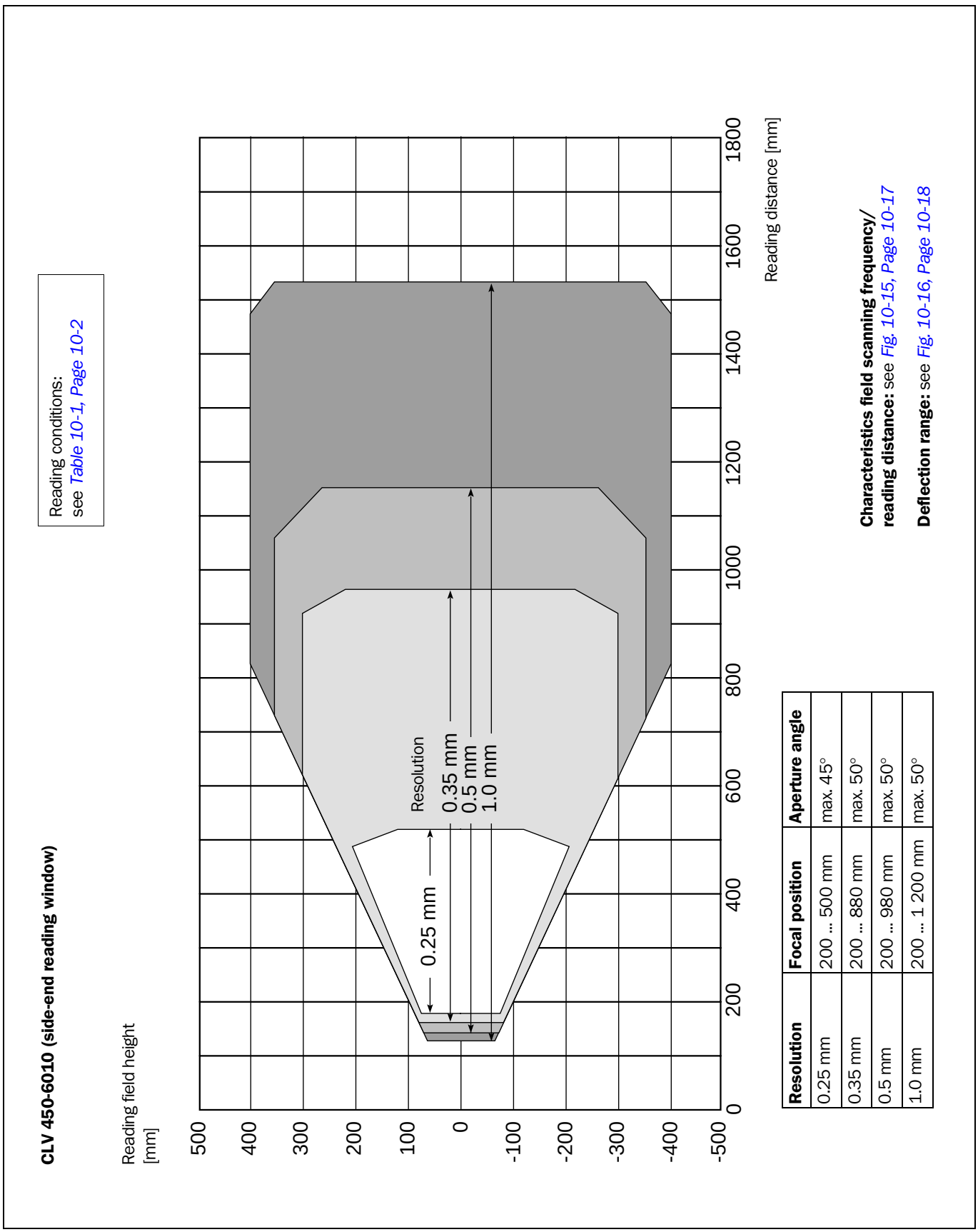
Table 10-2: Overview CLV 45x specification diagrams

10.2.3 Reading ranges of CLV 450 line scanner/line scanner with oscillating mirror



Resolution	Focal position	Aperture angle
0.25 mm	200 ... 500 mm	max. 45°
0.35 mm	200 ... 880 mm	max. 50°
0.5 mm	200 ... 980 mm	max. 50°
1.0 mm	200 ... 1 200 mm	max. 50°

Fig. 10-1: CLV 450-0010: Reading ranges about all focal positions for line scanner



Resolution	Focal position	Aperture angle
0.25 mm	200 ... 500 mm	max. 45°
0.35 mm	200 ... 880 mm	max. 50°
0.5 mm	200 ... 980 mm	max. 50°
1.0 mm	200 ... 1 200 mm	max. 50°

Fig. 10-2: CLV 450-6010: Reading ranges about all focal positions for line scanner with oscillating mirror

10.2.4 Depths of field for CLV 450 line scanner (front-end reading window)

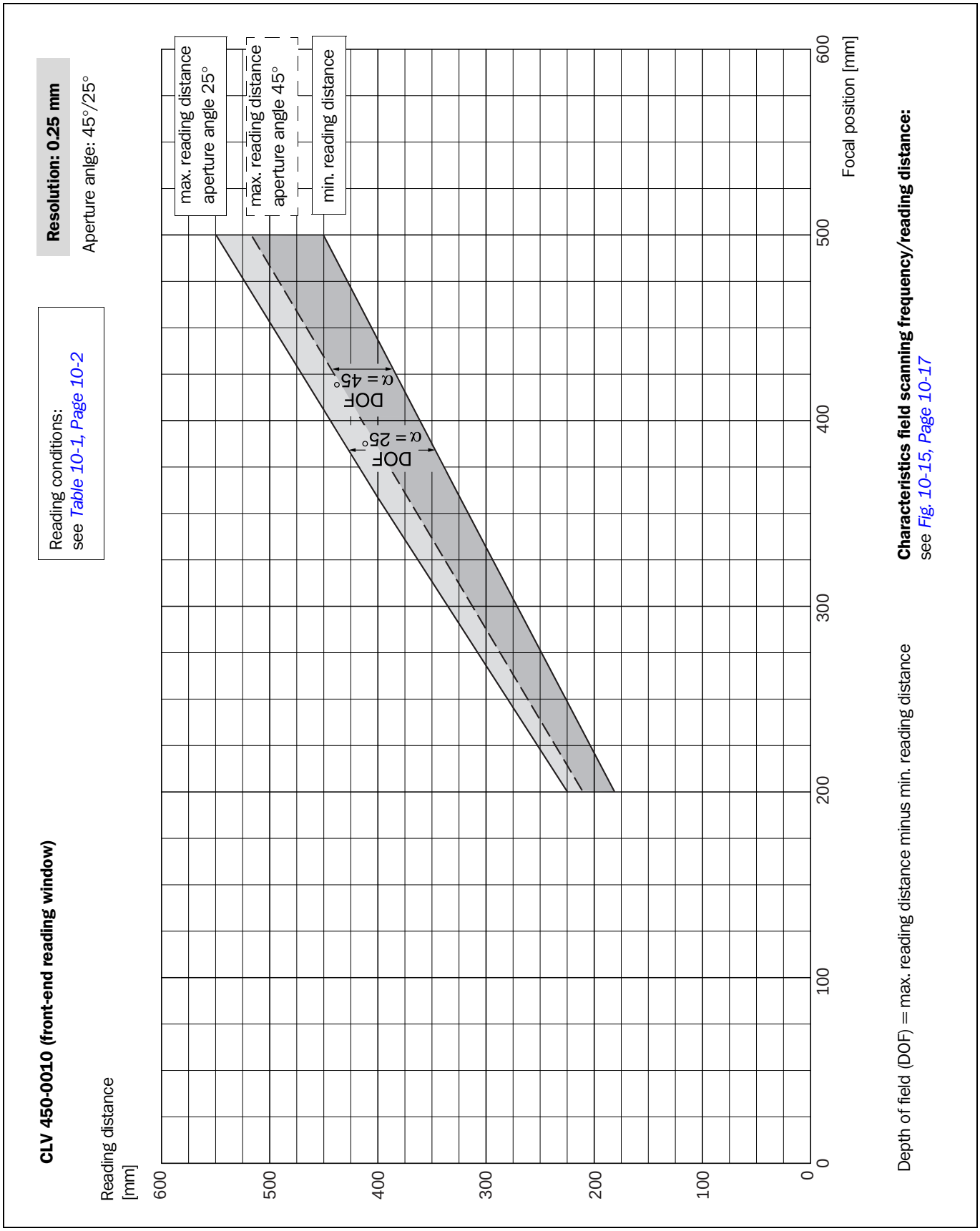


Fig. 10-3: CLV 450-0010: Min. and max. reading distance for the line scanner as a function of the focal position at a resolution of 0.25 mm

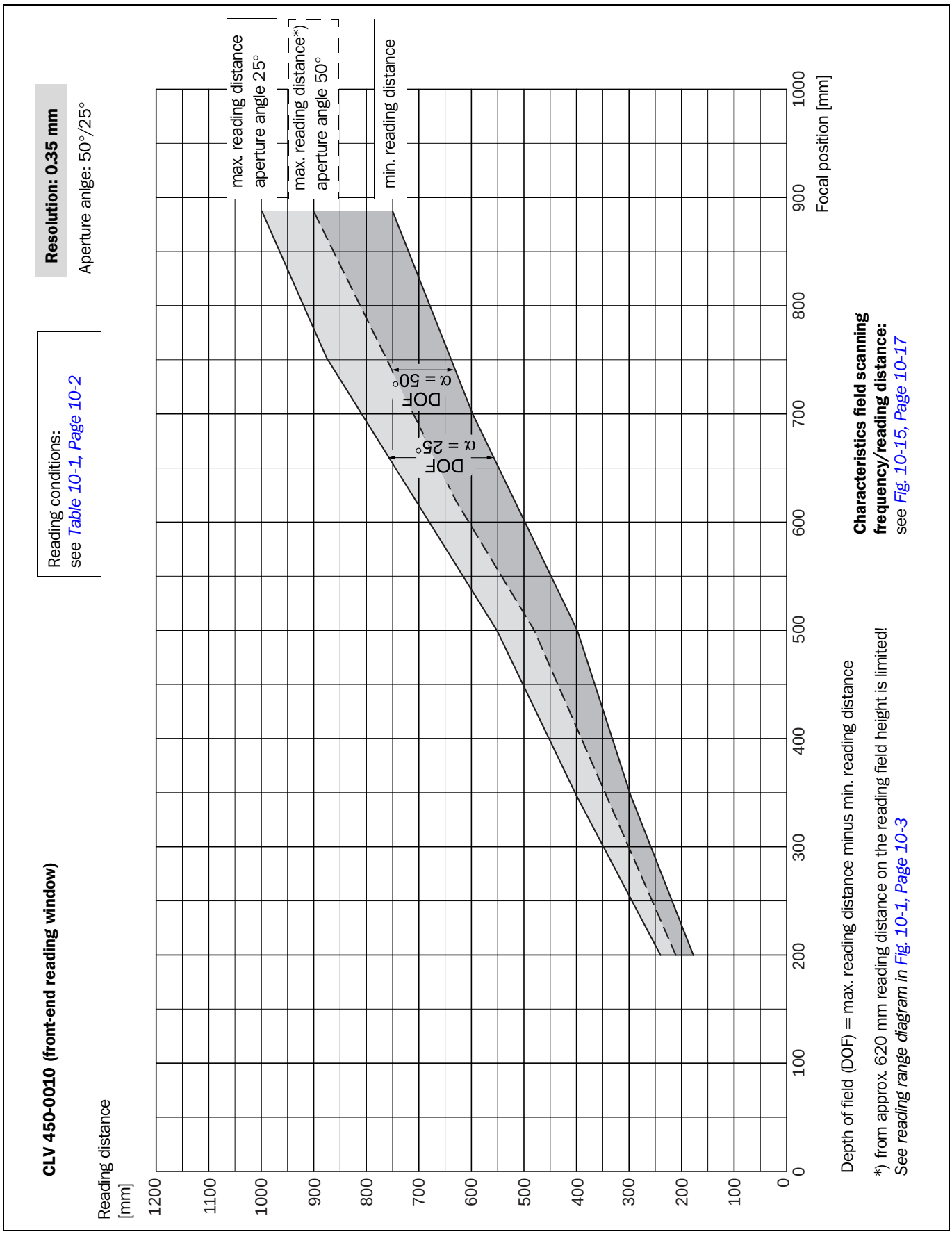


Fig. 10-4: CLV 450-0010: Min. and max. reading distance for the line scanner as a function of the focal position at a resolution of 0.35 mm

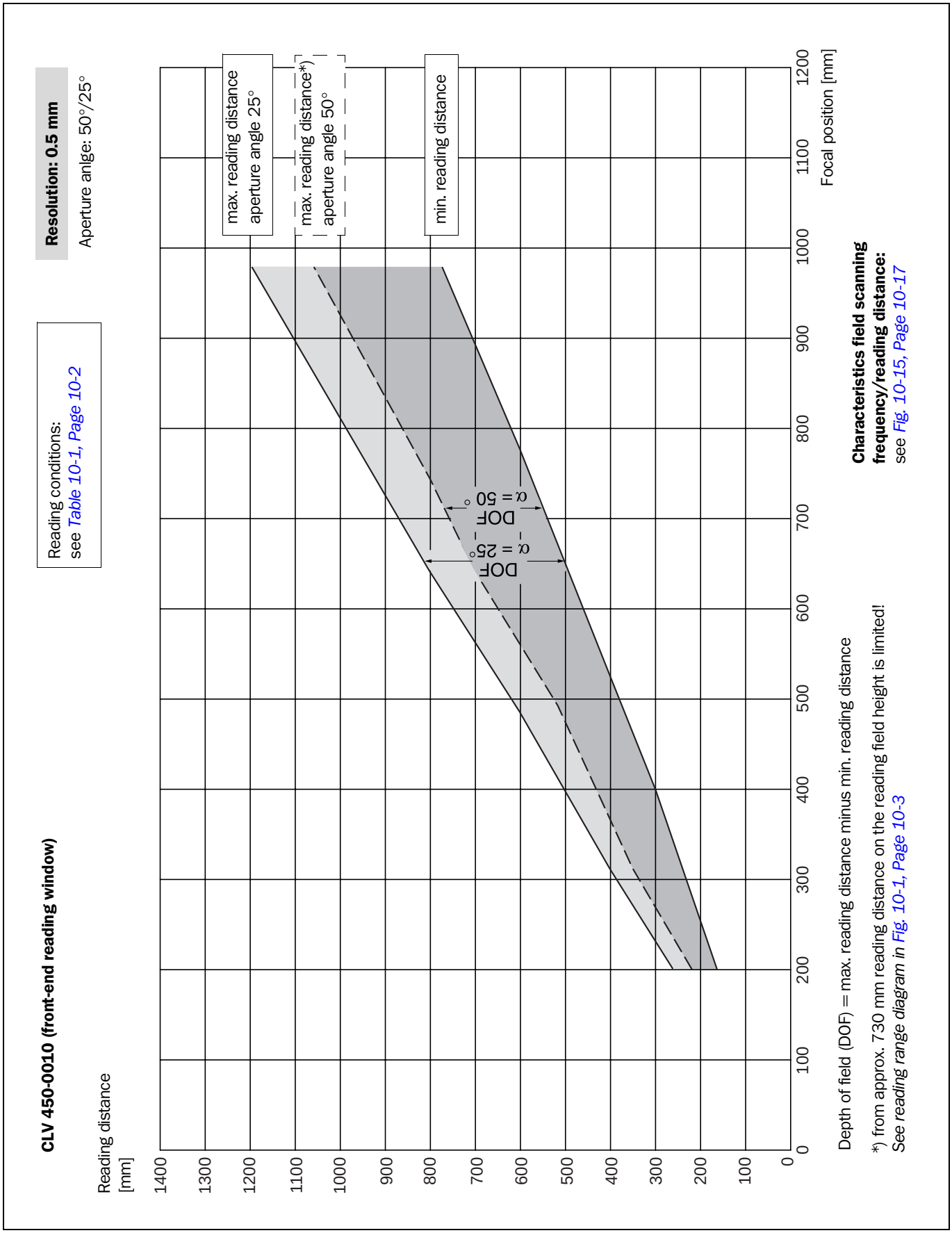


Fig. 10-5: CLV 450-0010: Min. and max. reading distance for the line scanner as a function of the focal position at a resolution of 0.50 mm

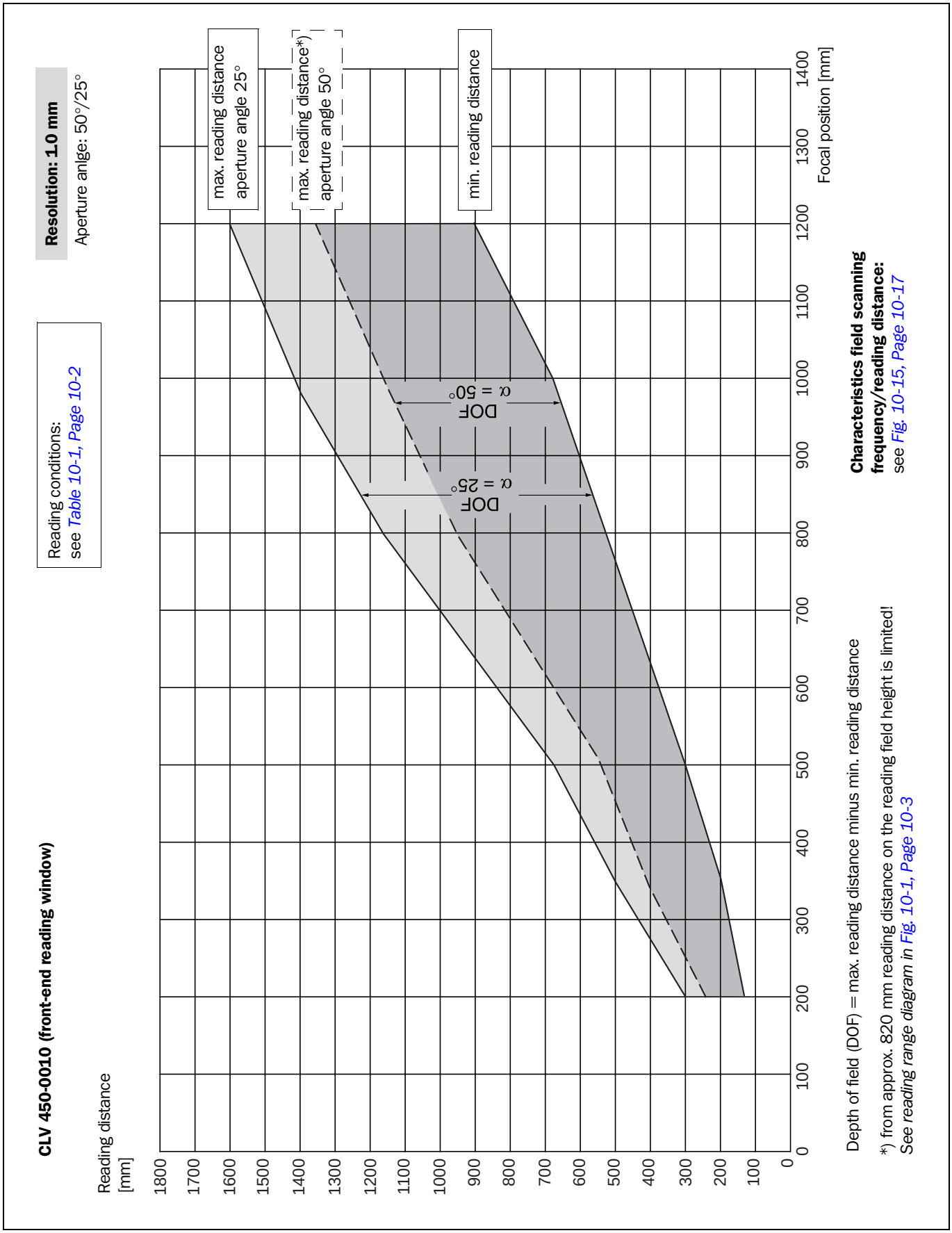


Fig. 10-6: CLV 450-0010: Min. and max. reading distance for the line scanner as a function of the focal position at a resolution of 1.00 mm

10.2.5 Depths of field for CLV 450 line scanner with oscillating mirror (side-end reading window)

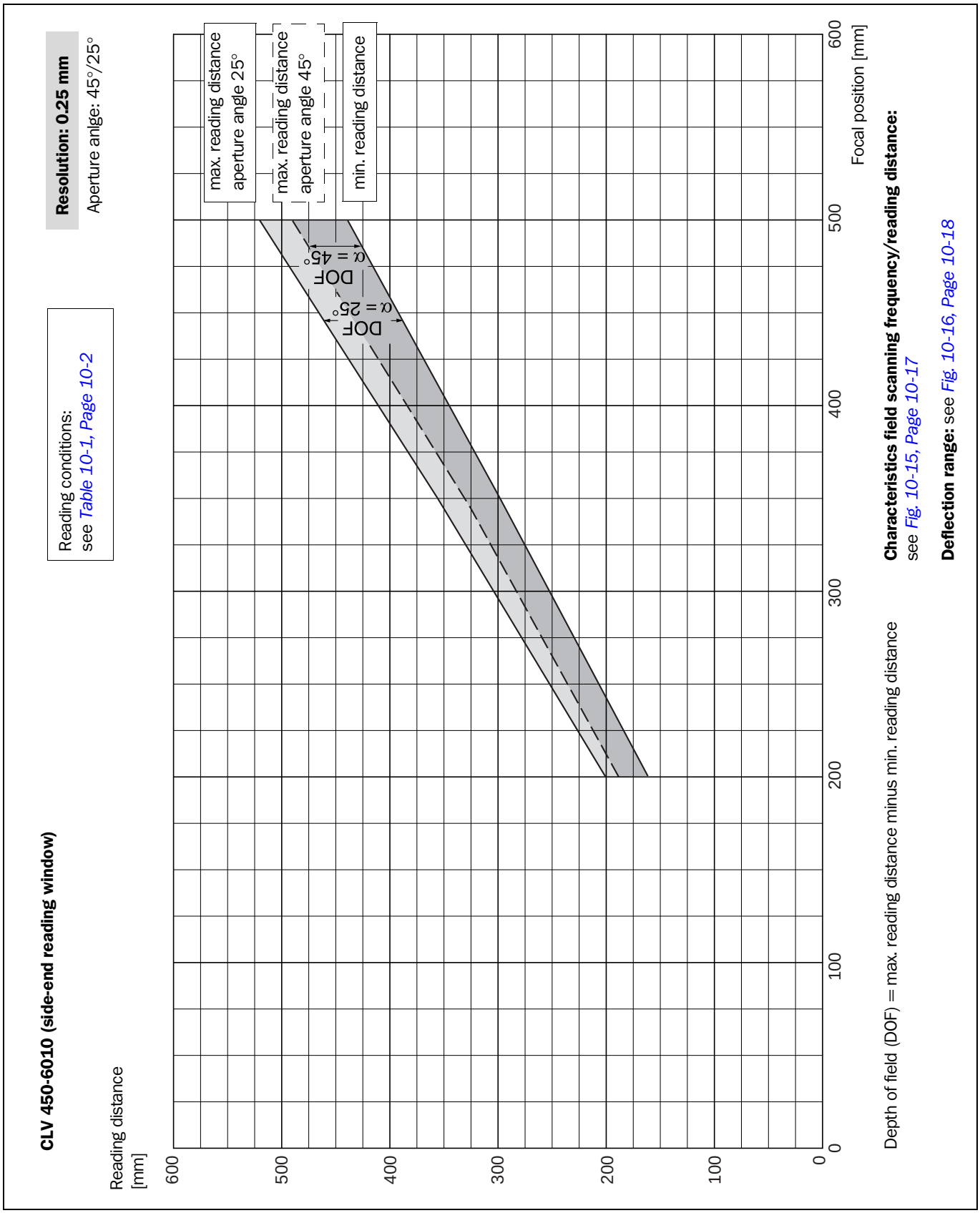


Fig. 10-7: CLV 450-6010: Min. and max. reading distance for the line scanner with oscillating mirror as a function of the focal position at a resolution of 0.25 mm

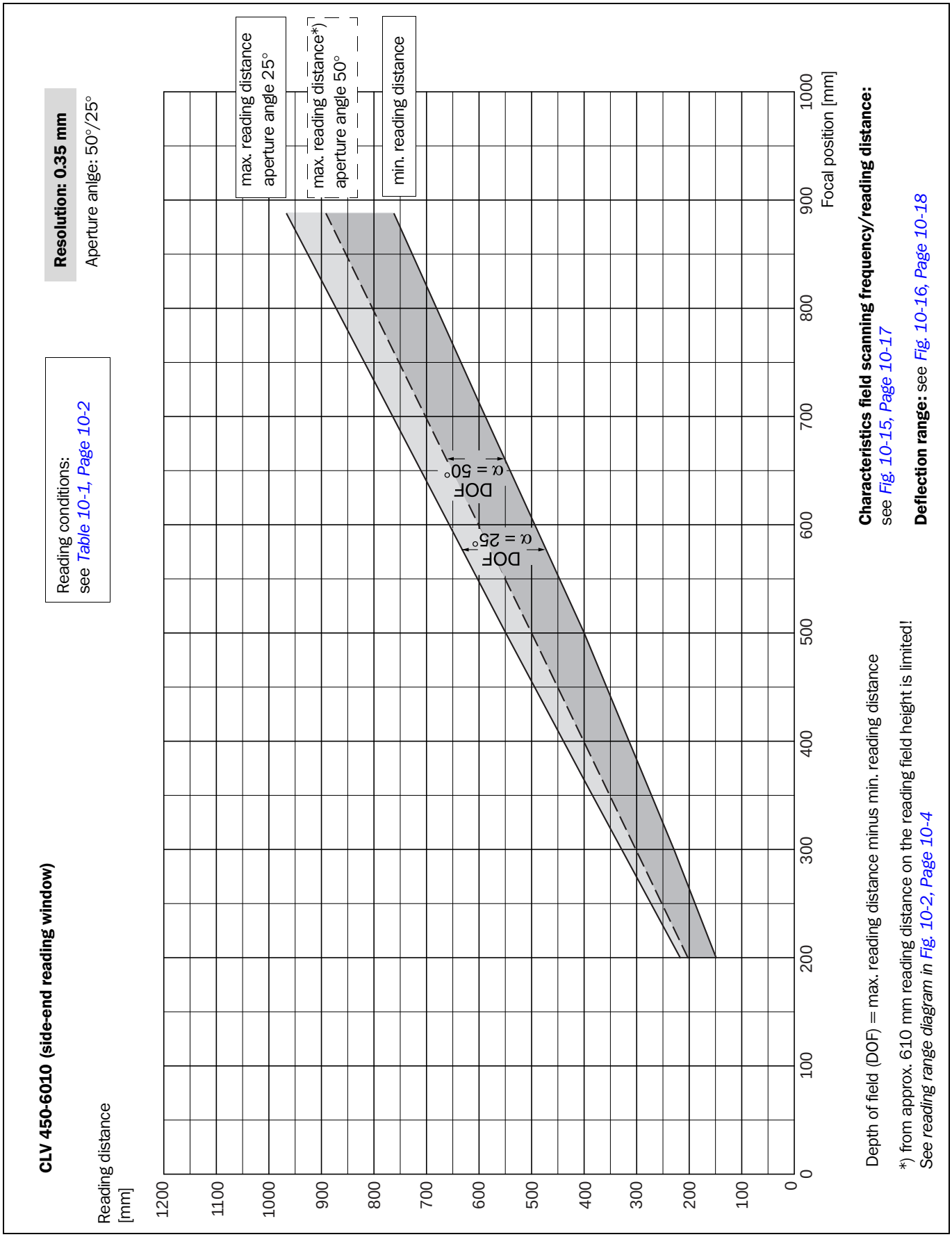


Fig. 10-8: CLV 450-6010: Min. and max. reading distance for the line scanner with oscillating mirror as a function of the focal position at a resolution of 0.35 mm

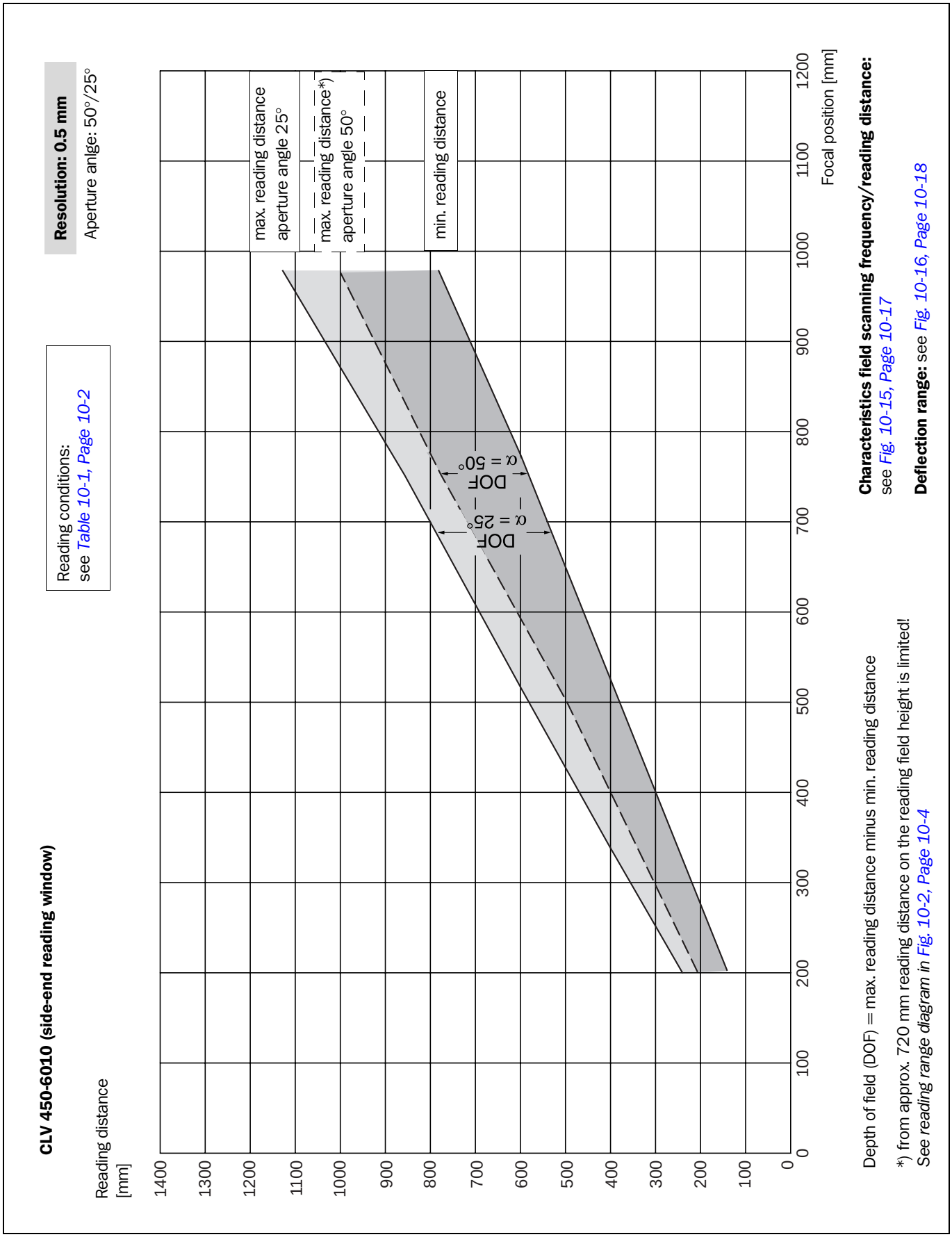


Fig. 10-9: CLV 450-6010: Min. and max. reading distance for the line scanner with oscillating mirror as a function of the focal position at a resolution of 0.50 mm

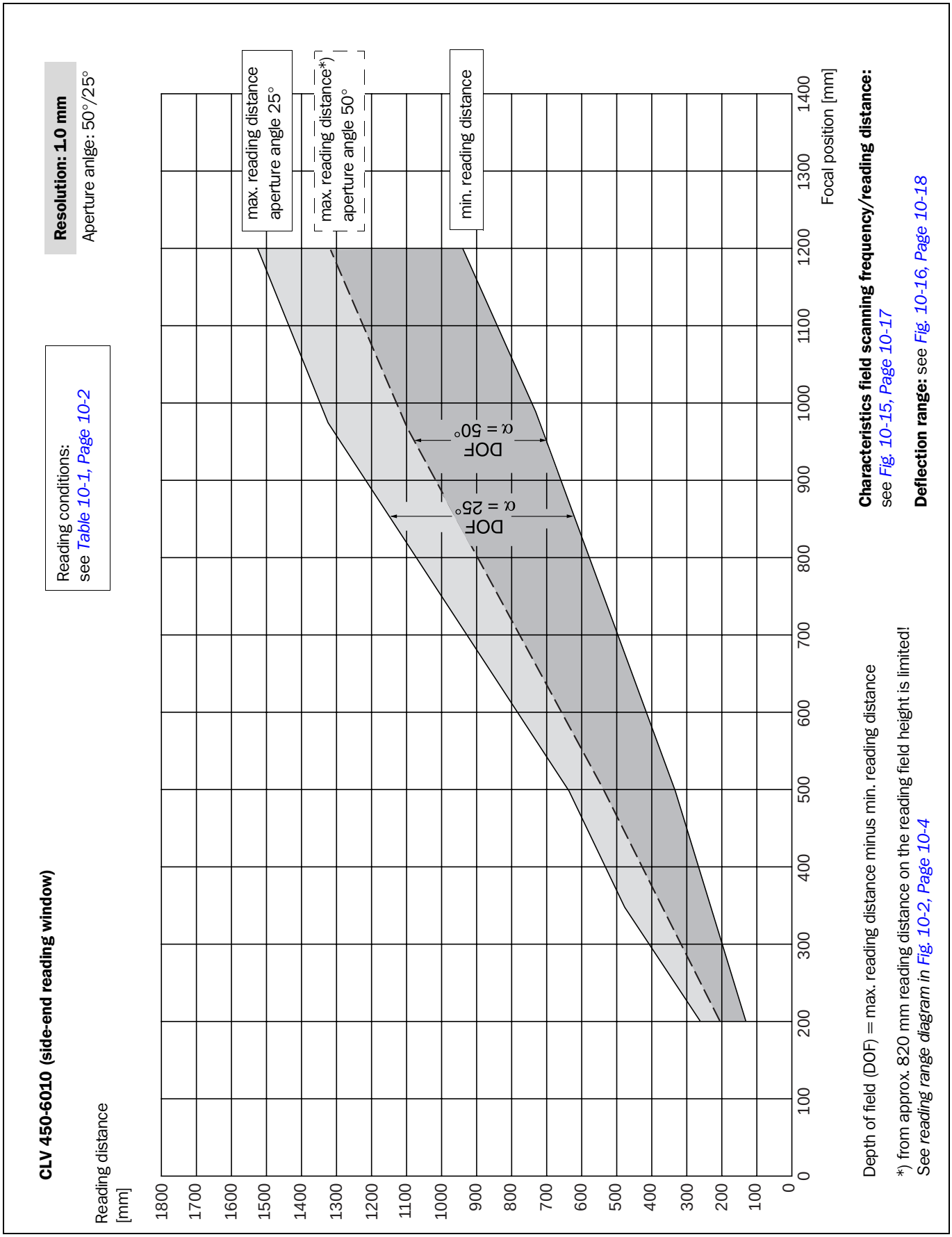


Fig. 10-10: CLV 450-6010: Min. and max. reading distance for the line scanner with oscillating mirror as a function of the focal position at a resolution of 1.00 mm

10.2.6 Depths of field for CLV 451 line scanner (front-end reading window)

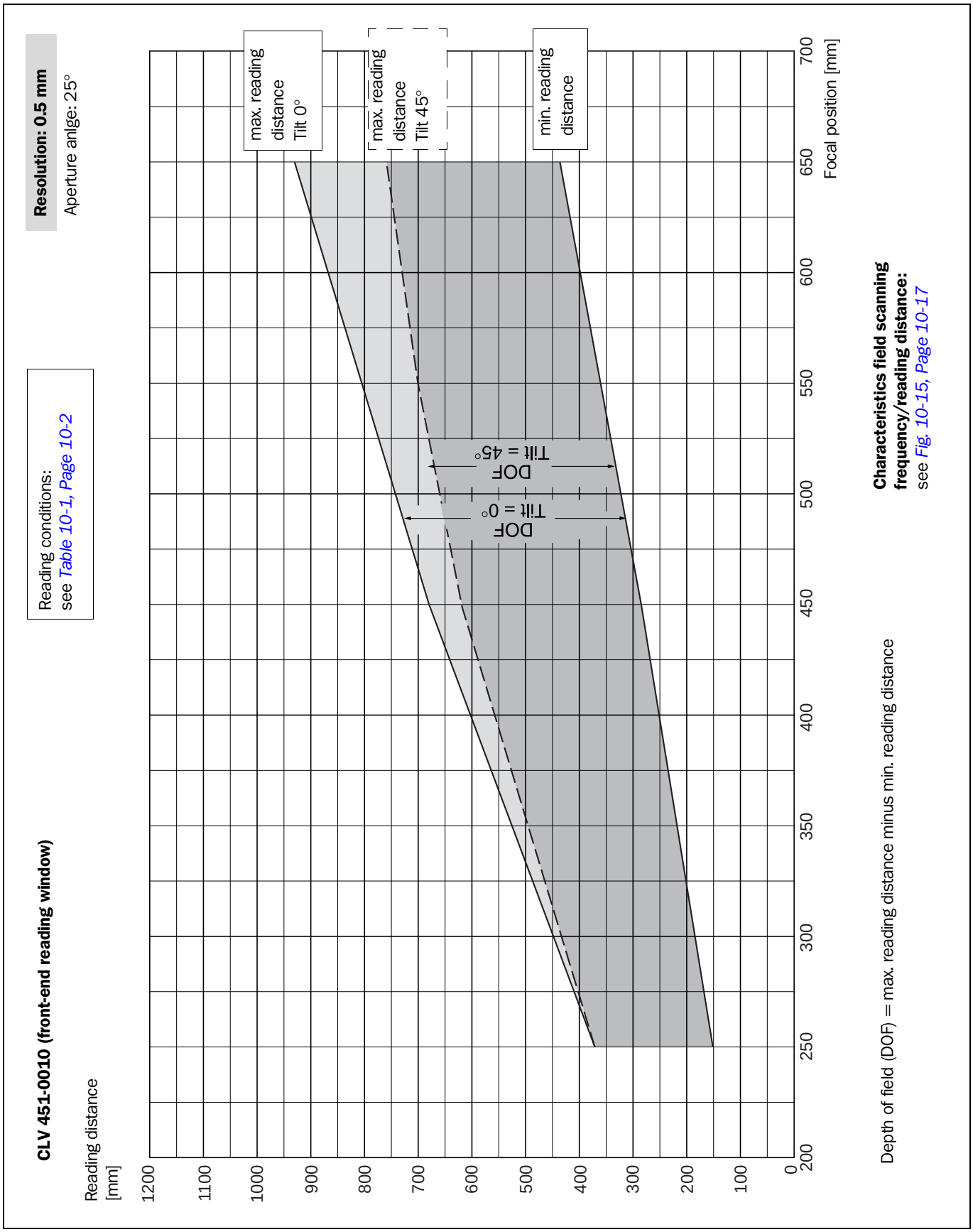


Fig. 10-11: CLV 451-0010: Min. and max. reading distance for the line scanner as a function of the focal position and the tilt at a resolution of 0.5 mm and an aperture angle of 25°

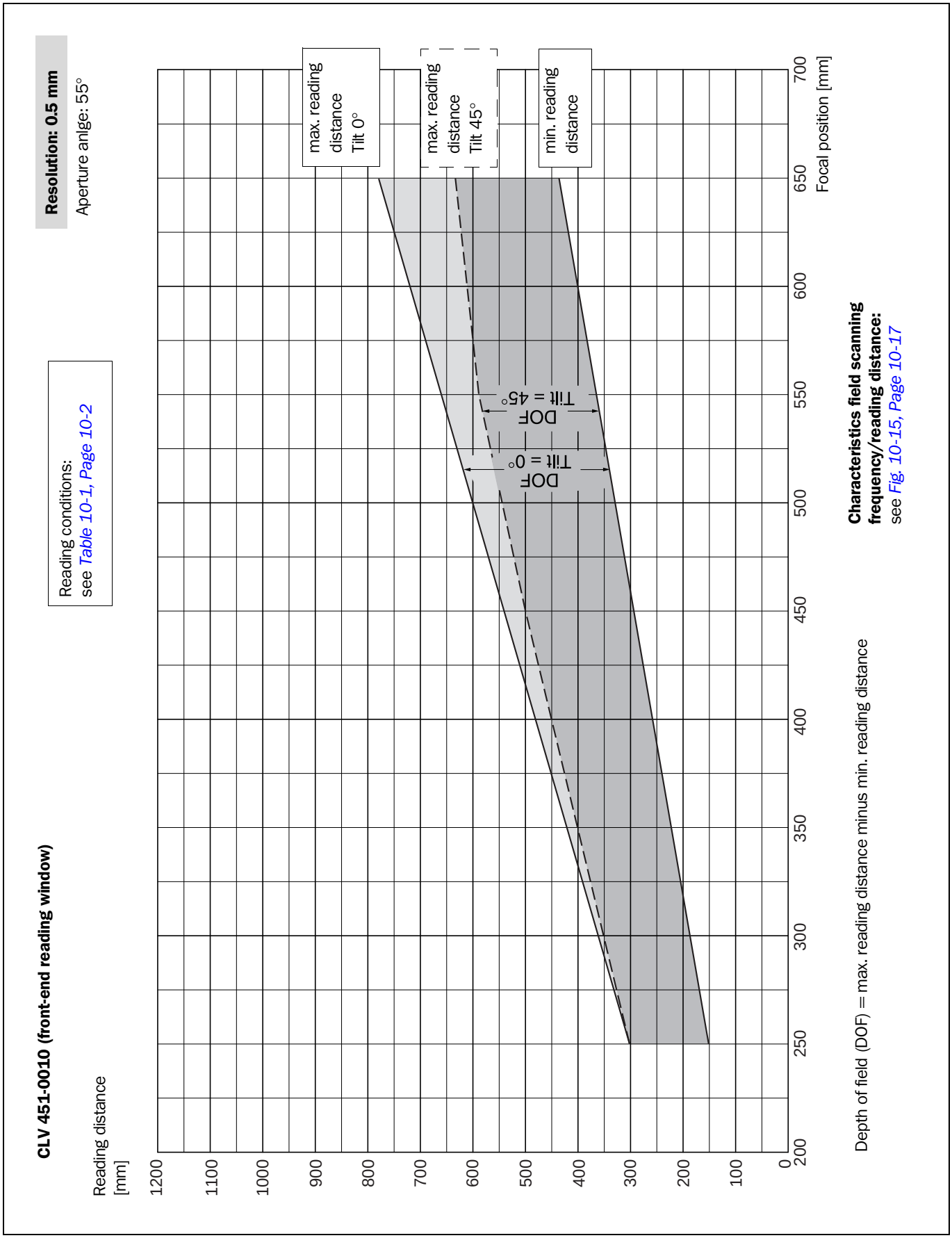


Fig. 10-12: CLV 451-0010: Min. and max. reading distance for the line scanner as a function of the focal position and the tilt at a resolution of 0.5 mm and an aperture angle of 55°

10.2.7 Depths of field for CLV 451 line scanner with oscillating mirror (side-end reading window)

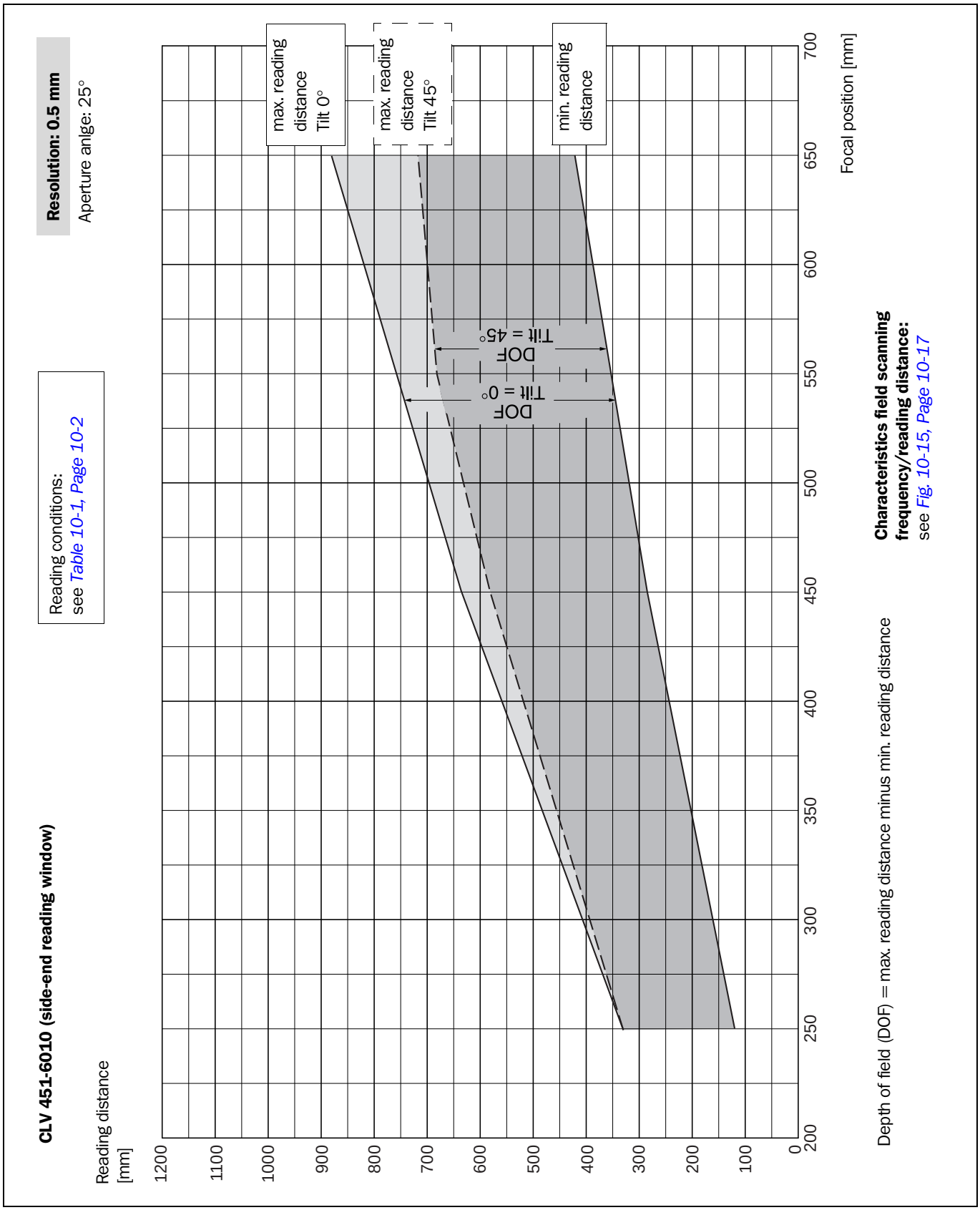


Fig. 10-13: CLV 451-6010: Min. and max. reading distance for the line scanner with oscillating mirror as a function of the focal position and the tilt at a resolution of 0.5 mm and an aperture angle of 25°

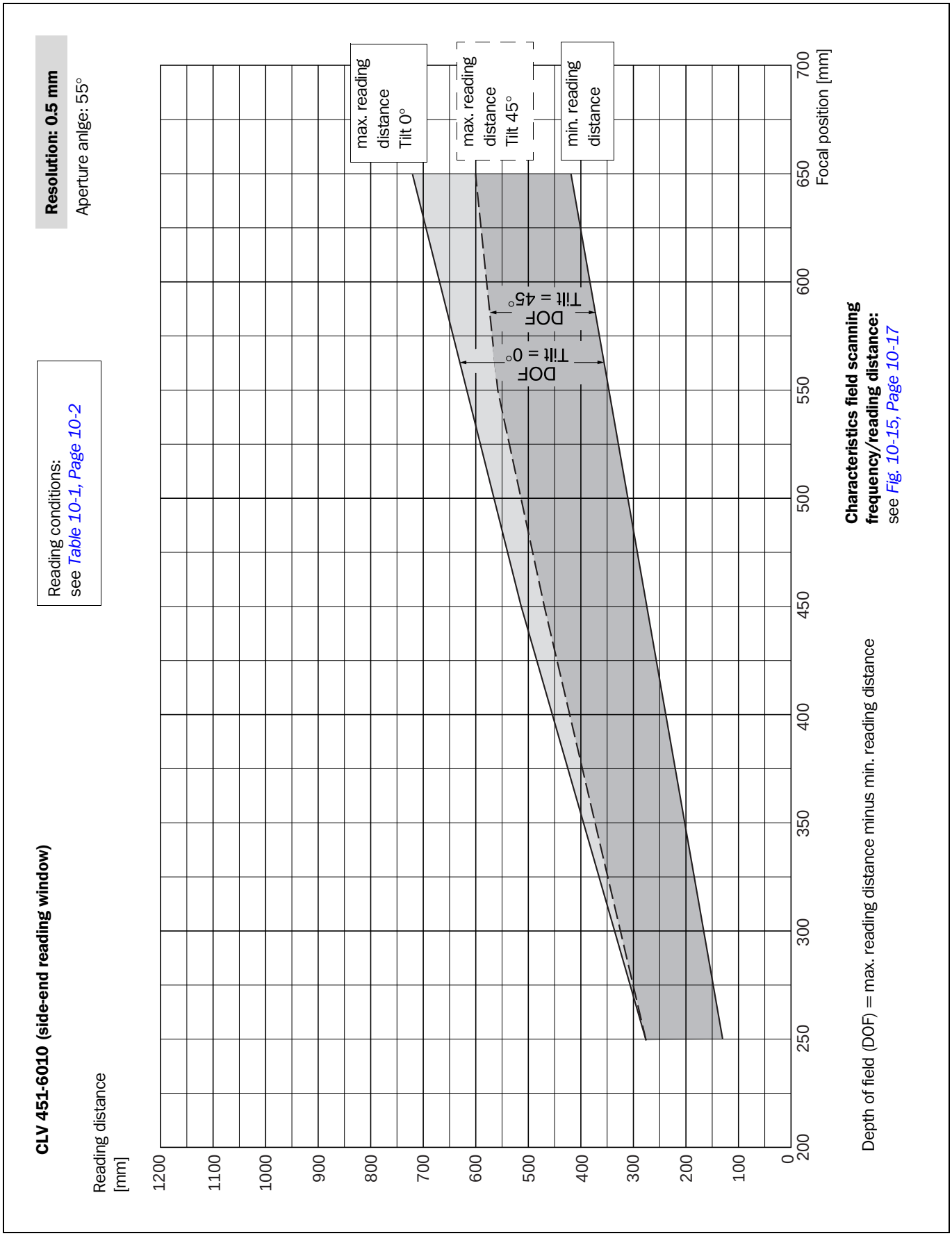
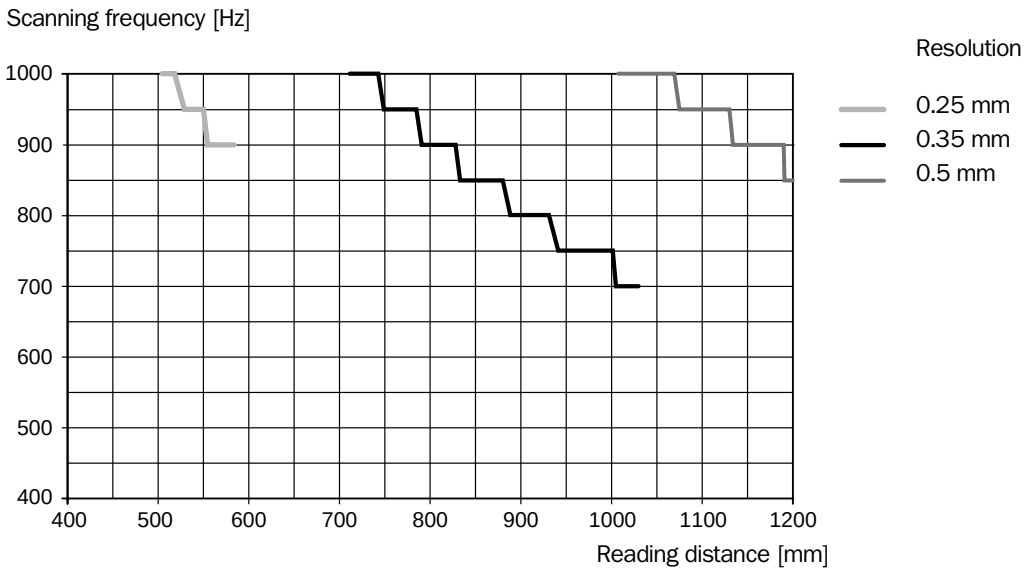


Fig. 10-14: CLV 451-6010: Min. and max. reading distance for the line scanner with oscillating mirror as a function of the focal position and the tilt at a resolution of 0.5 mm and an aperture angle of 55°

10.2.8 Characteristics field scanning frequency (maximum values)



Reading conditions: see *Table 10-1, Page 10-2*

Fig. 10-15: CLV 450: Characteristics field scanning frequency as a function of the reading distance and resolution

Recommended scanning frequencies (optimum)

Resolution	Min. reading distance	Max. reading distance	Scanning frequency
0.25 mm	for all reading distances		700 Hz
0.35 mm	165 mm	800 mm	800 Hz
0.35 mm	800 mm	900 mm	700 Hz
0.35 mm	900 mm	1 000 mm	600 Hz
0.5 mm	for all reading distances		800 Hz
1.0 mm	130 mm	900 mm	1 000 Hz
1.0 mm	900 mm	1 600 mm	800 Hz

Table 10-3: CLV 450: Optimum of scanning frequencies

10.2.9 Deflection range of CLV 450 line scanner with oscillating mirror

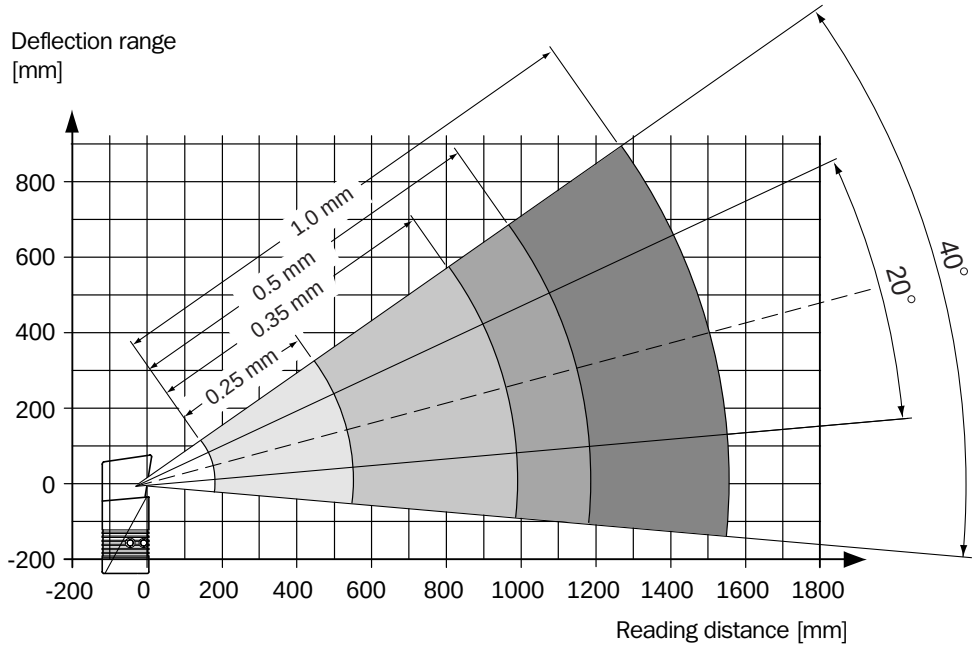


Fig. 10-16: CLV 450-6010: Deflection range as a function of the reading distance, the angle of deflection and the resolution

10.2.10 Deflection range of CLV 451 line scanner with oscillating mirror

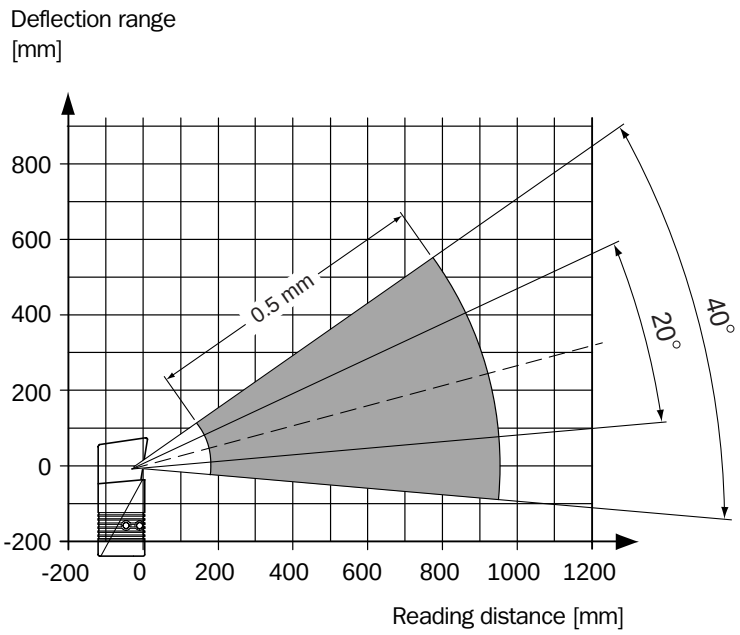


Fig. 10-17: CLV 451-6010: Deflection range as a function of the reading distance and the angle of deflection at a resolution of 0.5 mm

10.3 System messages

The CLV outputs all system messages in plain text on the terminal interface only. The messages are in English and can be displayed in the extended terminal emulator mode in the CLV-Setup user interface.

(Refer to *Chapter 6.6.1 Displaying messages, Page 6-30*).

Message	Meaning
"CLV 45x Soft.Vers. VX.XX Rev. No. 0000 Host: RS232"	Information on the software version and revision is displayed when the supply voltage is switched on.
"no code"	In Reading/Parameter evaluation mode, the CLV indicates that no codes matching the parameterized evaluation conditions were detected during the read port (error status ST = 2 output on the host interface).
"laser safety timeout"	The CLV has deactivated the laser diode 10 min. (default setting) after the start of a reading pulse. The reading interval is still active, even though the CLV 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.
"cancel Auto Setup"	The CLV has terminated the Auto Setup, without a valid bar code being found in the search run.

Table 10-4: CLV system messages

10.4 Installing and operating the "CLV-Setup" PC software

The scope of delivery of the CLV includes a CD-ROM containing the "CLV-Setup" software. The software can be installed on a PC with the following minimum configuration: Processor 80486, 66 MHz frequency, 16 MB RAM, CD drive, serial interface and mouse (recommended) as well as an operating system Windows 95™/98™, Windows NT™ or Windows XP™. Approximately 26 MB of hard disk space is required to install CLV-Setup, CLV Assistant, CLV-Setup Help, and the off-line browser "I-ViewPro™".

10.4.1 Preparing the installation

1. Make sure you have the CD-ROM at hand.
2. Connect the CLV to the AMV/S 40 connection module (refer to *Chapter 5.5.3 Connecting the supply voltage, Page 5-4*).
3. Connect the PC to the terminal interface of the CLV using an RS-232 data connection cable (AMV/S 40: Connect the PC to the internal 9-pin "Service" plug).
   (refer to Chapter 5.5.5 Connecting the CAN interface, Page 5-6).
4. Switch on the supply voltage of the AMV/S 40.
   After the start the CLV confirms the successful self-test with a beeper sound and shortly afterwards starting of the reading mode is signaled by two consecutive sounds. The "Device Ready" LED lights up.
5. Switch on the PC and start Windows

10.4.2 Carrying out the installation

The CLV-Setup installation program creates a main directory "CLV" with subdirectories and the necessary links during the installation. A de-installer is also installed automatically so that you can remove CLV-Setup from the PC at any time. As from Version V2.6 CLV-Setup is only supplied and maintained as a 32-bit program.

First installation

1. Shut down all the applications under Windows!
2. Insert the CD-ROM in the CD drive.
3. Select the RUN dialog box in Windows.
   Enter the following text in the OPEN list field: "X\setup.exe" (X = Drive character).
   Confirm the dialog box with "OK".

– or –

Open the Windows Explorer, open the CD drive symbol and double-click the file "setup.exe".

The installation program is started and guides you through the installation procedure with screen messages. The program asks you for your user name and company name. This information appears as a header in CLV-Setup printouts. Depending on the selected configuration the CLV-Setup, CLV Assistant and the "CLV-Setup Help" online help programs are then installed.

4. If required, install the "I-ViewPro™" HTML browser (the system asks you whether you want to do so). If you choose not to install the "I-ViewPro™" browser, the system searches your hard disk for the "Netscape Navigator™" and uses it to display the "CLV-Setup Help" online help.

5. Please read the Readme file that contains the latest information and problems regarding CLV-Setup.
6. Confirm the final installation message by clicking on "OK".
7. Restart the PC.
   If necessary DLL files are updated in Windows.

The "CLV-Setup" software and the "CLV-Setup Help" online 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 uninstaller to remove CLV-Setup and must not be deleted if you want to use the uninstaller at some time in the future.

Updating an installation

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 –

- Installation of the new version instead of the old version (overwriting)

Installation of the new version in addition to the old version

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" of the old version can be used in the new version and contain the CLV parameter records. 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.

Installation of the new version instead of the old version

When the new version is installed instead of the old one, the files of the old version first have to be removed – with the exception of the configuration files "*.scl". They contain the parameter records of the CLV.

The uninstaller of the old version removes the program files. You can use the uninstaller to remove either all of the files (with the exception of the configuration files) or only selected files. The default setting is the complete removal (the configuration files are not removed). In the case of user-specific removal the files are listed and only the selected files are removed. If you choose this removal method, ensure that the main directory containing the configuration files "*.scl" is not deleted. We recommend that you move these files beforehand to a different directory and copy them back to the "data" directory later.

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

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

10.4.3 Starting "CLV-Setup"

The "CLV-Setup" software is started with the following default setting:

Communication	COM 1, 9 600 bits/s, 8 data bits, 1 stop bit, no parity
Send control characters	Start: STX, Stop: ETX
Receive control characters	Start: STX, Stop: ETX
Linear measures	Metric (depending on the selected installation)
Browser	I-ViewPro™ (if installed), alternatively Netscape Navigator™
Language	As selected during the installation
Company name	As entered during the installation
User name	As entered during the installation
Automatic connection establishment to CLV	On program startup: Yes On scanner selection: Yes When the terminal emulator is started or closed: Yes
Initial screen	Yes
Storage confirmation prompt	Yes
Last type selected	CLV 41x
Directory for files	"data" (configuration files for CLV)

Table 10-5: Default settings of CLV-Setup (extract)

1. Switch on the PC and start Windows.
2. Select "CLV-Setup" from the Start menu.
   The initial dialog box is displayed after the identifier for the SICK software.
3. Confirm the initial dialog box with "OK".
   CLV-Setup checks whether a CLV is connected to the **COM 1** port on the PC and whether the communication parameters on the PC match those on the CLV. If this is the case, the "Connected" status is displayed with the exact CLV specification in the bottom right in the status field. The CLV type (here: CLV 45x) is displayed in the DEVICE list field in the top right of the toolbar.

The program then loads the internal description of the CLV as well as the default parameter values and displays them on the tab cards. Then the software copies the current parameter record from the RAM of the CLV. This is displayed in the tab cards instead of the default setting.

The current parameter record can be edited in the tab cards. During the initial startup its values correspond to the default setting.

Help in cases of problems

If CLV-Setup cannot establish a communication, it displays "No connection" in the bottom right in the status field. This can have two causes. The CLV is not connected or the communication parameters on the CLV do not match those on the PC. In this case, CLV-Setup enters the CLV type of the device it last communicated with successfully in the DEVICE list field in the toolbar. When CLV-Setup is called up the first time the default setting is the CLV 41x. The software then loads the internal device description for this type and displays the default parameter values on the tab cards.

1. Connect the PC to the terminal interface on the CLV using an RS-232 data connection cable (AMV/S 40: Connect the PC to the internal 9-pin "Service" plug).
   (refer to *Chapter 5.5.5 Connecting the CAN interface, Page 5-6*).
2. Click on (AutoBaud detect) in the toolbar or select AUTOBAUD DETECT menu item under the options in the menu bar.
   CLV-Setup scans the serial interface by varying the communication parameters and sends a telegram to the CLV repeatedly. As soon as an answer of the CLV is registered, CLV-Setup signals the found values of the communication parameters.
   Fig. 10-18 shows an example of the event display of the AutoBaud-Detect. CLV-Setup displays "Connected" in the bottom right of the status bar.
3. Confirm the AUTO DETECT dialog box with "OK".
   CLV-Setup displays the detected CLV type in a separate dialog box and asks you whether you want to upload the current parameter record from the CLV.
4. Confirm the dialog box with "YES".
   CLV-Setup then uploads the current parameter record from the RAM of the CLV to its database and displays the values on the tab cards.

The current parameter record can be edited in the tab cards.

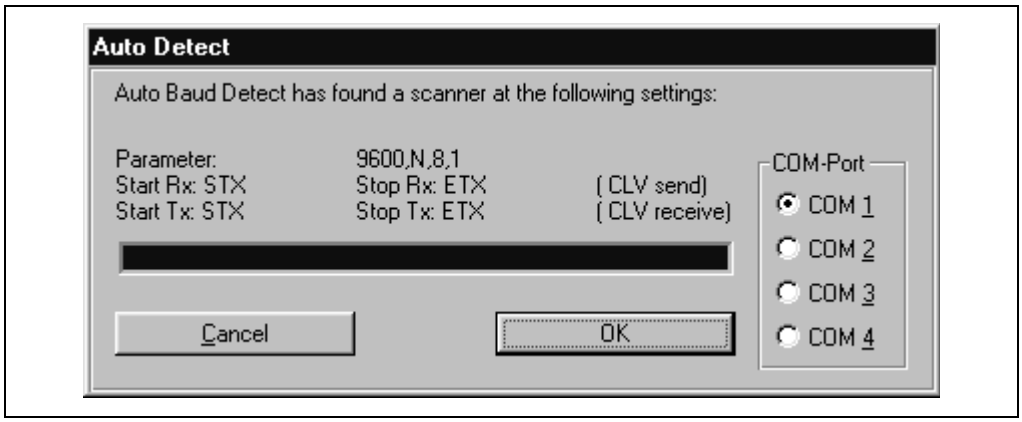


Fig. 10-18: CLV-Setup: Result display of the AutoBaud-Detect

– or –

2. Select the SERIAL INTERFACE menu item under OPTIONS in the menu bar.
   CLV-Setup displays the current communication parameter settings on the PC in the COM PARAMETERS dialog box.
3. Ensure that the communication parameters on the PC and CLV are identical **(connected COM port, 9,600 bits/s, 8 data bits, 1 stop bit, no parity)**
4. Confirm the dialog box with "OK".
   CLV-Setup attempts to communicate with the CLV again.
   If it is successful, it displays the "Connected" status in the bottom right of the status bar.
5. Click on in the toolbar.
   CLV-Setup uploads the current parameter record from the RAM of the CLV to its database and displays the values on the tab cards.

The current parameter record can be edited in the tab cards.

10.4.4 CLV-Setup user interface

The CLV-Setup user interface is largely self explanatory. The online help function provides a description of how to use the program under PROGRAM INFORMATION menu item in the HELP menu. The user interface is shown in *Fig. 10-19* below.

The user interface consists of 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 icons (command buttons) which trigger a function when clicked on
- List field (top right) for selecting the device type
- 9 tab cards (Reading configuration, Device configuration, etc.). The parameters on the tab cards are grouped according to their function. Some of these parameters open further dialog boxes.
- Status bar (at the bottom of the window) with two display fields for communication events between CLV-Setup and CLV, interface parameter display of the PC, error display field (system errors) of the CLV, device specification field and status display for the connection to the CLV.

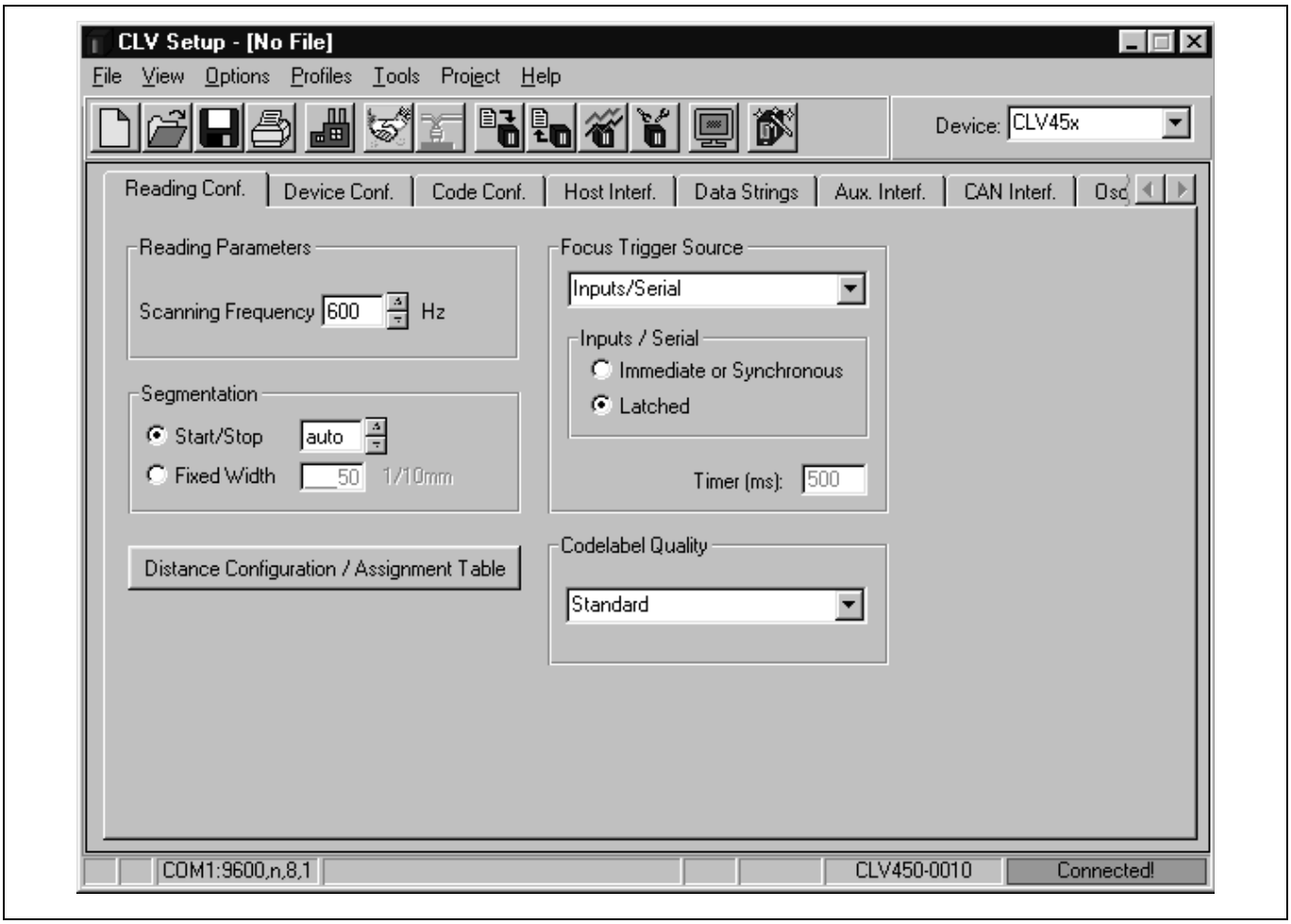


Fig. 10-19: User interface of the "CLV-Setup" software

10.4.5 Functions

The "CLV-Setup" software from version 3.0 onwards features functions to carry out the following:

- Loading of the default setting of the parameter record from the database
- Automatic communication attempt with the CLV when the program is started
- Automatic software compatibility check in the CLV
- Uploading parameter record which is stored in the CLV
- Changing the parameter values in the tab cards
- CLV Assistant for simple parameterization
- Saving the changed parameter record to the CLV (download)
- Saving the changed parameter record in CLV-Setup as a configuration file "*.scl"
- Printing the configuration files
- Exporting the configuration files in RTF format
- Printing the parameter record in the form of Profile bar codes
- Direct access to the CLV via a terminal emulator (select operating mode, start operating functions, log file for communication between the CLV and CLV-Setup, extended terminal mode, e. g. for displaying CLV messages)
- AutoBaud detect for automatic communication setup with the CLV
- Selection of the COM ports for adapting the data transfer parameters
- Monitor for supervising the data communication of the host interface of the CLV
- Selection menu for the displayed language
- Selection menu for the units of measure
- Display of the last 10 edited configuration files
- Saving the CLV type that was selected last
- Automatic storage confirmation prompt when changes are made to the configuration file
- Assistants for individual device functions
- Setting switches for starting the program in the "CLVmain.ini" file
- Hot keys [F keys] for important functions (program use without mouse)
- Start program with SCL file as an argument
- Context-specific help via [F1]

10.4.6 "CLV-Setup Help" online help

The "CLV-Setup Help" online help helps you in using the "CLV-Setup" software. The help runs under an HTML browser (such as Netscape™, Microsoft Internet-Explorer™, or the I-View Pro™ browser supplied with the program). The help can be called up context-specifically for the parameter being edited and describes the function of the parameter and possible values for the parameter.

1. Press [F1].
   The browser window is opened and displays the help topic.
2. If CLV-Setup cannot find a browser, it asks you to specify the location on the hard disk. Enter the name of the executable file and the path for the browser in the dialog box (e. g. Iviewpro32.exe in the "Iview" directory).
3. In order to prevent several browser windows from being opened use the [ALT] + [TAB] key combination or the Windows status bar to toggle between the CLV-Setup and CLV-Setup Help applications.

4. In order to display an overview of the Help function, select the CONTENTS menu item under HELP in the CLV-Setup menu bar.
5. To display information on a tab card, click the tab card in the top, horizontal frame. The vertical frame on the left-hand side of the screen then displays a list of the assigned parameters.
6. Click on a parameter for a description.
   CLV-Setup Help then displays the associated help text in the right-hand frame and jumps to the parameter heading.

10.4.7 Transferring a parameter record between CLV-Setup and the CLV

Refer to *Chapter 6.4.1 Configuring the CLV by means of the CLV-Setup user interface, Page 6-4*.

10.4.8 Handling unknown parameters

Uploading from the CLV

If the CLV-Setup does not recognize certain parameters or parameter values when it uploads them from the CLV, it outputs a warning. Causes for unknown parameters/values are, e. g. that the CLV is a special model or because the version of CLV-Setup is older than the version on the CLV. CLV-Setup displays the unknown parameters in the window of the EXTRAS tab card. The parameters are displayed in the form of command strings and can be edited using the command string conventions. This ensures upward compatibility with the CLV. These parameters/values are taken into consideration when saving the parameter record as a configuration file in CLV-Setup as well as downloading to the CLV.

Downloading to the CLV

If the CLV does not accept individual parameters or parameter values in the parameter recorded downloaded with CLV-Setup, it outputs a separate warning in CLV-Setup for each parameter. This could be due to the fact that the version of the "CLV-Setup" software is newer than the software version on the CLV and therefore contains new parameters/values. However the respective CLV still has an older software version, which does not know these parameters/values.

We recommend that you check the effects of warnings in the CLV as follows:

1. Check whether the existing CLV functions work correctly after the download.
2. Click on  in the toolbar.
   CLV-Setup loads the default settings from the database.
3. Click on  in the toolbar.
   CLV-Setup uploads the problem parameter record from the CLV.
4. Click on  in the toolbar.
   CLV-Setup prints out the problem parameter record when you confirm the dialog box.
5. Open the previous configuration file "*.scl" for the CLV.
6. Click on  in the toolbar.
   CLV-Setup prints out the previous parameter record when you confirm the dialog box.
7. Compare the two parameter records.
   In order to restore the previous state, correct individual parameters in the problem parameter record if necessary and download them to the CLV again.

Opening configuration files "*.scl"

Whenever it loads configuration files, CLV-Setup checks whether it recognizes all the CLV parameters/values contained.

If CLV-Setup detects an error, it outputs a warning and enters the problem parameter/value in the window of the "EXTRAS" tab card.

10.4.9 Recording the log file in the terminal emulator

The communication between CLV-Setup and the CLV can be logged in the terminal emulator. CLV-Setup stores the data transferred in both directions with the following identifiers:

CLV -->: CLV sending to CLV-Setup

--> CLV: CLV receiving from CLV-Setup

1. Click on in the toolbar.
   The terminal emulator window opens.
2. Click the empty check box in front of the WRITE LOG FILE radio button on the right.
   The SAVE LOG FILE AS... dialog box opens.
3. Enter the file name with the "log" extension and exit the window with SAVE.
   CLV-Setup saves the file in the "data" directory and records logs the communication.
4. In order to terminate logging, click again on the check box before the WRITE LOG FILE again or close the terminal emulator.

10.4.10 Starting CLV-Setup with an INI file as an argument

When the program is started, CLV-Setup can also have the name of an INI file transferred as a parameter. To do so, enter "/INI" in front of the file.

Example:

"CLVmain32.exe**data**\Record1_45x.scl /INI user.ini"

CLV-Setup is launched with the initialization data contained in the "user.ini" file and immediately loads the configuration file "Record1_45x.scl" from the "data" directory.

The "user.ini" file must be positioned 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 CLV is not connected.

10.4.11 CLV Assistant

The CLV Assistant facilitates e. g. the parameterizing and testing of the CLV. It guides you in simple steps through the configuration of the CLV for an application-specific reading situation with **one** bar code. The determined settings are transferred to CLV-Setup.

10.5 Configuring the CLV by means of Profile bar codes

10.5.1 Activate Auto Setup with Profile bar code

Profile programming uses special bar codes to parameterize the CLV via the optical interface (reading window) and to initiate device functions. The Profile bar codes contain encoded parameter values or commands.
It is not necessary to connect a PC to the CLV in order to carry out Profile programming.

Profile bar code No. 10 on the enclosed card starts and ends Auto Setup. It can be presented to the CLV either immediately after the supply voltage has been switched on, during the wait time in the Free-running mode or during a reading pulse in the Reading mode.

Preparing Auto Setup

1. Auto Setup overwrites important values in the current parameter record of the CLV. If the CLV has already been configured for a particular application, it is advisable to save the existing parameter record as a configuration file "*.scl" in CLV-Setup (refer to *Chapter 6.4.1 Configuring the CLV by means of the CLV-Setup user interface, Page 6-4*).
2. Have card No. 8 008 085 with the 12 preprinted Profile bar codes ready.

Carrying out Auto Setup after switching on the supply voltage

1. Fold the card with the Profile bar codes in such a way that only Profile bar code No. 10 is visible.
2. Switch on the supply voltage of the AMV/S 40 connection module (of the CLV). The CLV confirms that the self-test has been completed successfully by outputting an acoustic signal via the beeper. The "Device Ready" LED lights up. It then switches to the Free running mode for 5 seconds. The scan line appears when the "Laser On" LED lights up.

   Line scanner with oscillating mirror:
   In the Auto Setup mode the CLV behaves in the following manner:
   - in “Oscillating“ mode (default setting: oscillating with a fixed amplitude), the CLV shuts off oscillation and positions the scan line under the angle CW = 50 (corresponding to an angle of deflection of 105°). This position cannot be altered.
   - in “One-Shot“ mode, the CLV also positions the scan line under the angle CW = 50.
   - in “Set Position“ mode, the scan line’s selected position remains unchanged.
3. Present Profile bar code No. 10 within **5 seconds**. The CLV confirms that Auto Setup has started by outputting an acoustic signal via the beeper. It temporarily activates the standard decoder. The "Device Ready" LED is extinguished.
4. Present the application-specific bar code at the maximum reading distance for the application. Take the limit values of the CLV into consideration (refer to the reading field diagrams in *Chapter 10.2 Specification diagrams, Page 10-2*). In order to avoid surface reflections, rotate the bar code towards the CLV approximately 15 away from the vertical axis (refer to *Fig. 4-7, Page 4-5*). Leave the bar code in this position.
5. The CLV confirms that Auto Setup has been completed successfully by outputting two consecutive acoustic signals via the beeper and activating the "Result" LED for 100 ms (default setting).It overwrites the appropriate parameter values in the current parameter record in the RAM and stores these permanently in the EEPROM. The CLV returns to the Reading mode with the decoder parameterized for this purpose.

The "Device Ready" LED lights up.
The CLV only evaluates the presented code type and length in further readings.

Running Auto Setup in the Reading mode

1. Fold the card with the Profile bar codes in such a way that only Profile bar code No. 10 is visible.
2. Start the reading pulse: Block the light path of the photoelectric switch or close the switch.
   The "Laser On" LED lights up. The scan line then appears.
3. Present Profile bar code No. 10.
   The CLV confirms that Auto Setup has started by outputting an acoustic signal via the beeper. It temporarily activates the standard decoder. The "Device Ready" LED is extinguished.

Continue Auto Setup from Step 4 as described in *„Carrying out Auto Setup after switching on the supply voltage“, Page 10-28*

Auto Setup canceled by the CLV in the event of a no read

If the CLV was not able to execute Auto Setup successfully, it cancels the search mode by outputting a long acoustic signal via the beeper. The current parameter record in the CLV does not change.

The CLV returns to the Reading mode with the decoder parameterized for this purpose.

The "Device Ready" LED lights up.

Repeating the Auto Setup

1. Switch the supply voltage of the connection module (of the CLV) off and on again.
2. Present Profile bar code No. 10 again after the first acoustic signal from the beeper.
   The CLV confirms that Auto Setup has started by outputting an acoustic signal via the beeper. It temporarily activates the standard decoder. The "Device Ready" LED is extinguished.

– or –

1. Start the reading pulse: Block the light path of the photoelectric switch or close the switch. The "Laser On" LED lights up. The scan line then appears.
2. Present Profile bar code No. 10.
   The CLV confirms that Auto Setup has started by outputting an acoustic signal via the beeper. It temporarily activates the standard decoder. The "Device Ready" LED is extinguished.

Continue Auto Setup from Step 4 as described in *„Carrying out Auto Setup after switching on the supply voltage“, Page 10-28*.

➢ If Auto Setup is unsuccessful again, check whether the CLV is able to read the bar code correctly (reading distance, tilt, more than one bar code in the reading area).

Terminating Auto Setup prematurely

➢ Present Profile bar code No. 10 again during Auto Setup.
   The CLV confirms that Auto Setup has been aborted by outputting a long acoustic signal via the beeper.
   The current parameter record in the CLV does not change.
   The CLV returns to the Reading mode with the decoder parameterized for this purpose.
   The "Device Ready" LED lights up.

Checking the determined read and code configurations

Carry out a test with a percentage evaluation of the CLV. A PC with the "CLV-Setup" PC software installed on it has to be connected for this purpose.
Also refer to the same topic under *„Activating Auto Setup by means of the CLV-Setup user interface“, 6-15*

10.5.2 Profile progamming

Profile programming uses special bar codes to parameterize the CLV via the optical interface (reading window). The Profile bar codes contain encoded parameter values. It is not necessary to connect a PC to the CLV in order to carry out Profile programming.

The Profile bar codes are presented to the CLV individually for reading. It copies the parameter values to the current parameter record. The changes are permanently valid after programming has been completed; in some cases, they also have an immediate effect on the reading and output characteristics of the CLV. The Profile bar codes can be presented to the CLV either immediately after the supply voltage has been switched on, during the wait time in the Free-running mode or during a reading pulse in the Reading mode. During Profile programming the CLV does not output a reading result and does not respond to an external reading pulse.

Profile bar codes are created and printed out via the CLV-Setup user interface after the application-specific parameter record has been compiled (refer to *„Printing Profile bar codes“*).

The enclosed card No. 8 008 085 ("Configuration Profiles for CLV 41x Bar Code Scanners") contains 12 preprinted Profile bar codes which can be used to parameterize tested settings or to trigger specific functions (e. g. Auto Setup). *Table 10-6, Page 10-33* explains the meaning of the individual Profile bar codes. Profile bar codes No. 11 and No. 12 on the card are of no significance for CLV 45x .

Preparing Profile programming

1. Profile programming overwrites values in the current parameter records of the CLV. If the CLV has already been configured for a particular application, it is advisable to save the existing parameter set as a configuration file "*.scl" in CLV-Setup (refer to *Chapter 6.4.1 Configuring the CLV by means of the CLV-Setup user interface, Page 6-4*).
2. Have the printed Profile bar codes of the compiled parameter record or card No. 8 008 085 ready.

Performing Profile programming after switching on the supply voltage

1. Switch on the supply voltage of the AMV/S 40 connection module (of the CLV).
   The CLV confirms that the self-test has been completed successfully by outputting an acoustic signal via the beeper. The "Device Ready" LED lights up. It then switches to the Free-running mode for **5 seconds**. The scan line appears when the "Laser On" LED lights up.

   Line scanner with oscillating mirror:
   The CLV behaves in the following manner:
   - in “Oscillating“ mode (default setting: oscillating with a fixed amplitude), the CLV shuts off oscillation and positions the scan line under the angle CW = 50 (corresponding to an angle of deflection of 105°). This position cannot be altered.
   - in “One-Shot“ mode, the CLV also positions the scan line under the angle CW = 50.
   - in “Set Position“ mode, the scan line’s selected position remains unchanged.

2. Present the first Profile bar code in the printed sequence (or the desired Profile bar code from the card) within 5 seconds. Fold the printout/card in such a way that only one Profile bar code is visible at any one time.
   The CLV confirms that the bar code has been read successfully by outputting an acoustic signal via the beeper and waits **10 seconds** for the next Profile bar code.
   It copies the new parameter value(s) to the current parameter record in the RAM.
3. Present the next Profile bar code within 10 seconds.
   The CLV confirms that the bar code has been read successfully as described in Step 2.
4. Allow 10 seconds to pass after the last Profile bar code has been read.
   The CLV exits the programming mode and saves the new parameter values permanently in the EEPROM. It also switches off the laser diode.
   Following this, it returns to the Reading mode and confirms this by outputting two consecutive acoustic signals via the beeper. The "Device Ready" LED lights up.

The CLV then uses the new parameter values.

Performing Profile programming in the Reading mode

1. Start the reading pulse: Block the light path of the photoelectric switch or close the switch.
   The "Laser On" LED lights up. The scan line then appears.
2. Present the first Profile bar code in the printed sequence (or the desired Profile bar code from the card).
   Fold the printout/card in such a way that only one Profile bar code is visible at any one time.
   The CLV confirms the successful read by emitting an acoustic signal and waits **10 seconds** for the next Profile bar code.
   It copies the new parameter value(s) to the current parameter record in the RAM.

Continue Profile programming as from Step 3 as described in Section *„Performing Profile programming after switching on the supply voltage“, Page 10-30*.

Note When the Profile bar code is presented to the CLV, note that the changes caused by the new parameter values in the RAM can have an immediate effect on the reading behavior of the CLV. Under unfavorable conditions, the CLV will only be able to read Profile bar codes with great difficulty or not at all.
Changes to the active evaluation range of the scan line (min./max. CP value), an increase in the scanning frequency and changes to the focal position must, therefore, be presented with care.
If the CLV is not able to read any further Profile bar codes, it must be corrected accordingly in the tab cards by means of the CLV- Setup user interface. A PC must be connected to the CLV for this purpose.

Cancelling Profile programming

- Switch off the supply voltage of the CLV within 10 seconds of presenting the last Profile bar code.
  The temporary changes to the current parameter record in the RAM are lost. After the supply voltage has been switched on again, the CLV uses the values from the last parameter record that was stored permanently.

Printing Profile bar codes

Profile bar codes are created and printed out via the user interface of CLV-Setup. It is not necessary to connect a PC to the CLV if the current parameter set of the CLV has been saved as a configuration file "*.scl" in CLV-Setup.

CLV-Setup creates a minimum set of Profile bar codes using the parameter values in the tab cards and the default setting of the CLV.

This comprises:

- A standard profile (all codes types active or all code types disabled)
- A host interface profile
- A greater or smaller number of Profile bar codes depending on the difference between the two above-mentioned profiles and the current setting of the entire parameter record.

CLV-Setup prints out the bar codes in a defined sequence. The size, position and number of codes on the page can be set.

1. Open the configuration file "*.scl" of the current parameter record.
   CLV-Setup displays the parameter values of the CLV in the tab cards.
2. If desired, make any necessary changes to the parameter record.
   Save the new parameter record in the configuration file "*.scl" under a new name.
3. In the menu bar select the CONFIGURE PRINTING menu item under PROFILES.
   Confirm the print option default settings for the Profile bar codes or define new ones (see below).
4. In the menu bar, select the PRINT PROFILES menu item under PROFILES.
   CLV-Setup calculates the required number of bar codes.
   The PRINT dialog box is opened.
5. Specify the number of printouts.
   If required, specify the page format. To do so, click on the PROPERTIES command button.
   Relatively long Profile bar codes must be printed in landscape format!
6. Confirm the dialog box with "OK".
   CLV-Setup then prints out the Profile bar codes.

Defining print options for Profile bar codes

1. In the menu bar select the CONFIGURE PRINTING under PROFILE.
   The BAR CODE PRINTING OPTIONS dialog box is opened.
2. Select the desired print options in the BAR CODE and PAGE LAYOUT tab cards and confirm the dialog box.
   CLV-Setup then asks if the print options are to be saved.
3. To save them, confirm this dialog box with "OK".
   The SAVE SETTINGS AS ... dialog box is then displayed.
4. Enter the file name "*.prf": Confirm the dialog box with SAVE.
   CLV-Setup saves the print options in a configuration file in the directory "CLV".

The default setting of the print options are active when CLV-Setup is started.

Preprinted Profile bar codes

The enclosed card No. 8 008 085 ("Configuration Profiles for CLV 41x Bar Code Scanners") contains 12 preprinted Profile bar codes which can be used to parameterize tested settings or to trigger specific functions (e. g. Auto Setup). The individual segments of the card can be folded in such a way that the CLV only reads the desired Profile bar code. The Profile

bar codes are explained in *Table 10-6*. The functions of the individual parameters are explained in the "CLV-Setup Help" online help.

Bar code	**Function**
Profile 1	Default setting of CLV for all parameter values. Code configuration: All code types, except for Pharmacode, enabled for evaluation. **Overwrites a code configuration created by Auto Setup!**
Profile 2	Only changes the configuration of host interface: – Data transfer rate: 38 400 bits/s – Data format: 8 data bits, no parity, 1 stop bit – Repeat request: None
Profile 3	Only changes the configuration of host interface: – Activate RS 422/485 interface – SICK network protocol (standard) – Data transfer rate: 38 400 bits/s – Data format: 7 data bits, parity odd, 1 stop bit – Device number: 99
Profile 4	Only changes the configuration of host interface: Reading result is output as soon as evaluation criteria are fulfilled
Profile 5	Only changes the configuration of host interface: – Output of error status "ST" in separator – Output of CLV: <CR><LF> in terminator (jumps to start of new line after each code)
Profile 6	Parameterizes CLV as master in master/slave configuration – No. of slaves: 1 – Timeout: automatic
Profile 7	As Profile 6, but no. of slaves: 2
Profile 8	Parameterizes CLV as slave in master/slave configuration
Profile 9	Parameterizes CLV for pass-through mode: output of " / " and device number in header
Profile 10	Starts and ends CLV Auto Setup
Profile 11	No function for CLV 45x
Profile 12	No function for CLV 45x

Table 10-6: Function of the preprinted Profile bar codes on card No. 8 008 085

10.6 Configuring the CLV with command strings

The CLV can be parameterized and operated with command strings via the terminal interface and the host interface. Parameters that are not recognized by CLV-Setup can also be used by following the conventions for command strings. This enables special devices, for example, to be parameterized and new CLV parameters to be configured which may not be recognized by the CLV-Setup program if this is older than the software on the CLV. The CLV-Setup user interface is based on the command language.

The command language accesses the CLV command interpreter directly. It is to be used with care. The commands sent to the CLV are executed immediately. Parameter values that have been changed by commands are initially only active in the current parameter set in the RAM of the CLV. Using a special command, the modified parameter record must also be copied to the EEPROM so that it can be stored permanently, otherwise the changes will be lost when the supply voltage is switched off.

The online mode of the terminal emulator in CLV-Setup enables the CLV to parameterize directly with command strings. *Fig. 10-20* contains the view of the terminal emulator with the command field and output window of the communication between PC and CLV.

1. Click on in the toolbar.
   The terminal emulator window opens. The CLV is in the Reading mode.
2. Click on the PARAMETERIZE radio button under DEVICE MODE.
   The CLV aborts reading mode. The "Device Ready" LED is extinguished.
   CLV-Setup switches the CLV to the Parameterization mode by means of a command.
   In the Parameterization mode, all commands begin with the identifier "3".
3. Enter the desired command in the ① command field and press the [Return] key.
   The command is then sent to the CLV.
   With a few exceptions, the CLV replies to a command with correct syntax with an echo.

   Example:
   Entering "3?LT" causes the CLV to output the parameter values of the reading pulse in encoded form in the output window ②.
4. Click the READING MODE radio button to return to the Reading mode.
   The "Device Ready" LED lights up.

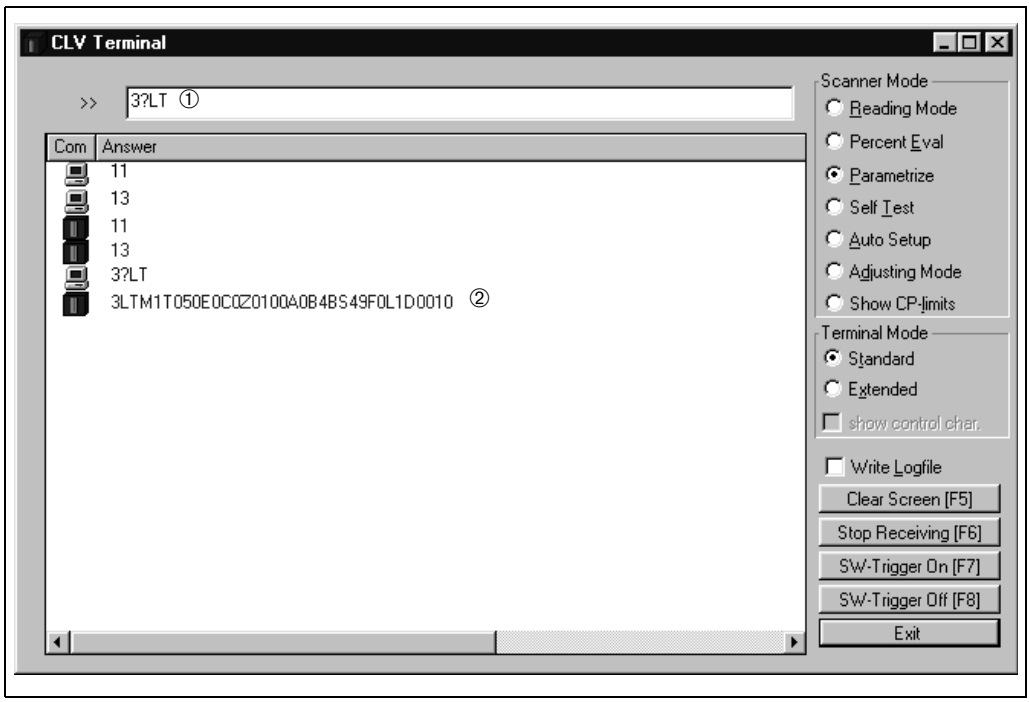


Fig. 10-20: CLV-Setup: Entering commands in the terminal emulator

Note Changes that are made directly to parameter values in the CLV using command strings are only registered and displayed in CLV-Setup after the current parameter record has been uploaded from the CLV.

A list of command strings is available on request.

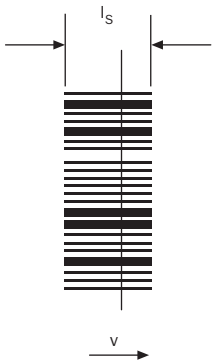
10.7 Calculating parameter values for setting the CLV

10.7.1 Calculating the number of scans (for standard decoders)

The maximum possible number of scans for a bar code depends on the transporting speed v.

Line scanner: Ladder-type bar code positioning

Line scanner: Lateral reading at object



Specified values:
Number of scans n = ?
Transporting speed v = 1.5 m/s
Bar length l_S = 20 mm
Scanning frequency f = 600 Hz
Bar code 100 % readable

Calculation for standard decoder!

$$v = \frac{s}{t}$$

$$v = \frac{l_s}{n \times t_{scan}}; \quad t_{scan} = \frac{1}{f}$$

$$v = \frac{l_s}{n} \times f$$

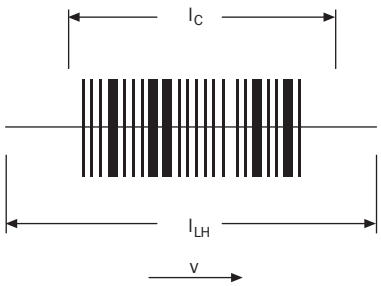
$$n = \frac{l_s}{v} \times f$$

$$n = \frac{0.02\ m}{1.5\ m/s} \times 600/s \qquad \underline{\mathbf{n = 8}}$$

Fig. 10-21: Line scanner: Calculating the number of scans for ladder-type bar code positioning

Line scanner: Fence-type bar code positioning

Line scanner: Lateral reading at object



Specified values:
Number of scans n = ?
Transporting speed v = 2 m/s
Code length with idle zone l_C = 150 mm
Reading area height l_{LH} = 400 mm
Scanning frequency f = 600 Hz
Bar code 100 % readable, all scans on the code
Code window s = $l_{LH} - l_C$

Calculation for standard decoder!

$$v = \frac{s}{t}$$

$$v = \frac{(l_{LH} - l_c)}{n \times t_{scan}}; t_{scan} = \frac{1}{f}$$

$$v = \frac{(l_{LH} - l_c)}{n} \times f$$

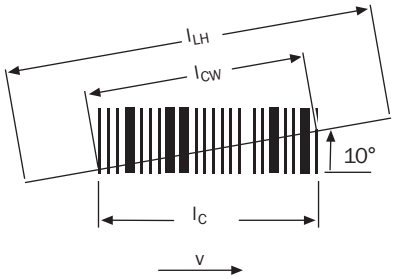
$$n = \frac{(l_{LH} - l_c)}{v} \times f$$

$$n = \frac{(0.4 - 1.5)\ m}{2\ m/s} \times 600/\ s \qquad \underline{\mathbf{n = 75}}$$

Fig. 10-22: Line scanner: Calculating the number of scans for fence-type bar code positioning

Line scanner with oscillating mirror: Fence-type bar code positioning

Line scanner with oscillating mirror: Lateral reading at object



Calculation for standard decoder!

Specified values:
Number of scans n = ?
Transporting speed v = 0.5 m/s
Code length with idle zone l_C = 100 mm

Code length under 10°: $l_{CW} = \frac{100\ mm}{\cos 10} = 102\ mm$

Reading area height l_{LH} = 500 mm
Scanning frequency f = 600 Hz
Bar code 100 % readable, all scans on the code
Codefenster s = l_{LH} - l_C

1. Dwell time of the bar code in the reading area:

$t = \frac{s}{v}$

$t = \frac{(l_{LH} - l_{CW})}{v}$

$t = \frac{(0.5 - 0.102)}{0.5\ m/s}$

t = 796 ms

2. Required oscillating mirror frequency:

$f_{SW} = \frac{1}{t}$

$f_{SW} = \frac{1}{0.796\ s}$

$f_{SW} = 1.26\ Hz$

3. Number of possible scans (approximation):

$n = \frac{f}{f_{SW}}$

$n = \frac{600\ Hz}{1.26\ Hz}$

n = 476

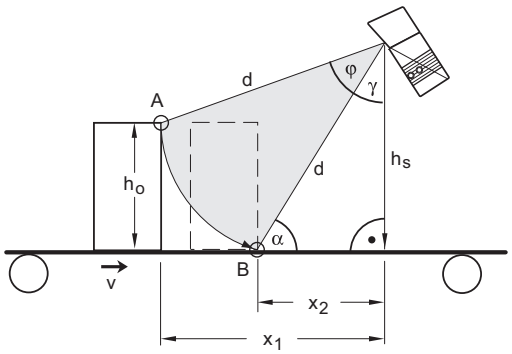
Fig. 10-23: Line scanner with oscillating mirror: Calculating the number of scans for fence-type bar code positioning

10.7.2 Calculating the start position and mirror speed for the forward and return phase of the One-Shot function

Line scanner with oscillating mirror

Theoretical calculation: Reading from the front (object moving towards CLV)

Calculation for Standard decoder!



(Scanning direction in the drawing level)

Legend:

h_0 = Max. object height
h_S = Distance of the CLV across conveyor level
φ = Oscillating angle
α = Max. angle of impact on bar code (skew)
Start Phase 1: Point A
Start Phase 2: Point B

Specified values:

$h_S > h_0$
$\alpha \leq 45°$ (better: $\alpha \leq 30°$)
Set max. deflection angle: $\pm 20°$

➢ Determine distances through measurement:
x_1 = Distance at Start Phase 1
x_2 = Distance at Start Phase 2

1. Focal position for distance configuration

$$\sin\alpha = \frac{h_s}{d} \quad \Rightarrow \quad d = \frac{h_s}{\sin\alpha}$$

2. Oscillating angle φ

$$\gamma = 90° - \alpha$$

$$\cos(\varphi + \gamma) = \frac{(h_s - h_0)}{d}$$

$$\varphi = \text{arc}\cos\left(\frac{(h_s - h_0)}{d}\right) - \gamma$$

➢ Enter φ symmetrically to CW = 50 :

$$\text{StartPos 1} = 50\ \text{CW} + \left(\frac{\varphi}{2} \times \frac{1\ \text{CW}}{0.5}\right)$$

$$\text{StartPos 2} = 50\ \text{CW} - \left(\frac{\varphi}{2} \times \frac{1\ \text{CW}}{0.5}\right)$$

3. Mirror speed $\varphi^{*)}$

$$v = \frac{\Delta x}{\Delta t};\ \Delta x = x_1 - x_2$$

$$\varphi^* = \frac{\Delta\varphi}{\Delta t}$$

During the period Δt, in which the object moves from x_1 to x_2 the oscillating mirror must also pass through the angle $\Delta\varphi$

$$\Rightarrow \frac{\Delta x}{v} = \frac{\Delta\varphi}{\varphi^*}$$

$$\varphi^* = \Delta\varphi \times \frac{v}{\Delta x} \quad \text{with} \quad 1\ °/s = 2\ \text{CW/s}$$

When entering the values take the following into consideration:
– Debouncing time of the "Sensor 2" switching input (One-Shot trigger)
– Start time of the oscillating mirror (movement of the mass)

➢ Select the mirror speed of the return phase, depending on the distances between the objects, so that the scan line can be positioned on time in the starting position (Point A).
➢ Check the theoretically calculated values on site and adapt them, if required.

Fig. 10-24: One-Shot: Line scanner with oscillating mirror: Calculating the number of scans for fence-type bar code positioning

10.7.3 Calculating the necessary distance 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: 10 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

$$d_{scan} = \frac{V}{f} \qquad d_{scan} = \frac{2000\ mm/s}{800\ /s} = 2.5$$

dy = 10 x 2.5 mm = 25 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 CODE DISTANCE between the bar codes must be parameterized correctly
   (DEVICE CONFIGURATION tab, EDIT TRACKING PARAMETERS button)
2. The code position comparison must be activated
   (CODE CONFIGURATION tab, under CODE POSITION)

Bar code lines in conveyor direction:
If the scan line is to detect bar codes of the same name with the same code position, the travel information must be supplied by an external incremental sensor so that the bar codes can be distinguished from one another.

Rule of thumb: the blank zone should surround the bar code completely!

Fig. 10-25: Required distance between the bar codes on an object

10.8 Auxiliary tables

10.8.1 Calculating the code length of a bar code

The code length of a bar code corresponds to the number of used characters in the printing image including the check digits (if they exist). The 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 calculation equations are provided in *Table 10-7*.

1. Count the bars and gaps as specified in *Table 10-7*. Do not forget to include the start and stop characters.
2. Calculate the code length in accordance with the equation specified 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	$I_{Code} = \frac{\text{Number} - 10}{5}$	Calculated code length
2/5 Interleaved	Number of wide elements (bars and gaps)	$I_{Code} = \frac{\text{Number} - 1}{2}$	Calculated code length
EAN	Not applicable	13 characters (normal version) 8 characters (short version)	Activate 13-digit Activate 8-digit
UPC	Not applicable	12 characters (UPC A, normal version) 6 characters (UPC E, short version)	Activate Version A Activate version E
Codabar	Number of bars	$I_{Code} = \frac{\text{Number} - 8}{4}$	Calculated code length
Code 128 (character set A)	Number of bars	$I_{Code} = \frac{\text{Number} - 10}{3}$	Calculated code length
Code 93	Number of bars plus separator after the stop character	$I_{Code} = \frac{\text{Number} - 13}{3}$	Calculated code length
EAN 128	Number of bars	$I_{Code} = \frac{\text{Number} - 10}{3}$	Calculated code length
Pharmacode	Number of bars	Number	Number = 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 CLV read result is output)
2. With few exceptions each printed character corresponds to an ASCII character which has to be decoded.
   With Code 39 extended, Code 93, Code 128 and EAN 128, the number of characters in the data string of the CLV can be larger than the number of characters in the printed code because it comprises several character sets.

Table 10-7: Auxiliary table for calculating the code length of a bar code

10.9 Special applications and procedures

10.9.1 Triggering the Teach-in match code 1 via the "Sensor 2" switching input

In Reading mode, the CLV compares up to two match codes with the bar codes it recorded in the reading pulse. In case of a corresponding function assignment the result status of the code comparison is signaled via the "Result 1" and "Result 2" ("Result" LED) and the beeper. The match codes can also be used as output filters for the host interface. In this case, when a "Good Read" occurs, the CLV only outputs those bar codes that have the same code type, code length, and data content as the match code(s). A match code can have a max. of 50 characters from the range 32 ... 137 decimal and also originate from a code type which evaluates the CLV.

By means of the "Sensor 2" switching output, the CLV can:

- Teach in match code 1 via its optical interface (reading window) and store it permanently in the parameter record instead of entering it with the CLV-Setup user interface. The code type, code length and data content are entered
- Activate the code comparison. The status remains active until the supply voltage to the CLV is switched off

In order to carry out the Teach-in, a switch must be connected in accordance with *Fig. 10-26*, the functional assignment of the switching input changed, and Teach-in mode selected.

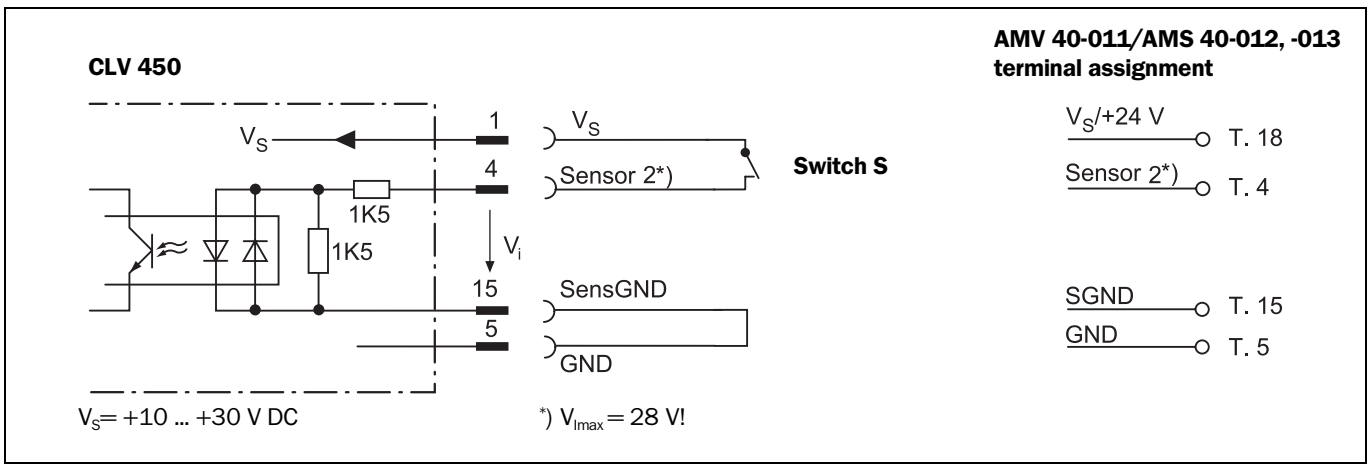


Fig. 10-26: Wiring of the "Sensor 2" switching input for triggering the teach-in match code 1

There are two modes for teaching in match code 1:

- Dynamic teaching-in of the match code 1
  Possible with the SMART and the Standard decoder. The code type that corresponds to the match code must be activated for the evaluation in the CLV. The CLV must be pulsed manually so that it can read the match code. After the teach-in procedure has been successfully completed, the CLV still continues to output bar codes of all the code types that were previously enabled.
- Static teaching-in of the match code 1 without/with Pharmacode
  The CLV only uses the standard decoder temporarily during the teach-in. It also reads a match code whose code type has been implemented but not enabled for evaluation. A reading pulse starts automatically at the start of the teach-in procedure. The CLV terminates the reading pulse once the teach-in procedure has been successfully completed. In Reading mode, it only outputs those bar codes that have the same code type and length as match code 1.

All other code types are disabled. In order to ensure that the match code is read reliably, the CLV temporarily sets the number of multiple reads to 30. The previous code configuration is kept if a match code is not detected during the teach-in procedure. Since the CLV can in principle interpret every code as a Pharmacode, the "static with Pharmacode" variant should only be activated if this code is actually to be programmed (teach-in) as a match code. The Pharmacode must comprise a minimum of 6 characters. Check whether the programmed Pharmacode is correct by uploading it from the CLV using the CLV-Setup user interface! If the static teach-in method is used, the CLV can also reset the daily operating data for each new match code 1 taught in. This encompasses the following counters:

- Daily operating hours
- No. of reading intervals
- No. of good reads (Good Read)
- Max. reading interval duration
- Min. reading interval duration
- No. of no reads (No Read)
- No. of match 1 (agreement with match code 1)
- No. of match 2 (agreement with match code 2)
- No. of no matches (no match with a match code)

Once match code 1 has been programmed, the code comparison can alternatively be activated with the user interface – either temporarily or permanently, depending on the download option. Activating the function by means of the user interface has a higher priority than with the "Sensor 2" switching input. In this case, the switch must already be open when the supply voltage to the CLV is switched on.

Match code 2 can only be defined and activated using the user interface or command strings, irrespective of the teach-in procedure.

Preparations for teach-in

1. Switch off the supply voltage of the AMV/S 40 connection module.
2. Connect the switch in the AMV/S 40 connection module to the "Sensor 2" switching input of the CLV as shown in *Fig. 10-26, Page 10-40*. Connect the "SensGND" and "GND" signals.
3. **Open the switch!** ("Sensor 2" switching input must be de-energized).
4. Connect the PC to the terminal interface of the CLV. To do so connect the RS-232 data connection cable to the 9-pin "Service" plug of the module *(*refer to *Chapter 5.5.5 Connecting the CAN interface, Page 5-6**)*.
5. Switch on the supply voltage to the AMV/S 40 connection module.
   Once the CLV has started, it outputs an acoustic signal to indicate that the self-test was completed successfully. Shortly afterwards, it outputs two acoustic signals to indicate that it has assumed Reading mode. The "Device Ready" LED lights up.

   Line scanner with oscillating mirror:
   In reading mode the CLV deflects the scan line in the default setting with a frequency of 1 Hz around the position CW = 50 at a maximum angle of ±20°.
6. Start Windows and the "CLV-Setup" software on the PC *(*refer to *Chapter 10.4.3 Starting "CLV-Setup", Page 10-22**)*.
7. Upload the current parameter record from the CLV.
   CLV-Setup displays the values in the tab cards of the user interface.
8. If you have not already done so, save the parameter record as a configuration file "*.scl".

a) Dynamic teach-in procedure

Configuring the dynamic teach-in procedure:

- Accompanying measure: Changing the reading pulse for teach-in

1. Select the DEVICE CONFIGURATION tab card.
2. Click on the DYNAMIC option in the TEACH-IN section.
3. Select the MATCH CODE TEACH-IN option in the list field in the ASSIGNMENT SENSOR 2 section.
4. If necessary, proceed as follows to activate the output filter in the CODE COMPARISON section:
   – Click on the CODE #1 ACTIVE check box.
   – Click on the OUTPUT FILTER check box.
   – Click on the CODE #1 ACTIVE check box again.
   The permanent activation of the code comparison is de-activated again. However, the output filter remains active.
5. Click on the EDIT READING TRIGGER command button.
6. Click on the SERIAL INTERFACE radio button in the dialog button under MODE.
7. Click on the EDIT RESULT OUTPUTS command button.
8. Select the MATCH 1 option in the list field in the dialog box under OUTPUT FUNCTIONS for Result 2 ("Result" LED).
9. Select the CODE CONFIGURATION tab card.
10. In the CODES section activate the code type which corresponds to the match code.
11. Click on the EDIT CODES command button.
12. Select the corresponding tab card of the code type and click on the FREE radio button in the CODE LENGTH section.
13. Carry out the download to the CLV. To do so, click on  in the toolbar.
    The DOWNLOAD PARAMETERS dialog box is opened.
14. Confirm the dialog box with the saving option PERMANENT.

Carrying out the dynamic teach-in procedure:

1. Click on  in the toolbar.
   The terminal emulator is opened. The CLV is in the Reading mode.
2. **Close the switch** in order to energize the "Sensor 2" switching input.
3. Click on the PARAMETERIZE radio button under DEVICE MODE.
   The CLV switches to Parameterize mode.
4. Click on the READING MODE radio button under DEVICE MODE.
   The CLV starts the Reading mode again and samples the state of the "Sensor 2" switching input. At the same time it activates the code comparison.

– or –

As an alternative to steps 3 and 4, switch the supply voltage to the connection module (of the CLV) off and on again. The CLV outputs two consecutive acoustic signals to indicate that it has switched to Reading mode.

5. **Open the switch** to de-energize the "Sensor 2" switching input.
   The CLV activates the teach-in mode for match code 1.
6. Click on the SW-TRIGGER ON command button or press [F7].
   The CLV starts the read port and waits for the match code.
7. Present the match code.

8. Click on the SW-TRIGGER OFF command button or press [F8].
   The CLV confirms that the read was successful by emitting an acoustic signal and then ends the reading interval. Match code 1 is now stored in the RAM.
9. **Close the switch** to re-energize the "Sensor 2 " switching input.
   The CLV saves match code 1 (code type, code length, and data content) permanently in the parameter record stored in the EEPROM.
   Until the supply voltage is switched off it compares whether the bar codes match the match code 1 in every further reading. It outputs the result state of the comparison via the "Result 2" output and the "Result" LED with the set pulse length.
10. **Keep the switch closed.**
    If the switch is opened, the CLV activates the teach-in mode again!

Replacing the match code:

In order to replace the current match code 1 with a new match code using the teach-in method, simply repeat Steps 5 to 9.

Checking the programmed match code 1 in the CLV:

1. Switch the supply voltage of the connection module (of the CLV) off and on again.
2. Carry out an upload from the CLV. To do so, click on  in the toolbar.
3. The code type and data contents of match code 1 are shown in the CODE COMPARISON section in the DEVICE CONFIGURATION tab card.

Resetting the reading pulsing to the old state:

1. Select the DEVICE CONFIGURATION tab card.
2. Click on the EDIT READING TRIGGER command button.
3. Click on the current radio button in MODE in the dialog box.
4. Carry out the download to the CLV. To do so, click on  in the toolbar.
5. Confirm the dialog box with the saving option PERMANENT.
   The CLV then uses the reading pulse type that was set before the teach-in procedure.

b) Static teach-in procedure

Configuring the static teach-in procedure:

1. Select the DEVICE CONFIGURATION tab card.
2. Click on the STATIC WITHOUT PHARMACODE (or STATIC WITH PHARMACODE to read a Pharmacode) in the TEACH-IN section.
3. If necessary, click on the WITH COUNTER RESET radio button in the COUNTER RESET section.
4. Select the MATCH CODE TEACH-IN option in the list field in the ASSIGNMENT SENSOR 2 section.
5. If necessary, proceed as follows to activate the output filter in the CODE COMPARISON section:
   - Click on the CODE #1 ACTIVE check box.
   - Click on the OUTPUT FILTER check box.
   - Click on the CODE #1 ACTIVE check box again.
     The permanent activation of the code comparison is de-activated again. However, the output filter remains active.
6. Click on the EDIT RESULT OUTPUTS command button.
7. Select the MATCH 1 option in the list field in the dialog box under OUTPUT FUNCTIONS for Result 2 ("Result" LED).

8. Carry out the download to the CLV. To do so, click on  in the toolbar.
   The DOWNLOAD PARAMETERS dialog box is opened.
9. Confirm the dialog box with the saving option PERMANENT.

Note Before you can use the static teach-in method, the parameter record in the RAM and EEPROM of the CLV must be identical. This is implemented by using the save variant PERMANENT. If TEMPORARY is selected instead, the CLV loads the default setting after the teach-in and after the supply voltage has been switched on.

Carrying out the static teach-in procedure:

1. Click on  in the toolbar.
   The terminal emulator is opened. The CLV is in the Reading mode.
2. **Close the switch** in order to energize the "Sensor 2" switching input.
3. Click on the PARAMETERIZE radio button under DEVICE MODE.
   The CLV switches to Parameter mode.
4. Click on the READING MODE radio button under DEVICE MODE.
   The CLV starts the Reading mode again and samples the state of the "Sensor 2" switching input. At the same time it activates the code comparison.

– or –

As an alternative to Steps 3 and 4, switch the supply voltage of the connection module (of the CLV) off and on again. The CLV outputs two consecutive acoustic signals to indicate that it has switched to Reading mode.

5. **Open the switch** to de-energize the "Sensor 2" switching input.
   The CLV activates the teach-in mode for match code 1.
   It starts the read port automatically and waits for the match code.
6. Present the match code.
   The CLV confirms that the read was successful by emitting an acoustic signal and then ends the reading interval. The match code 1 is stored in its RAM.
7. **Close the switch** to re-energize the "Sensor 2" switching input.
   The CLV saves match code 1 (code type, code length and data contents) permanently in the parameter record stored in the EEPROM.
   Until the supply voltage is switched off it compares whether the bar codes match the match code 1 in every further reading. It outputs the result state of the comparison via the "Result 2" output and the "Result" LED with the set pulse length.
   If the CLV was not able to read the match code, the reading interval is terminated when the switch is closed. The code configuration remains unchanged.
8. **Keep the switch closed**.
   If the switch is opened, the CLV activates the teach-in mode again!

Replacing the match code:

In order to replace the programmed match code 1 with a new match code using the teach-in method, repeat Steps 5 to 7.

Checking the programmed match code 1 in the CLV:

Proceed as described in Steps 1 to 3 under *„a) Dynamic teach-in procedure“, Page 10-42*.

Activating/de-activating the code comparison via the "Sensor 2" switching input

- Prerequisite: Assignment of the "Sensor 2" switching input with the function MATCHCODE TEACH-IN

Activating the code comparison function:

1. Close the switch before switching on the supply voltage to the CLV.
2. Switch on the supply voltage.
   The CLV activates the code comparison function.
3. Do not open the switch while the CLV is starting up.

De-activating the code comparison function:

1. Switch off the supply voltage to the CLV.
2. Open the switch.
3. Switch on the supply voltage.
   The CLV starts Reading mode without the code comparison.

Assigning output functions to the ”Result 1", ”Result 2” (”Result" LED) switching outputs and beeper

CLV can output the result status of the code comparison with the match codes in the following functions:

– No match (code does not match either match code)
– Match 1 (matches match code 1)
– Mismatch 1 (does not match match code 1)
– Match 2 (matches match code 2)*)
– Mismatch 2 (does not match match code 2)*)
– Match 1 or 2 (matches match code 1 or 2)
– Match 1 and 2 (matches match code 1 and 2)*)

*) only relevant if match code 2 is active

When configuring the Teach-in function for match code 1, define the following settings:

1. Select the DEVICE CONFIGURATION tab card.
2. Click on the EDIT RESULT OUTPUTS command button.
3. Select the required option for Result 1, Result 2, and beeper in the list field in the dialog box under OUTPUT FUNCTIONS.
4. Carry out the download to the CLV. To do so, click on  in the toolbar.
   Confirm the dialog box by choosing the PERMANENT storage option.

10.9.2 Auxiliary input via terminal interface

If the CLV cannot read a bar code in process-synchronous Reading mode, since there is no bar code on the object, the data contents of the bar code can be sent subsequently to the host by using the AUXILIARY INPUT function. In this way, the sequence of read results can be completed if necessary.

The auxiliary input function uses the terminal interface of the CLV exclusively and offers two options:

- Manual entry of the data content on the keyboard of a connected terminal or PC with terminal emulation

- Entry of the bar code using a handheld reader. Transfer to the CLV via internal or external decoder of the device

Fig. 10-27 shows the scheme of the auxiliary input.

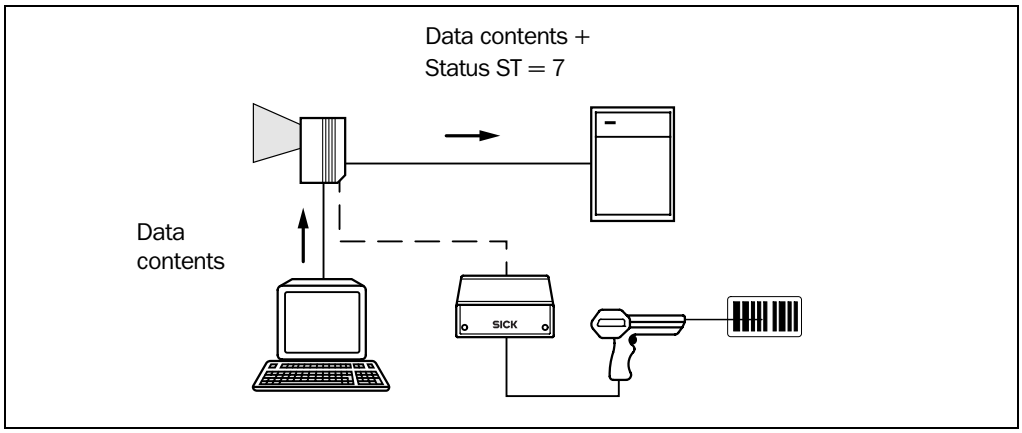


Fig. 10-27: Auxiliary input via the terminal interface of the CLV

The CLV sends the data contents of the bar code that it receives via the terminal interface to the host in the same format as the other read results on the host interface. Each string can contain the data from a bar code with a maximum length of 50 characters. The CLV automatically enters the status ST = 7 if the error status has been enabled for transfer. The values of the other reading diagnosis data in the data string do not have any significance.

You must switch the operating mode on the interface to "Auxiliary input" so that the CLV can receive the data contents of the bar code via the terminal interface.

1. Connect the PC to the **terminal interface** on the CLV using an RS-232 data connection cable (AMV/S 40: Connect the PC to the internal 9-pin "Service" plug).
   (refer to *Chapter 5.5.5 Connecting the CAN interface, Page 5-6*)
2. Start the "CLV-Setup" software on your PC.
   (refer to *Chapter 10.4.3 Starting "CLV-Setup", Page 10-22*)
3. Select the AUXILIARY INTERFACE tab card.
4. Select the AUXILIARY INPUT option in the list field.
5. Carry out the download to the CLV. To do so, click on in the toolbar.
   The DOWNLOAD PARAMETERS dialog box is opened.
6. Confirm the dialog box with the saving option TEMPORARY .

The terminal interface operates temporarily in "Auxiliary input" mode.

Entering the bar code using the terminal emulator function in CLV-Setup

1. Click on in the toolbar.
   The terminal emulator window opens.
   The CLV is in the Reading mode.
2. Click on the EXTENDED radio button under TERMINAL MODE.
   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. 10-28 displays the terminal emulator window in extended mode.
3. Use the list field 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 input errors.
   The data contents may not contain control characters.

5. Press [RETURN] or [ENTER].
   The CLV then interprets all further characters as a new data string.
   CLV-Setup sends the character string to the CLV and deletes the entry in the text field.
   The CLV does not send an echo.
6. Once the active reading pulse has ended, the CLV sends the data received from the PC to the host via the host interface.

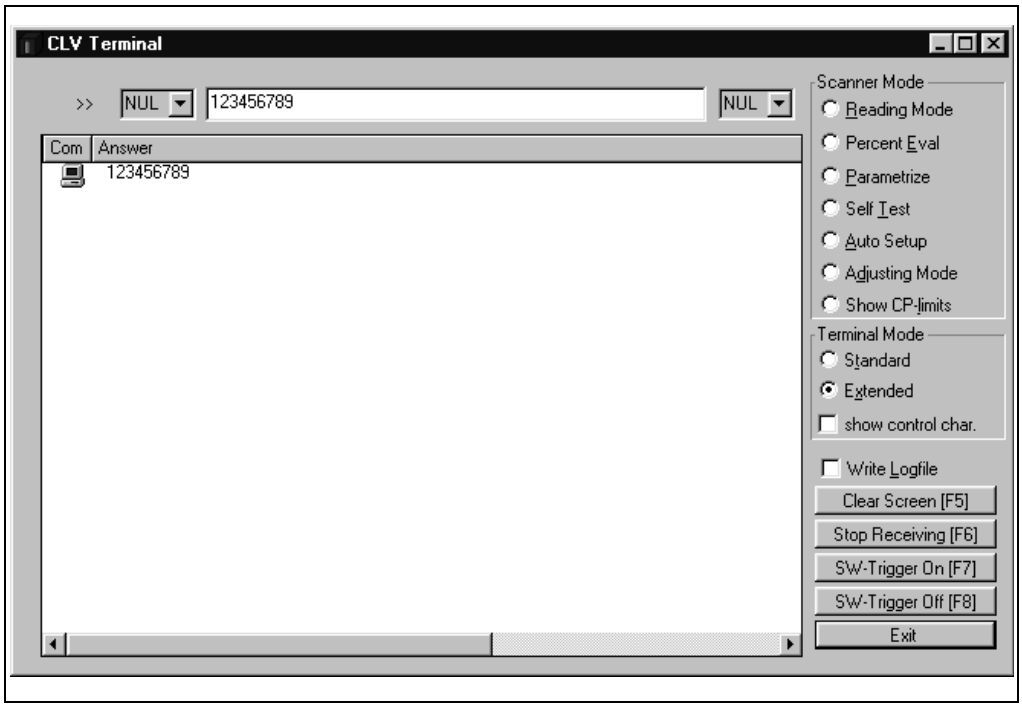


Fig. 10-28: CLV-Setup: Auxiliary input on the terminal emulator

Entering a bar code by means of a terminal/PC keyboard

1. Connect the terminal or PC with terminal emulation to the terminal interface of the CLV (via AMV/S 40). For pin assignment refer to *Chapter 5.5.6 Connecting the PC, Page 5-6*.
2. Set the communication parameters and data output format as shown in *Table 10-8*.

Parameter	**Value**
Data transfer rate	9 600 bits/s
Data bits	8
Parity	None
Stop bits	1
Data output format	Data terminator *e. g. 1234 CR*

Table 10-8: Communication parameters to be set on the terminal/PC for the auxiliary input

3. Enter the data contents of the bar code on the keyboard.
   The terminal sends the individual characters immediately to the CLV.
   Use the backspace key to correct input errors.
4. Terminate the data contents with the control character <CR>.
   The CLV then interprets all further characters as a new data string.
   The CLV ignores other control characters. The data content itself must not contain any control characters.

5. Once the active reading pulse has ended, the CLV 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 terminal interface of the CLV (via AMV/S 40). For pin assignment refer to *Chapter 5.3 Pin assignment of the connecting plug, Page 5-2*.
2. Set the data format and communication parameters of the hand scanner in accordance with *Table 10-8, Page 10-47*.
3. Read the bar code with the hand scanner.
   Once the active reading pulse has ended, the CLV sends the data received from the PC to the host via the host interface.

If you are using the ST 1100 decoder from SICK, for example, set the communication parameters and data output format as specified in *Table 10-9*.

Parameter	Value
Terminal ID	Unassigned
WA Network	No
ACK/NAK	No
Baud rate	9 600 bits/s
Data bits	7
Parity	Space
Configuration	RS 232
Preamble (Header)	Clear
Postamble (Terminator)	CR

Table 10-9: Communication parameter to be set for the ST 1100 decoder

10.9.3 "Building a Daisy-chain configuration" (data forwarding or master/slave arrangement)

Refer to *Technical Information "Master/Slave with Bar Code Scanners from the CLV Series" (Order No. 8 007 675, English edition)*

10.9.4 SICK network (RS 485)

Refer to *Technical Description "CLX 200 Network Controller" (Order No. 8 007 157, English/German edition)*

10.9.5 Connection to the Profibus DP

Refer to *Operating Instructions "BMV/BMH 10 for Profibus DP" (Order No. 8 008 825, English edition)*

10.9.6 Connection to the DeviceNet

Refer to *Operating Instructions "BMV/BMH 10 for DeviceNet" (Order No. 8 008 972, English edition)*

10.9.7 Connection to the Interbus-S

Refer to *Technical. Information "BMS 10/20 for Interbus-S" (Order No. 8 007 546, English edition)*

10.9.8 Connection to Ethernet

Refer to *Operating Instructions "BMV/BMH 10 for Ethernet"*
(Order No. 8 009 398, English edition)

10.9.9 Building a CAN Scanner Network

Refer to *Operating instructions "Application of the CAN interface"*
(Order No. 8 009 180, English edition)

10.10 Replacing a CLV (copying the parameter record)

There are two methods of replacing a CLV and transferring the current parameter record to the new device:

- Transferring the parameter record using the Profile bar codes
- Transferring by means of a download from CLV-Setup

The parameter record can only be transferred between identical device types (e. g. from CLV 45x to another CLV 45x, etc.).

10.10.1 Transferring the parameter set using Profile bar codes

You do not need to connect the device to a PC in order to transfer the parameter record using the Profile bar codes. The parameter record of the CLV that is to be replaced must be available in the form of an archived Profile bar code print or at least as a configuration file in CLV-Setup. Otherwise the replacement device has to be reconfigured.

The procedure for printing out the Profile bar codes is described in *Chapter 10.5.2 Profile progamming, Page 10-30*.

1. Disconnect the supply voltage of the AMV/S 40 connection module (of the CLV).
2. Disconnect and remove the CLV cable plug from the AMV/S 40.
3. Remove the CLV from the retainer.
   Before doing so, mark the position and alignment on the retainer or surroundings.
4. Mount, align, and connect the replacement device.
5. Switch on the supply voltage of the AMV/S 40.
   The "Device Ready" LED lights up. The CLV outputs an acoustic signal to indicate that it is ready to read the Profile bar codes.
6. Present the first Profile bar code **within 5 seconds**.
   The CLV confirms the successful read by emitting an acoustic signal and waits **10 seconds** for the next Profile bar code.
7. Present all the further Profile bar codes consecutively in the **printed sequence**.
8. Then allow the final wait time of 10 seconds to elapse.
   The CLV outputs two consecutive acoustic signals to indicate that it has switched to Reading mode.

The new CLV is now ready to use the transferred parameter record.

Help in cases of problems

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 Profile bar codes may contain coded parameters or parameter values that cannot be interpreted by the older software of the replacement device. However, the CLV reads all of the Profile bar codes, without anything being said about the ability to be interpreted.

➢ Check the functionality of the replaced CLV by means of the CLV-Setup user interface.

To do so, connect the PC to the terminal interface on the CLV. Check whether all of the parameter settings used are necessary to configure the CLV 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.

➢ After the parameter record has been uploaded use the CLV-Setup user interface to check whether the new parameters are relevant for configuring the CLV for the current reading situation. If necessary, edit the parameters and download the parameter record again to the CLV. Save the new parameter record as a configuration file in CLV-Setup and print it out as Profile bar codes to archive it.

Also refer to *Chapter 10.4.8 Handling unknown parameters, Page 10-26*.

10.10.2 Transferring the parameter record by means of a download

You must connect a PC running the "CLV-Setup" software to the replacement device in order to download the parameter record. The parameter record of the CLV 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 supply voltage of the AMV/S 40 connection module (of the CLV).
2. Disconnect and remove the CLV cable plug from the AMV/S 40.
3. Remove the CLV from the retainer.
   Before doing so, mark the position and alignment on the retainer or surroundings.
4. Mount, align, and connect the replacement device.
5. Connect the PC to the terminal interface on the CLV using an RS 232 data connection cable (AMV/S 40: Connect the PC to the internal 9-pin "Service" plug).
   (refer to *Chapter 5.5.6 Connecting the PC, Page 5-6*)
6. Switch on the supply voltage of the AMV/S 40.
   After the start the CLV confirms the successful self-test with a beeper sound and shortly afterwards starting of the reading mode is signaled by two consecutive sounds. The "Device Ready" LED lights up.
7. Switch on the PC and start Windows.
8. Start the "CLV-Setup" software.
   If the communication parameters on the PC and CLV are identical, CLV-Setup uploads the parameter record from the CLV and displays the values in the tab cards.
9. Open the archived parameter record as a configuration file "*.scl" in CLV-Setup and download it to the CLV.
10. Confirm the dialog box by selecting the TEMPORARY storage option.
11. Check whether the CLV reads the bar codes correctly.
    Correct the parameter record, if necessary.
12. Finally, download the tested parameter record to the CLV and save it with the PERMANENT storage option.
    The parameter record is transferred permanently to the replacement device.
13. Save the modified parameter record as a new configuration file in CLV-Setup.

Help in cases of problems

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 record transferred may contain parameters or parameter values that cannot be interpreted by the older software. The

replacement device, however, outputs an error message in CLV-Setup for each of these parameters/values when the parameter records is downloaded.

➢ Check whether all of the parameter settings used are necessary to configure the CLV for the current reading application. If necessary, replace the software version in the replacement device.

If the software version on the replacement 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.

➢ After an upload from CLV to CLV-Setup check whether the new parameters are relevant for configuring the CLV for the current reading situation. If necessary, edit the parameters and download the parameter record again to the CLV. Save the new parameter record as a configuration file in CLV-Setup.

Also refer to *Chapter 10.4.8 Handling unknown parameters, Page 10-26*.

10.11 Available accessories

10.11.1 Mounting accessories

Order No.	Description	Fig.
2 020 410	Mounting bracket, with securing material	*Fig. 10-29, Page 10-54*
2 022 564	Mounting bracket (formed as a bow), with securing material	*Fig. 10-30, Page 10-54*
2 023 691	Rod clamp for rods and tubes with 12 ... 20 mm ext. diameter, with securing material	*Fig. 10-31, Page 10-55*
2 031 342	Mounting bracket with vibration damper, with securing material	*Fig. 10-32, Page 10-55*

Table 10-10: Available accessories: Mounting accessories

10.11.2 Connection modules

Order No.	Type	Description
1 017 132	AMV 40-011	Connection module for CLV 45x, with 15-pin D-Sub HD socket, terminal strips (signal distributors) for connecting the data and function interfaces, internal 9-pin D-Sub "Service" plug, cable grips, polycarbonate housing, enclosure rating max. IP 54. Operating voltage 10 ... 30 V DC
1 017 135	AMS 40-013	As AMV 40-011 with additional integrated 230 V AC 50 Hz/24 V DC power pack
1 017 136	AMS 40-012	As AMV 40-011 with additional integrated 115 V AC 50/60 Hz/24 V DC power pack
1 017 385	AMS 40-023	As AMS 40-013, with additional 2-row LCD
2 020 825	–	RS 422 to CL 20 mA interface converter, for one CLV, for optional installation in the AMV 40-011, AMS 40-013, AMS 40-012 and AMS 40-023
1 019 160	AMV 70-081	Connection module for CLV 45x, with 15-pin D-Sub HD socket, spring terminal strips (signal distributors) for connecting the data and function interfaces, internal 9-pin D-Sub "Service" plug, plastic cable glands, polycarbonate housing, enclosure rating max. IP 30. With address function for network operation, operating voltage 10 ... 30 V DC
6 021 105	AMV 100-011	Universal Connection Module for max. two CLVs, for the CLV 45x with 15-pin D-Sub HD socket, terminal strips (signal distributors) for connecting the data and function interfaces, two internal 9-pin D-Sub "Service" plugs, cable grips, cast aluminium housing, enclosure rating max. IP 54 (enclosure rating max. IP 65 with connector cover), operating voltage 10 ... 30 V DC
6 021 106	AMV 200-011	As AMV 100, but for four CLV 45x
6 007 655	–	Power cable, 3-wire, length 2 m, with 3-pin connector (grounding) and one open end (stripped)

Table 10-11: Available accessories: Connection modules

10.11.3 Bus connection modules

Order no.	Type	Description
6 020 896	BMV 10-0111	Bus connection module for connection of max. two CLVs to **Profibus DP**; for the CLV 45x each with a 15-pin D Sub HD device socket. With a 9-pin D Sub bus socket, terminal strips (signal distributors) for wiring the RS 232 data interface and the functional interfaces, two internal 9-pin D Sub "Service" plugs, 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
6 020 893	BMH 10-0111	Bus module for connection of a CLV to **Profibus DP**; with terminal screws, a 9-pin D-sub bus socket, no housing, for top-hat-rail installation, enclosure rating max. IP 20, operating voltage 10 to 30 V DC
6 021 190	BMV 10-0311	Bus connection module for connection of max. two CLVs to **DeviceNet,** terminal strips for bus connection, otherwise, as BMV 10-0111
6 021 188	BMH 10-0311	Bus module for connection of one CLV to **DeviceNet**, otherwise as BMH 10-0111
1 012 672	BMS 10-0113	Bus connection module for the connection of one CLV to **Interbus-S**; for the CLV 45x with a 15-pin D Sub HD device socket, two 9-pin D Sub bus connections (in/out), terminal strips (signal distributors) for wiring the data and functional interfaces, internal 9-pin D Sub "Service" plug, integrated power supply 230 V AC 50 Hz/ 24 V DC, cable grips, polycarbonate housing, enclosure rating max. IP 54
1 012 680	BMS 10-0112	as BMS 10-0113, but with integrated 115 V AC 50/60 Hz/24 V DC power supply
6 025 757	BMV 10-0411	Bus connection module for the connection of max. two CLVs to **Ethernet**. TCP/IP communication, data transmission rate 10 MBit/s. For each CLV 42x with a 15-pin D Sub HD device socket. With a 8-pin RJ-45 bus socket, terminal strips (signal distributors) for wiring the RS 232 data interface and the functional interfaces, two internal 9-pin D Sub "Service" plugs, 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
6 025 756	BMH 10-0411	Bus module for connection of one CLV to **Ethernet.** 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
6 022 140	BMV 10-0431	as BMV 10-0411, but with FTP communication, data transmission rate 10/100 MBit/s
6 025 748	BMH 10-0431	as BMH 10-0411, but with FTP communication, data transmission rate 10/100 MBit/s
6 007 655	–	Power cable, 3-wire, length 2 m, with 3-pin connector (grounding) and one open end (stripped)

Table 10-12: Accessories: Bus Connection modules

10.11.4 Cables and connectors

Order No.	Description	Cores	Length	Connection
6 010 075	Extension cable for data and function interfaces, ∅ 6.5 mm, shielded, with 15-pin D-Sub HD socket and plug	15	2 m	CLV 45x to AMV/S 40
6 010 137	Connection cable for data and function interfaces, ∅ 6.5 mm, with 15-pin D-Sub HD socket and one open end (stripped)	15	2 m	CLV 45x to non-SICK supply system device
2 014 054	RS-232 data connection cable, ∅ 5 mm, shielded, with two 9-pin D-Sub sockets (Pin 2 (RxD) and Pin 3 (TxD) transposed)	3	3 m	PC to AMV/S 40
6 010 088	Data cable, ∅ 6.6 mm, shielded, for connections up to 3 m in length	15 x 0.09 mm^2	Bought to size	Free wiring
6 007 508	Data cable, ∅ 8.5 mm, twisted pair, shielded	2 x 2 x 0.23 mm^2	Bought to size	SICK network (RS-485)
6 009 438	D-Sub connector housing (metal) for 9-pin or 15-pin HD inserts			
6 007 335	D-Sub connector insert, 9-pin female multi-point connector (socket)			

Table 10-13: Available accessories: Cables and connectors

Order No.	Description	Cores	Length	Connection
6 010 019	D-Sub connector insert, 15-pin HD female multi-point connector (socket)			
6 010 020	D-Sub connector insert, 15-pin HD pin connector (plug)			

Table 10-13: Available accessories: Cables and connectors

10.11.5 Reading pulse generation

The SICK catalog "SENSICK Industrial Sensors" (Order No. 8 006 530, English edition) contains a large selection of photoelectric switches and photoelectric proximity switches as well as the associated accessories (retainers, connection cables)

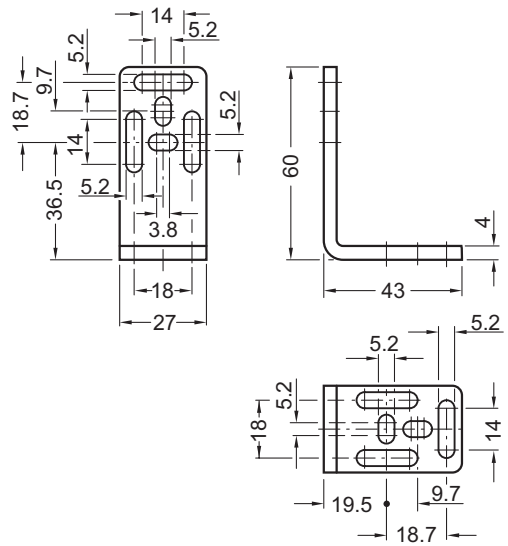
10.11.6 Network controller

Order No.	Type	Description
On request	CLX 200	Network controller with LCD, membrane-sealed keyboard, integrated power pack and 9-pin D-Sub connections for network, host and terminal, enclosure rating max. IP 31

Table 10-14: Available accessories: Network controller

10.12 Dimensioned drawings of the accessories

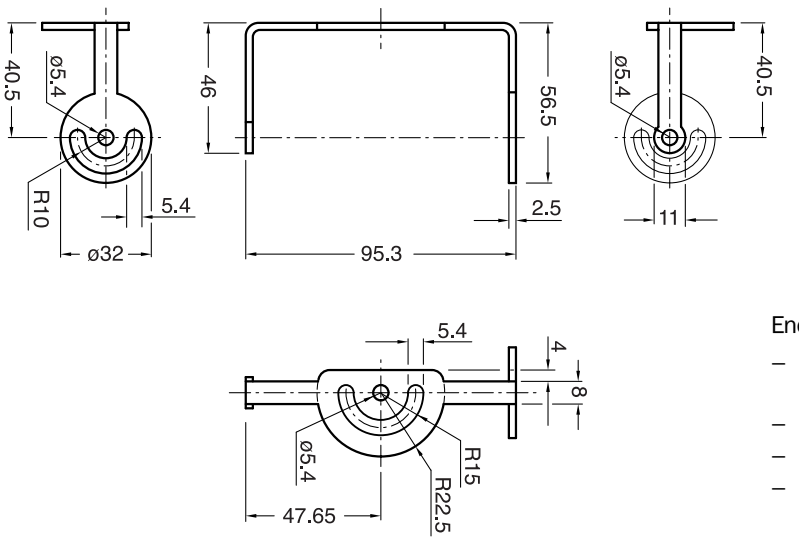
10.12.1 Mounting bracket No. 2 020 410 (for one CLV)



Enclosed to fasten the CLV:
2 pan-head screws M 5 x 8 mm,
Hex-head cap w/s 3 mm, self-locking

Fig. 10-29: Dimensions of the mounting bracket No. 2 020 410

10.12.2 Mounting bracket No. 2 022 564

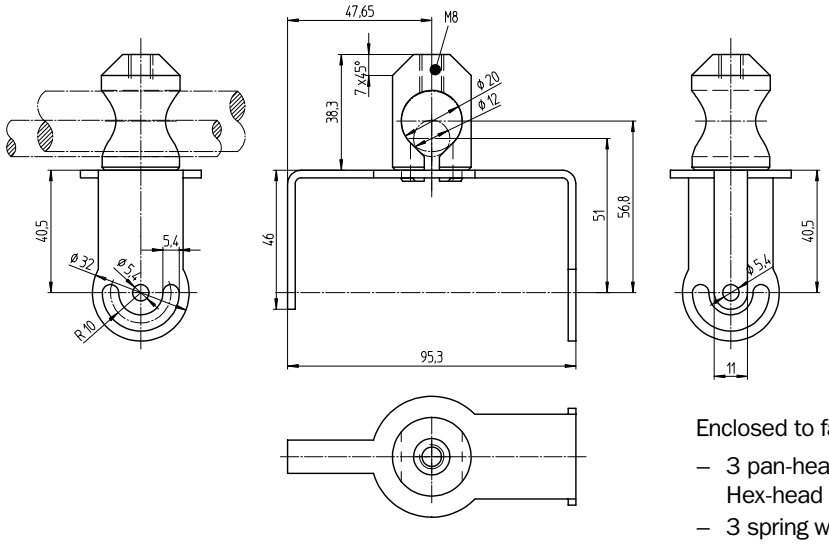


Enclosed to fasten the CLV and the bracket:

- 3 pan-head screws M 5 x 8 mm,
  Hex-head cap w/s 3 mm, self-locking
- 3 spring washers A5
- 2 hexagon screws M 5 x 12 mm
- 2 washers A5.3

Fig. 10-30: Dimensions of the mounting bracket No. 2 022 564

10.12.3 Rod clamp No. 2 023 691

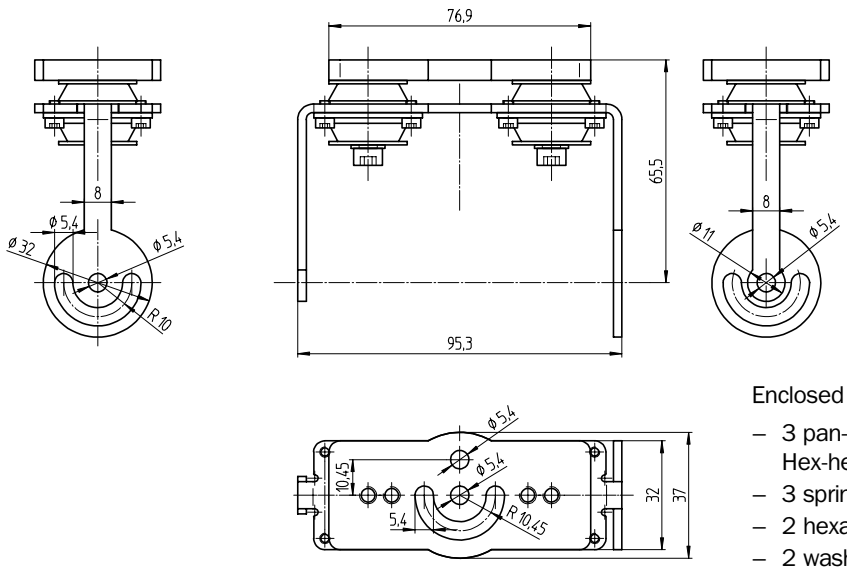


Enclosed to fasten the CLV:

- 3 pan-head screws M 5 x 8 mm, Hex-head cap w/s 3 mm, self-locking
- 3 spring washers A5

Fig. 10-31: Dimensions of the rod clamp No. 2 023 691

10.12.4 Mounting bracket with vibration damper No. 2 031 342



Enclosed to fasten the CLV and the bracket:

- 3 pan-head screws M 5 x 8 mm, Hex-head cap w/s 3 mm, self-locking
- 3 spring washer A5
- 2 hexagon screws M 5 x 16 mm
- 2 washers A5.3

Fig. 10-32: Dimensions of the mounting bracket with vibration damper No. 2 031 342

10.13 Supplementary documentation

Order No.	Title	Contents
2 022 890	Technical documentation set	– Operating instructions CLV 45x, German and English – 1 CD-ROM with "CLV-Setup" software, "CLV-Setup Help" online help and "I-ViewPro™" HTML-Browser – Card with 12 printed Profile bar codes
8 008 292	Operating Instructions "AMV/S 40"	Description for wiring the CLV to the SICK network/PLC/sensor via the AMV 40 connection module
8 009 154	Operating Instructions "AMV 70/71"	Description for wiring the CLV to the host/PLC/sensor via the AMV/S 70 connection module
8 008 879	Operating Instructions "AMV 100/200"	Description for connecting two (four) CLV to the host/PLC/sensor via the AMV 100 (AMV 200) connection module
8 007 675	Technical Information "Master/Slave with CLV bar code scanner"	Description of the structure of a "daisy-chain configuration" (master/slave or data forwarding)
8 007 157	Technical Description "CLX 200 Network Controller"	Description of the structure of a SICK Network (RS 485) with CLV bar code scanners
8 008 825	Operating Instructions "BMV/BMH 10 for Profibus-DP"	Description for connecting the CLV to the Profibus/PLC/sensor via the BMV/BMH 10 bus connection module
8 008 972	Operating Instructions "BMV/BMH 10 for DeviceNet"	Description for connecting the CLV to the DeviceNet/PLC/sensor via the BMV/BMH 10 bus connection module
8 007 546	Technical Information "BMS 10/20 for Interbus-S"	Description for connecting the CLV to the Interbus-S/PLC/sensor via the BMS 10/20 bus connection module
8 009 398	"BMV/BMH 10 for Ethernet" operating instructions	Description of the connection of the CLV to the Ethernet/the PLC/the sensor via the bus connection module BMV/bus module BMH 10
8 009 180	Operating Instructions "Application of the CAN interface"	Description of the building a CAN Scanner Network (connection, configuration of the CLV, functions) as well as the integration of the CLV into a general CANopen network
On request	"Command strings"	Description of the command strings for the functions of the CLV

Table 10-15: Supplementary documentation in English

10.14 Glossary

For further terms please refer to the "*CLV-Setup Help*" *online help*.

Adjusting mode

Special operating mode that enables the center of the scan line to be positioned exactly on the object containing the bar code.

Aperture angle α

Angle within whose limits the laser beam is deflected by the polygon mirror wheel. A V-shaped range perpendicular to the scan direction, which must contain the bar code, is formed in front of the reading window. If only part of this opening angle is used (part of the scan line symmetric around the center point), the depth of field for the focal position and resolution is greater.

Aspect ratio

Ratio of the code height (bar length) to the code length (number of characters). The SMART decoder can also read bar codes with extremely small aspect ratios.

Auto Setup

Function that allows the code and reading configuration of the CLV to be adapted automatically to the reading situation. The CLV uses the standard decoder to search for a bar code that is presented at a fixed reading distance and attempts to determine the optimum scanning rate and focal position. It enters the found code type and code length as parameter values and disables all other code types and lengths for the evaluation.

Auxiliary input

Special function on the ⇨ terminal interface. Used to enter bar code data manually subsequently in order to complete reading results sent to the host.

Capture range

Zone around a moving bar code created by the CLV using the increment management and code position comparison functions. Enables bar codes with identical contents and code type to be separated.

Christmas tree effect

Effect caused by limiting the active scan line range (CP values) and oscillating amplitude (CW values) on the ⇨ line scanner with oscillating mirror. In this way, a uniform "sharply-defined window" can be created in the reading field for each distance configuration, independent of the reading distance.

CLV Assistant

The CLV Assistant facilitates e. g. the parameterizing and testing of the CLV. It guides you in simple steps through the configuration of the CLV for an application-specific reading situation and **one** bar code. The determined settings are transferred to CLV-Setup.

CLV-Setup

PC software, executable under Windows 95™/98™ and Windows NT™. Is used for offline parameterization (adaptation to the reading situation on site) and the online operation of the CLV in a dialog box. The parameter record to be edited is exchanged with the CLV by ⇨ uploading and ⇨ downloading it.

CLV-Setup Help

On-line help function that provides support for using the CLV-Setup program. The functions of the parameters of the CLV are explained and the respective range of values specified in the help. Runs under an HTML browser such as "Netscape Navigator™" or the enclosed "I-ViewPro™" and can be called in CLV-Setup.

CLV-setup user interface

Windows-based input interface in the "CLV-Setup" PC software for operating and configuring the CLV.

Code angle (CA value)

Current deflection range of the scan line (oscillating mirror) perpendicular to the scan direction when a bar code is detected. Is determined by the CLV for each scan and used, for example, to define a capture range so that bar codes with identical data contents in a given range can be separated.

Code geometry

Length and height dimensions of the bar code.

Code position (CP value)

Position of the first dark bar in a detected bar code along the ⇨ scan line. Determined by the CLV 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 CP value for the application.

Command strings, commands

Alternative user interface to the CLV instead of the "CLV-Setup" program. Basic, yet clearly structured command language for modifying the CLV parameter record online. Accesses the CLV command interpreter directly. Special programming activities are required to use the command strings from the host.

Configuration file

File in the CLV-Setup program that archives an entire ⇨ parameter record of the CLV. Can also be printed out in tabular form.

Data forwarding

Option of forwarding data sent by the host transparently to a terminal via the CLV using an identifier. The direction can also be reversed. 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). Application: Forwarding reading results or reading trigger commands in pass-through mode, e. g. in a master/slave network.

Data output string

Structured data message of the ⇨ reading result output by the CLV 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 ⇨ terminal 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.

Deflection angle

Angle about each side of the center position CW = 50 (equal to 0) that the ⇨ scan line sweeps when it is deflected by the oscillating mirror. Also referred to as the oscillating angle.

Deflection range

Deflection of the scan line caused by the ⇨ oscillating mirror, perpendicular to the scan direction about the center position CW = 50 at each side (corresponds to a deflection angle of 105). Also referred to as oscillating amplitude. The maximum deflection range is set in OSCILLATING WITH FIXED AMPLITUDE mode. In OSCILLATING WITH VARIABLE AMPLITUDE mode, the deflection range is set for each distance configuration using the OSCILLATING MIRROR tab card in the CLV-Setup program.

Distance configuration

Data record in the CLV for defining a ⇨ focal position for the laser beam for ⇨ focal position changeover. The focal position as well as the maximum and minimum ⇨ code position must be entered in the READING CONFIGURATION tab card of the CLV-Setup user interface for this purpose. In the case of the line scanner with oscillating mirror, the ⇨ oscillating amplitude (deflection range) is also required. The depths of field for the individual focal positions are shown as a function of the resolution values in the specification diagrams.

Distance detection

System for detecting the distance of objects with a bar code in front of the CLV in 2 stages. When the bar code is read from above, for example, the distance is detected by installing a photoelectric reflex switch beside the conveyor belt. The two ranges for the ⇨ focal position changeover are defined by using the distance detection as well as the "Sensor 1" switching input and the assignment table for the ⇨ distance configurations.

Download

Method of transferring the ⇨ parameter record that was modified with the ⇨ CLV-Setup user interface from the PC to the CLV. CLV-Setup either always transfers a complete copy to the RAM of the CLV (DOWNLOAD TO CLV) or only the parameter currently being edited by means of the pop-up menu called up with the right-hand mouse button (DOWNLOAD PARAMETER). You can overwrite the existing parameter record in the EEPROM of the CLV by choosing the "Permanent" storage option.

Error messages

Messages in ⇨ plain text that are used by the CLV to identify a diagnosed error in Reading mode. The messages are output on the terminal interface only. Exception: Output of ST = 3 (device error), which is also output via the host interface. The error messages can be displayed in extended mode of the TERMINAL EMULATOR in the CLV-Setup user interface.

Error status

Identifier output with the reading result by the CLV for errors that were diagnosed while the bar code was being read. The entry for the host interface is made in the separator of the ⇨ data output string and must be enabled by means of the parameters (for the CLV 45x disabled by default setting).

Focal position

Distance of the focal point of the emitted laser beam in front of the reading window. Can be adjusted via the optic. Creates a distance-specific depth of field (DOF) in which the bar code can be detected.

Focal position changeover

Property of the CLV for shifting the focal point of the laser beam across a wide range in the reading plane. The focal position changeover is event-controlled (e. g. by the ⇨ distance detection).

Functional interfaces

Switching inputs and outputs on the CLV.

Good read

The CLV successfully detected a bar code or the required number of bar codes specified by the parameterized evaluation conditions during the ⇨ reading pulse.

Header

Data block in the read result of the ⇨ host interface. Used as a header in the ⇨ data output string for the subsequent data contents of the bar codes. Contains reading diagnosis data and/or constants (e. g. characters), depending on the configuration (for the CLV 45x empty by default setting).

Host interface

Main data interface of the CLV with configurable data output format. Used to output the ⇨ read result in message form to the host/PLC. Integrates the CLV in the SICK network or builds a master/slave arrangement. Physically switchable to RS 232 or RS 422/485. It supports various transfer protocols.

Increment management

Used in certain applications in CLV to separate bar codes with identical contents that move during the reading procedure and assign them to the objects.

Line scanner

Scanner that uses a polygon mirror wheel with paraxial mirrors to deflect a focused laser beam extremely rapidly. As a result, it creates a light spot in the reading plane that moves along a straight line, which appears to the naked eye as a stationary scan line due to its relative inertia.

Line scanner with oscillating mirror

Line scanner that also deflects the laser beam about a central position, on both sides and perpendicular to the scan direction using an oscillating mirror. By doing so, the CLV can search for bar codes in larger areas and ranges. In addition to basic deflection with the maximum oscillating amplitude, optimum oscillating mirror functions are also possible (variable deflection per distance configuration, ⇨ One-Shot).

Master/slave configuration

Special arrangement for connecting up to max. eight CLVs to one reading station (e. g. left/right read). Via the master the entire network appears as one device to the host.

Multiple reading

Variable number of reading operations that must provide identical internal read results (data contents) of the same bar code before the CLV outputs the result.

No read

The CLV failed to detect a bar code or the required number of bar codes specified by the evaluation parameters during the ⇨ reading-pulse.

No read format

Special, parameterizable data block as a substitute for bar codes, which were expected but not detected, in the data output string of the host interface for ⇨ no reads. Comprises a variable combination of the error string and the ⇨ separator.

Object height detector

See distance detection

One-Shot

Selective, one-off deflection of the oscillating mirror for each ⇨ reading pulse. Usually comprises a slow forward phase (read) and a fast return phase (return to starting position).

Oscillating mirror reversal point

Deflection point of the oscillating mirror at which it changes direction. Can be used to trigger a ⇨ focal position changeover for slower applications (search run).

Parameter record

Data record used to initialized and activate the functions implemented in the CLV. It is transferred from CLV-Setup to the CLV or vice versa with ⇨ downloading and ⇨ uploading.

Percentage evaluation

Special operating mode in which the quality of the reads (not those of the bar codes, however) is assessed statistically. The bar codes must be stationary in the process. The CLV carries out 100 scans and evaluates the reading quality. It then outputs the read results on the ⇨ terminal interface every 2 s together with the reading diagnosis data.

Plain text

Readable form of a CLV message. The CLV outputs special messages in coded form, e. g. the result of the self-test is represented as three digits.

Profile bar code

Special bar codes that are created and printed using the ⇨ CLV-Setup user interface. They contain coded parameter values of the parameter record. The Profile bar codes can be used to configure the CLV with its optical interface (reading window) instead of a PC.

Reading diagnosis data

Data directly derived from the reading procedure by the CLV. These data enable the quality of the read to be assessed. Output is carried out via the ⇨ terminal interface together with the reading result. Only output on the host interface if enabled on the DATA STRING tab card in the CLV-Setup user interface (for the CLV 45x disabled in the default setting).

Reading field height

Length of the ⇨ scan line that is available for detecting the bar code in the reading plane. Due to the V-principle of beam generation, it depends on the reading distance.

Reading interval

Time window in which the CLV 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 read result.

Reading pulse

Pulse applied externally to the CLV to trigger the internal • ⇨ reading interval. Can be supplied by a photoelectric reflex switch or a command from the host via 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.

Read result

Electronic representation of the data contents of the read bar codes together with the ⇨ reading diagnosis data in one ⇨ data output string that is generated after the reading pulse has elapsed. The read result on the terminal interface has a fixed format in contents and output format; the read result of 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 "Result 1" and "Result 2" switching outputs in Reading mode. Signals the status of the reading result without indicating its contents (e. g. "Good Read"). You can assign a different status to each output in the DEVICE FUNCTION tab card in the CLV-Setup user interface. The "Result" LED is coupled in its display behavior to the "Result 2" output.

Scan line

See line scanner.

Sending point

Point at which the read result is output with respect to the start of the ⇨ reading pulse and the internal ⇨ reading interval.

Separator

Data block in the read result of the ⇨ host interface. Used to separate the data contents of the bar codes. Can be attached to the bar codes as a prefix or suffix. Contains reading diagnosis data and/or constants (e. g. characters), depending on the configuration (for the CLV 45x empty by default setting).

SICK network

Special, high performance network of max. 31 CLVs with high data transfer rates on the RS 485 interface. The CLVs are coordinated (polling) and connected to the host via the CLX 200 Network Controller.

SMART decoder

Specially developed ⇨ decoder for reading bar codes with an extremely small code height (⇨ aspect ratio > 1:3) and for poor-quality or contaminated code prints.

Specification diagrams

Diagrams for reading the resolution-specific depth of field (DOF) for specific focus positions.

Standard decoder

Tried-and-tested ⇨ decoder of the CLV product family. Suitable for applications with an adequate code height, limited tilt, and high-quality code prints.

Storage in the CLV

The application-specific ⇨ parameter record can be stored temporarily or permanently in the CLV. If it is stored temporarily in the RAM, it is lost as soon as the supply voltage is switched off. Parameter records that are stored permanently are transferred to the EEPROM in the CLV 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

Function of the focal position changeover. Sequence of the focal positions to be set consecutively with the corresponding depths of field areas. To this purpose the number of active ⇨ distance configurations are entered in the assignment table at the desired point.

System messages

Messages in ⇨ plain text with which the CLV signals its operating and device status. The messages are output on the terminal interface only. The error messages can be displayed in extended mode of the TERMINAL EMULATOR in the CLV-Setup user interface.

Teach-in

Method of programming the information required to adjust the CLV to the reading situation in Parameter mode. Example: Teaching-in match code 1 or teaching-in the application-specific bar code in ⇨ Auto Setup.

Terminal interface

Auxiliary data interface (RS 232) on the CLV with fixed data output format. Used to connect the CLV-Setup program to the CLV so that it can operate and configure the device. Also used to output ⇨ system and error messages. Can have various functions assigned.

Terminator

Data block in the read result on the ⇨ host interface. Used to terminate the preceding data contents of the bar codes. Contains reading diagnosis data and/or constants (e. g. characters), depending on the configuration (for the CLV 45x empty by default setting).

Upload

Method of transferring the ⇨ parameter record from the CLV to the PC using the ⇨ CLV-Setup user interface. CLV-Setup either always loads a complete copy of the current parameter record from the RAM of the CLV (UPLOAD TO CLV) or only the parameter currently being edited by means of the pop-up menu called up with the right-hand mouse button (UPLOAD PARAMETER). Displays the current parameter values on the tabs. Prerequisite for modifying the current parameter record.

10.15 Copy of the EC Declaration of Conformity

SICK

EC Declaration of Conformity

In Compliance with the EC Directive on Electromagnetic Compatibility 89/336/EEG

We hereby declare that the devices (see page 2)

of the product family CLV45.

comply with the basic requirements of the EC Directive specified under Point 1. If an item of equip-ment listed overleaf is modified without our approval then this declaration loses its validity for this equipment.

We employ a quality system certified by the DQS (German Quality Assurance Society), No. 19 462-01, as per ISO 9001 and have therefore observed the regulations in accordance with module H as well as the following EC directives and EN standards during development and production:

1. ***EC directives***	EC EMC directive 89/336/EEC as per 92/31/EEC, 93/68/EEC, 93/465/EEC		
2. ***Harmonized standards used***	EN 50081-2	Emitted interference, industry	Ed. 93-08
	EN 50082-1	Immunity, residential, commercial and light industry	Ed. 97-08
	EN 61000-6-2	Immunity, industry	Ed. 99-04

Conformance of a type sample belonging to the above-mentioned product family with the regulations from the listed EC directives has been certified by:

Test authority } The tests were carried out and documented on our own responsibility.

Reute, 2000-06-14

i.V. Pierenkemper
(Manager Development Division Auto Ident)

i.V. Walter
(Manager Production Division Auto Ident)

The declaration certifies conformance with the listed directives, but does not guarantee product characteristics. The safety instructions contained in the product documentation must be observed.

Mat.-Nr.: 9 057 471
Page 3, engl.
Update no.: see page 2

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Fig. 10-33: Reproduction of the declaration of conformity (Page 1, reduced in size)

SICK

Type	Id.-No.
CLV450-0010	1018566
CLV450-0010S01	1022699
CLV450-0910S01	1022197
CLV450-6010	1019218
CLV450-6010S01	1022700
CLV451-0010	1019522
CLV451-0010S01	1022701
CLV451-0910S01	1022680
CLV451-0110	1019523
CLV451-0110S01	1022894
CLV451-6010	1019524
CLV451-6010S01	1022702
CLV451-6110	1019525
CLV451-6110S01	1022895

- end of list -

Mat. No.: 9 057 471
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Vorstand: Volker Reiche (Vorsitzender) · Dr. Robert Bauer · Anne-Kathrin Deutrich · Dieter Fischer · Walter Schmitz (Stellvertr.)
Sitz: Waldkirch i. Br. · Handelsregister: Emmendingen HRB 355 W

Fig. 10-34: Reproduction of the declaration of conformity (Page 2, reduced in size)

10.16 Index

10.17 Bar code sample

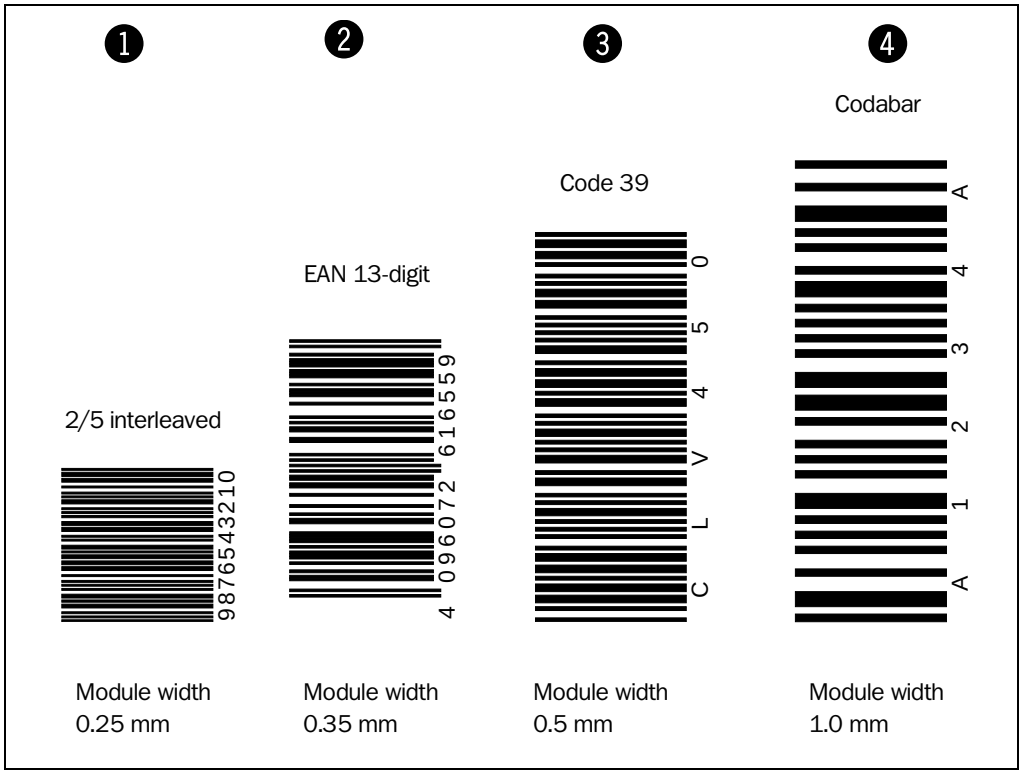

Fig. 10-35: Scannable bar codes of various module widths (printing ratio 2:1)

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