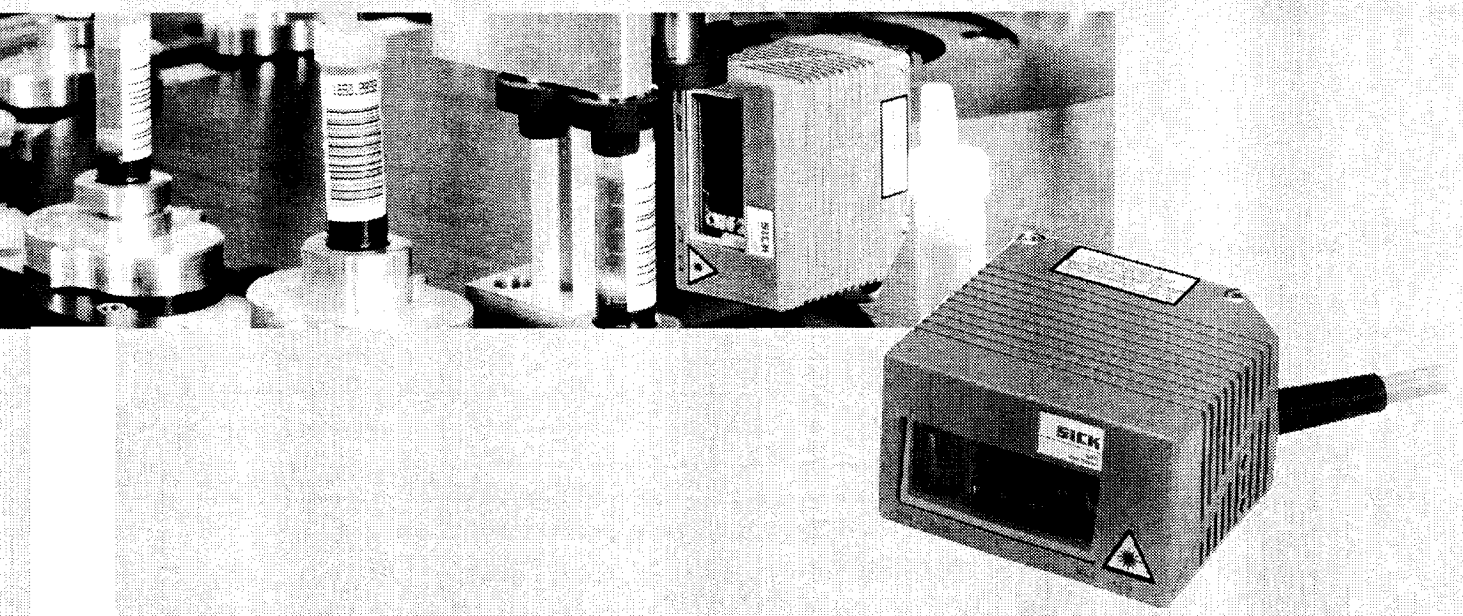
OPERATING INSTRUCTIONS



CLV 410 Bar Code Scanner

Standard line

SICK
optic
electronic

General

These Operating Instructions describe the procedure for installing and setting up the CLV 410 using the default settings defined at the factory and the steps required to replace the device (transferring the application-specific parameter set). The CLV 410 is simply referred to as the CLV in the sections below.

Software version

Software	Function	Version
CLV Setup	User interface (Windows-based)	from V 1.1.0
CLV Setup Help	Online help (HTML)	from V 1.0.1

Contents

1. Intended use

The CLV 410 with fixed focus is used to detect and decode bar codes in a stationary reading station automatically, e.g. on objects on a conveyor belt. For this purpose, it must be mounted securely on the station and supplied with an operating voltage of 4.5...30 V DC to IEC 742. The CLV outputs the read result via its host inteface to a higher-level computer for further processing.

2. Scope of delivery

The CLV 410 is supplied with the following:

- two polling reflectors for automatic reading pulse generation
- a sticker (yellow) with power connection diagram
- an additional set of laser warning labels (Class 2) in German and French

One or more of the following, depending on the number of devices ordered:

- CLV 410 Operating Instructions, in German and English
- three DOS-formatted disks (3.5 inch) with CLV Setup program for WIndows™, the online CLV Setup Help (HTML) software and a browser
- a fold-out card with 10 printed profile bar codes

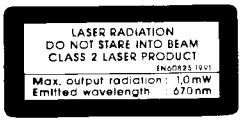
3. System requirements

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

- a SICK AM**V** 40-011 Connection Module (no. 1 017 132) or AM**S** 40-013 (no. 1 017 135)
  Alternatively, an external power supply unit with an output voltage of 4.5 ... 30 V DC to IEC 742 (functional extra-low voltage) and min. 3 W power output
- a PC with Windows-based GUI (Windows 3.1™, Windows 95™ or Windows NT™) and serial port (COM x)
- an HTML browser (e.g. Netscape™) to use the online help
- an RS 232 data connection cable (e.g. no. 2 020 319).
  Alternatively, the programming adapter for the LCV 410 (order no. available on request) to connect the PC between the CLV 410 and AMV/AMS 40 as well as an RS 232 data connection cable (e.g. no. 2 014 054) from the programming adapter to the PC
- a 24 V DC ±20% operating voltage for the AM**V** 40 or 230 V AC (115V) ±10% for the AM**S** 40
- a suitable sensor, e.g. a photoelectric switch, if the reading pulse is to be supplied externally via the switching input on the CLV

4. Laser protection

ATTENTION!



Laser radiation!

The radiation emitted by the laser diode (red or IR light) on the CLV 410 is harmful to the human eye. For this reason, do not look directly into the laser beam.
The laser beam of the devices equipped with IR light cannot be easily perceived by the human eye.
Opening the housing while the device is in operation does not prevent the laser diode from being activated by the reading pulse.
The maximum output power of the laser beam at the reading window is 1.0 W.
The CLV, therefore, is assigned to protection class 2.

Laser radiation, do not stare into the beam, class 2 laser product.
Max. output radiation: 1.0 mW, emitted wavelength: 670 nm

See *Section 15* for further safety instructions!

5. Design

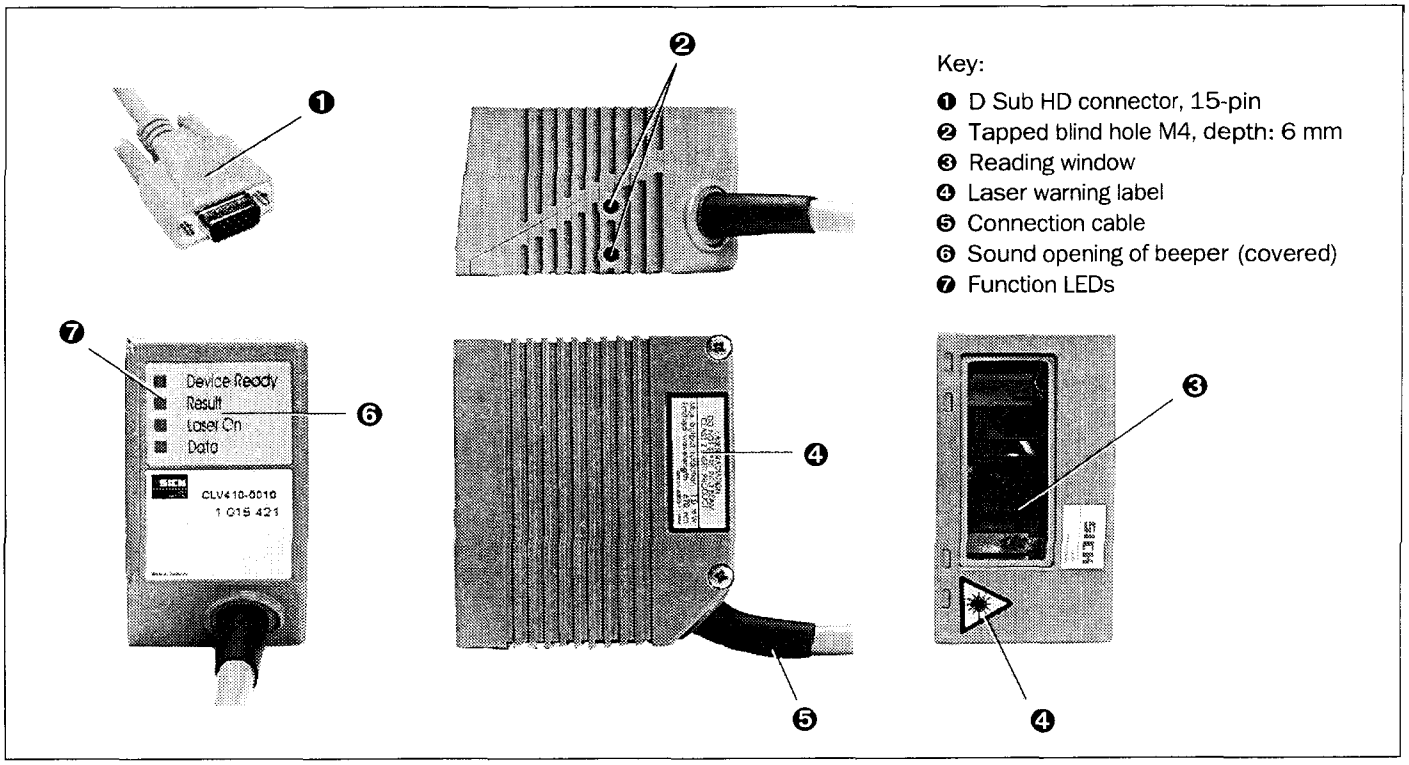


Fig. 1. CLV 410 design

6. Beeper

The beeper ⑥ either provides an acoustic confirmation that a function was executed successfully or indicates a malfunction. The sound opening is located below the LED label on the rear, narrow side of the device (*Fig. 1*).

Operating mode/function	Beeper function	Sequence
Reading mode*	1. The beeper confirms the start of reading mode when the device is switched on after the wait time for teach-in mode has elapsed	2 tones
	2. The beeper confirms a good read (default setting) and output of the read result	1 tone
Percentage Evaluation	The beeper confirms output of the reading result after every 100 reads	1 tone
AutoSetup	1. The beeper confirms successful read of the presented profile bar code for the start or end of AutoSetup	1 tone
	2. The beeper confirms successful read of the application-specific bar code	1 tone
	3. The beeper signals unsuccessful read of the application-specific bar code after approx. 35 seconds	3 tones
Profile programming*)	1. The beeper confirms successful read of the presented profile bar code	1 tone
	2. The beeper confirms the start of reading mode 10 s after the last profile bar code has been read	2 tones
Self-test	The beeper signals successful completion of the self-test after power-up	1 tone

*) After a safety time of 10 min., the beeper indicates that the laser diode has been switched off and the reading pulse has been deactivated automatically by generating three consecutive tones

Table 1

TIP: The beeper can be assigned a different result indicator function and the beeper volume changed (default: *low*) by means of the EDIT RESULT OUTPUTS field on the DEVICE CONFIGURATION card of the operating interface.

In these operating instructions, it is assumed that the beeper is operated with the default settings.

7. Function of the LEDs

The LED function indicators ⑦ are located on the rear, narrow side of the device (*Fig. 1*).

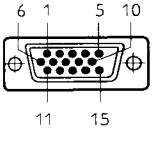
LED	Color	Function
Device Ready	green	Indicates that the the CLV is ready (Reading mode). Lights up when the device is switched on, after the self-test has been successfully completed and when the wait time for teach-in mode has expired. The LED extinguishes when the device is switched to a different operating mode.
Result	green	Function depends on the operating mode of the scanner: • In Reading Mode or Teach-in Mode, the LED indicates a successful read (good read). If the match code comparison is activated, it lights up if the bar code read matches the specified match code(s). The LED lights up constantly until the start of the next reading pulse • In Percentage Evaluation with 100 scans per reading interval, the LED indicates the trend in the read quality as follows: LED off — good read rate < 30% LED blinks (frequency 2 Hz) — good read rate 30%...70% LED blinks (frequency 5 Hz) — good read rate 70%...90% LED lights up constantly — good read rate > 90% • The LED lights up briefly when set to AutoSetup before it starts to scan the presented bar code
Laser On	green	Lights up when the laser diode is activated for reading the bar code. The laser diode is activated and deactivated by the reading pulse. The laser diode is activated constantly in Percentage Evaluation and Free-running modes. In Reflector Polling pulse mode, it is activated in accordance with the scanning frequency at every 20th scan (LED flickers). The scan line(s) are dimmed (with red-light scanner only)
Data	yellow	Flickers when the CLV is transferring data to the host on the serial data interface

Device Ready
Result
Laser On
Data

Table 2

8. Electrical installation

8. 1 Pin assignment of connector ①



Pin	Signal	Function	Wire colors of cable no. 6 010 137[1)]
1	DC +4.5...+30 V	Supply voltage	red
2	Sensor 2	Switching input teach-in (match code 1)	purple
3	Result 3	Switching output (to PLC)	yellow
4	Term RS 422	Termination for data interface 1	red/black
5	GND	Ground	black
6	RD+ (RS 422/485)	Data interface 1 (receiver)	light blue
7	RD- (RS 422/485)	Data interface 1 (receiver)	blue
8	TD+ (RS 422/485)	Data interface 1 (transmitter)	gray/turquoise
9	TD- (RS 422/485)	Data interface 1 (transmitter)	green
10	RxD (RS 232)	Data interface 2 (receiver)	gray
11	TxD (RS 232)	Data interface 2 (transmitter)	pink
12	Result 1	Switching output (to PLC)	brown
13	Result 2	Switching output (to PLC)	orange
14	Sensor 1	Switching input for ext. reading pulse	white
15	SensorGND	Common ground (all inputs)	black/white
		Shield	white/green

1) Cable with 15-pin D Sub HD socket and open cable end

Table 3

8. 2 Supply voltage

The CLV requires a supply voltage of 4.5...30 V DC to IEC 742 (functional extra-low voltage).

8. 3 Connecting the CLV to the AMV/AMS 40 (Connection Module)

Before it can be used in the reading station, the CLV must be connected to the AMV/AMS 40 Connection Module and the host/PLC/sensor as shown in *Fig. 2.*

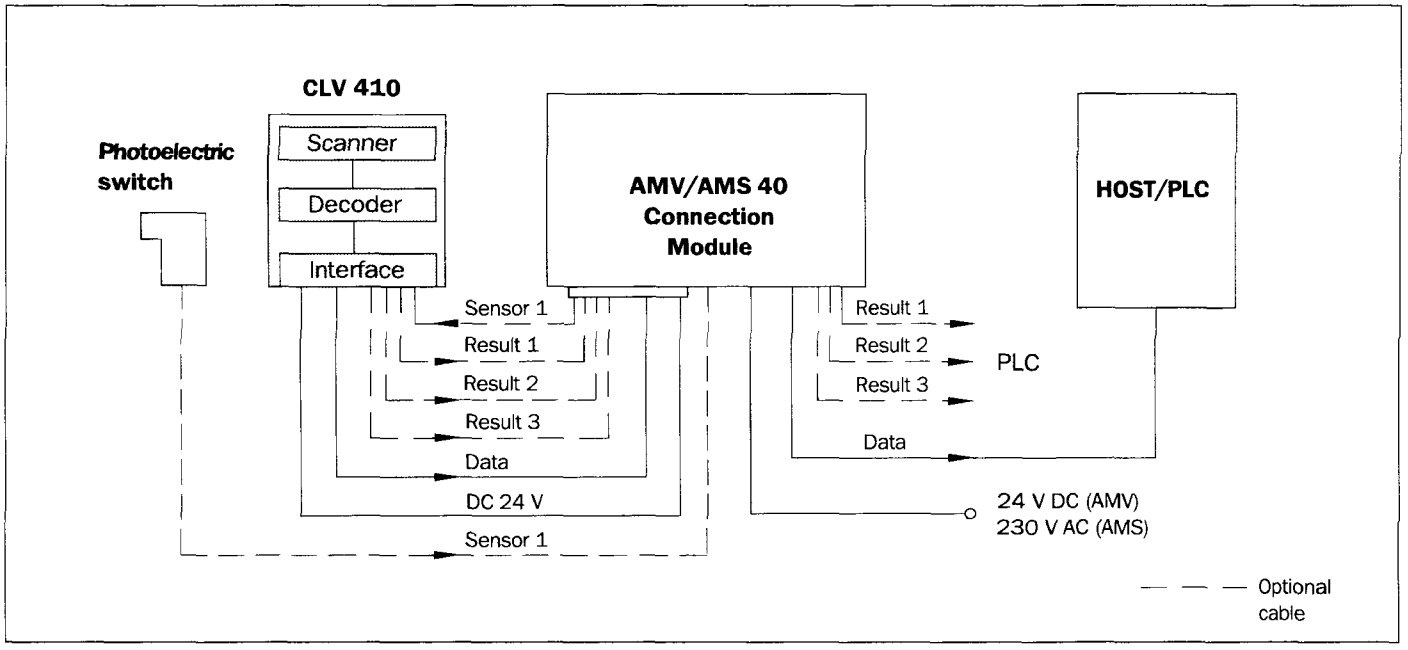


Fig. 2. Block diagram: connecting the CLV in the reading station via the AMV/AMS 40 Connection Module

TIP: A description of the basic wiring and configuration of the Connection Module is provided in the *AMV/AMS 40 Operating Instructions* (no. 8 008 292) supplied with the module.

- ▶ Mount the AMV/AMS 40 as close as possible to the CLV
- ▶ Connect the CLV to the 15-pin D Sub HD socket of the AMV/AMS 40. The connection cable can be extended with extension cable no. 1 011 931 (2 m)
- ▶ Do not exceed the max. cable lengths (host interface) between the CLV and the host/PLC (see *8.5.1 Connecting the host interface*)
- ▶ Connect a suitable, external reading pulse sensor via the AMV/AMS 40 if reflector polling (default setting) is not to be used for automatic reading pulse generation
- ▶ If an external power supply unit is used instead of the AMV/AMS 40, it must be able to provide a continuous output of at least 3 W and must comply with IEC 742 (functional extra-low voltage). The core cross-section for the CLV power supply (pins 1 and 5) must be at least 0.09 mm^2.
  Use cable no. 6 010 137 (open wire ends) to connect the CLV. See *Table 3* for wire color assignment.

8. 4 Connecting the PC to the CLV

A PC with Windows™ must be connected to the RS 232 port on the CLV to operate and parametrize the device. There are two ways of connecting the PC:

1. Connect the PC COM x port to the internal terminals on the AMV/AMS 40

- ▶ *Switch off the power supply to the Connection Module and the PC and connect* the PC and Connection Module as described in the AMV/AMS 40 Operating Instructions
- ▶ **Disconnect the CLV from the host if they are already connected (RS 232 interface)**
- ▶ Switch on the PC and AMV/AMS
- ▶ Copy the operating and parametrization software CLV Setup and the online help CLV Setup Help to the hard disk of the PC as described in the readme file and install the software accordingly
- ▶ Set the *communication parameters in CLV Setup for port COM x* (SERIAL PORT under OPTIONS) as shown in *Table 4* (Default setting on CLV)

2. Connecting the PC port COM x via the optional programming adapter

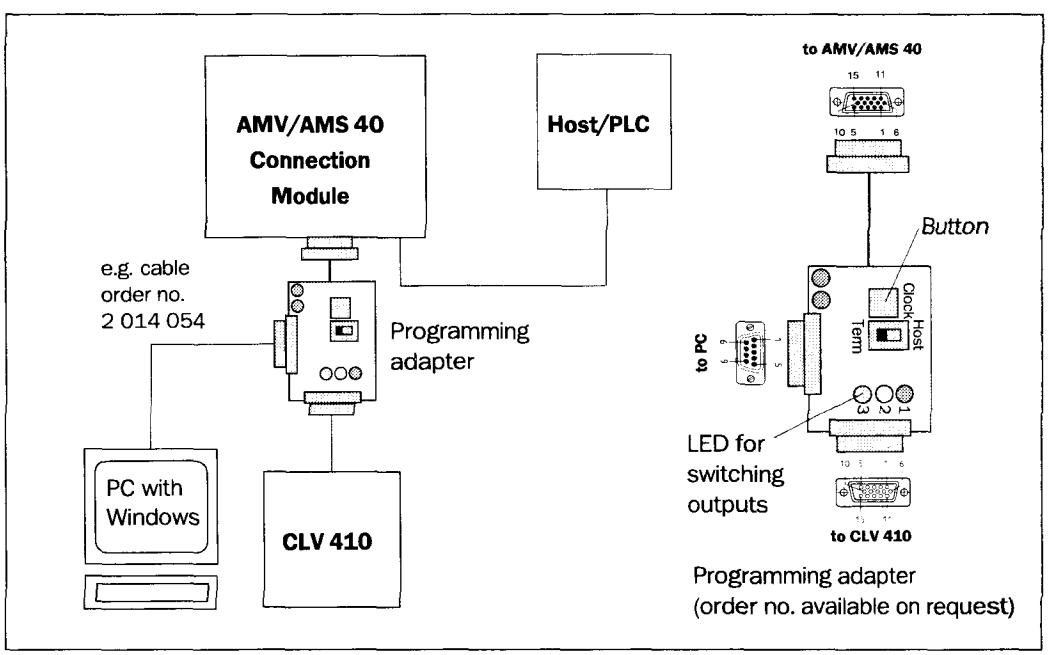


Fig. 3. Connecting the PC to the optional programming adapter

- ▶ Switch off the power supply to the Connection Module and PC
- ▶ Disconnect the CLV connector from the Connection Module (*Fig. 3*).
- ▶ Connect the 15-pin cable connector of the programming adapter to the socket on the AMV/AMS 40. Connect the free 15-pin socket of the programming adapter to the CLV connector. The adapter is supplied with power from the Connection Module
- ▶ Connect the PC port COM x to the 9-pin connector of the programming adapter via an RS 232 cable (e.g. no. 2 014 054)
- ▶ Set the slide switch on the programming adapter to TERM (the CLV is then disconnected from host and communicates with the PC only). The PC is disconnected from the CLV when the switch is set to HOST
- ▶ Switch on the PC and AMV/AMS

Parameter	Value
COM port	freely selectable
Baud rate	9600 bit/s
Data bits	8
Parity	none
Stop bit	1

Table 4

- ▶ Copy the operating and parametrization software CLV Setup and the online help CLV Setup Help to the hard disk of the PC as described in the readme file on disk 1 and install the software accordingly
- ▶ Set the communication parameters in CLV Setup for port COM x (SERIAL PORT under OPTIONS) as shown in *Table 4* (default setting of the CLV)

TIP: With the CLV pulse mode "Sensor Input", the reading pulse can be triggered with the Clock button on the programming adapter. For this purpose, choose the pulse mode via the EDIT READING PULSE field on the DEVICE CONFIGURATION card of the user interface and download it to the CLV

8. 5 Connecting the interfaces

All of the interfaces are routed via the 15-pin D Sub HD connector ① (*Table 3*).

8. 5. 1 Connecting the host interface

The CLV is equipped with two host interfaces (RS 232 and RS 422/485). One of these must be selected for data communication with the host/PC. If the RS 232 interface is not connected to the host, it can be used exclusively to monitor data traffic on the parallel RS 422/482 interface.

IMPORTANT

The internal modules of the CLV may be damaged irreparably if the data interface is connected incorrecIty.

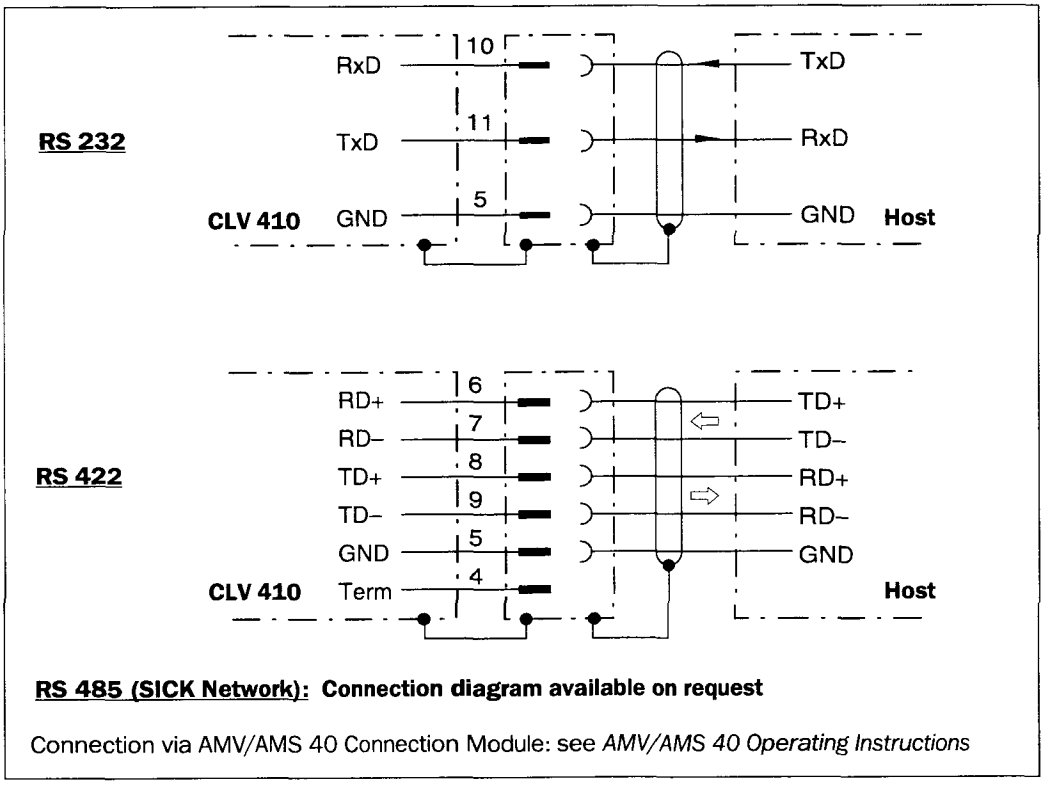
- ▶ Connect the host interface of the CLV to the host in accordance with the EMC requirements using shielded cables(*Fig. 4*)
- ▶ To prevent interference, do not lay the data cables over a long distance parallel to the power supply and motor cables, e.g. in cable ducts
- ▶ Apply the shield on one side (SICK recommendation)

Recommended max. cable lengths between the CLV and host:

Interface type	Transmission rate	Distance from host
RS 232	up to 19 200 bits/s 38 400...57600 bits/s	max. 10 m max. 3 m
RS 422/485[1)]	max. 38 400 bits/s max. 57 600 bits/s	max. 1200 m max. 500 m

1) with appropriate line termination

Table 5



RS 485 (SICK Network): Connection diagram available on request

Connection via AMV/AMS 40 Connection Module: see *AMV/AMS 40 Operating Instructions*

Fig. 4. Connecting the host interface

The default communication parameters of the CLV host interface are as follows:

Parameter	Value
Data transmission rate	*9600 bit/s*
Data bits	8
Parity	none
Stop bit	1
Protocol	Sick (start character: STX, stop character: ETX, no repeat request: none, timeout: 50 ms)

Table 6

TIP: The parameters can be changed in the DATA FORMAT and INTERFACE PROTOCOL fields on the HOST INTERFACE card of the user interface.

IMPORTANT

By reading in profile bar code nos. 11 and 12 (*Section 10.2 Default setting*), you can define the above default settings temporarily with a different parameter set to allow the PC to communicate with the CLV.

8. 5. 2 Connecting the functional interfaces

Sensor 1 switching input

In order to trigger a reading process, the CLV requires a suitable clock pulse in Reading mode that signals the presence of a conveyor object in the reading field. The clock pulse generates the reading interval (time window for evaluation) internally in the CLV. In the default setting, the reading pulse is supplied by means of internal, continuous reflector polling (see *Section 9.2*).

If an external sensor (e.g. photoelectric switch, switch) is to notify the CLV of the presence of a conveyor object, the following steps must be performed:

▶ Connect the sensor to the CLV as shown in *Fig. 5*

▶ Set the trigger source to SENSOR INPUT via the EDIT READING PULSE field on the DEVICE CONFIGURATION card of the user interface and download the parameter settings to the CLV

An external clock pulse is not required for Percentage Evaluation operating mode.

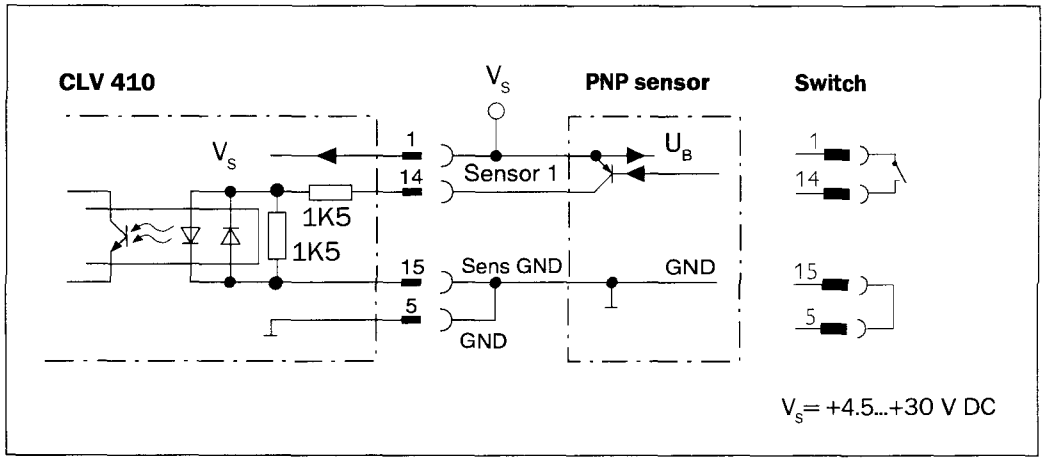


Fig. 5. Connecting the Sensor 1 input to an external reading pulse sensor

Sensor 1 switching input				
Switching characteristics	Start internal reading interval when input live (active high; default setting)			
Properties	opto-decoupled, non-interchangeable			
Electrical values	Low:	$-1V \le V_{in} \le +1$ V -0.3 mA $\le I_{in} \le +0.3$ mA	High:	-28 V $\le V_{in} \le -3$ V -18 mA $\le I_{in} \le -1.4$ mA $+3$ V $\le V_{in} \le +28$ V $+1.4$ mA $\le I_{in} \le +18$ mA

Table 7

Sensor 2 switching input

This input is used exclusively to teach in match code 1. The teach-in procedure is an alternative to entering the match code on the keyboard via the CODE COMPARISON field on the DEVICE CONFIGURATION card of the user interface.
In order to teach in the match code, the input is connected briefly to the power supply via a switch (*Fig. 6*). This can also take place in the Connection Module.

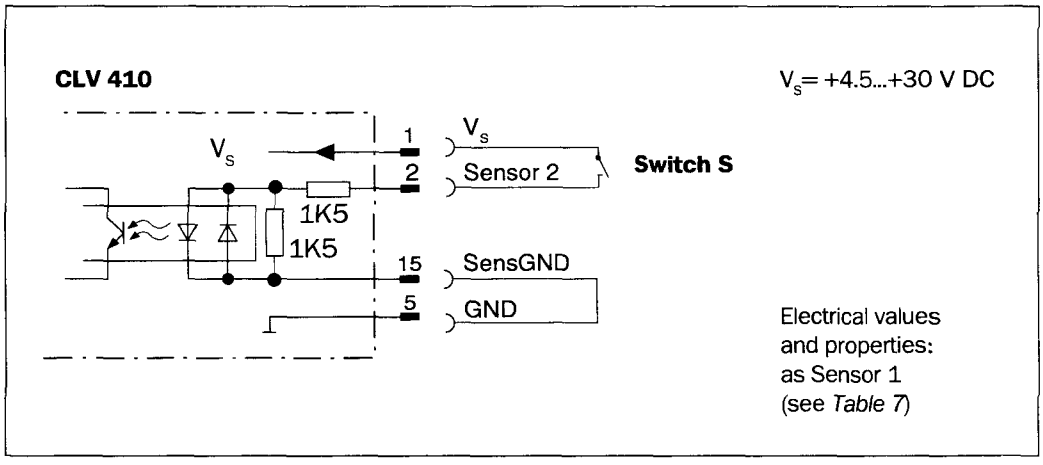


Fig. 6. Connection of Sensor 2 input for teaching in match code 1

▶ Procedure for teaching in match code 1

Prerequisite: CLV is in Reading mode and the current parameter set (if application-specific) is stored permanently.

Step	Action	Response from CLV[1)]
1	Switch off CLV	-
2	Close switch S and switch on CLV again	CLV switches to Reading mode and activates teach-in mode for the match code.
3	Open switch S	CLV in teach-in mode and searches match code.
4	Position match code at appropriate distance (see *16. Reading field diagrams*)	-
5	Trigger set reading pulse	CLV reads the match code. The Result LED lights up to confirm successful read (good read; default setting). Beeper emits a short acoustic signal.
6	Close switch S again	CLV stores the match code and its code type in the valid parameter set and permanently in the EEprom. From this point on, it compares each match code read with the match code taught in.

1) We recommend that you connect the PC with the CLV Setup interface to check the read result

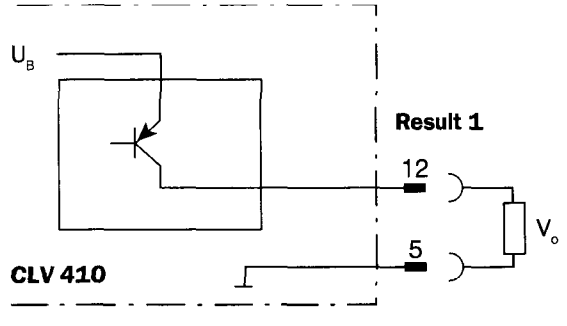
Table 8

Notes:

1. In order to replace the match code taught in in this way with a different match code, you can repeat steps 3 to 6 without having to switch off the CLV.
2. If match code 1 is set using the teach-in method, it must not be modified with the user interface (or command strings) until the CLV is switched off again. The methods used to set the match code cannot be mixed. This does not affect match code 2.

Result 1 to Result 3 switching outputs

The three outputs (*Fig. 7*) can each be assigned different result functions. When the associated result occurs, the corresponding output becomes live for the selected pulse duration at the end of the reading interval. The pulse duration can be set separately for each output.



V_S= depending on operating voltage applied (+4.5...+30 V DC)

Pulse duration: 10 ms ... 9.9 s or static (to end of next reading pulse)

Configuration of Result 2 (pin 13) and Result 3 (pin 3) outputs: as Result 1 output

Fig. 7. Connection example: Result 1 output

Result 1 to Result 3 switching outputs	
Switching characteristics	*PNP-switching to supply voltage* V_S
Properties	short-circuit + temperature-protected, not electrically isolated from V_S
Function assignment (default setting)	Result 1 : Device Ready, polarity: not inverted Result 2: Good Read, polarity: not inverted Result 3: No Read, polarity: not inverted *Pulse duration: 100 ms*
Electrical values	$0\ V \leq V_{Out} \leq V_S$ Guaranteed: $V_{Out} \leq V_S - 1.5\ V$ at $I_{Out} \leq 600\ mA$ $I_{Out} \leq 600\ mA$

Table 9

TIP: The function assignment, pulse duration and polarity of the signals can be modified via the EDIT RESULT OUTPUTS field on the DEVICE CONFIGURATION card of the user interface. The Result LED is not affected by this and lights up in Reading mode for a Good Read until the end of the next reading pulse.

9. Assembly

9. 1 Securing the CLV

The two fastening threads (②, *Fig. 1*) on the bottom, narrow side of the housing are used to secure the CLV. The thread dimensions are shown in Section *18. Dimensioned drawings.*

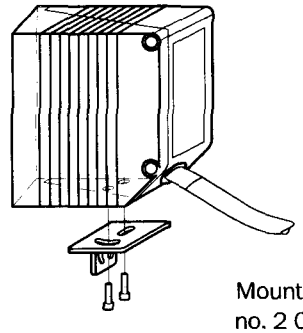
IMPORTANT

Risk of damage to the housing

The max. depth of engagement of the two M4 tapped blind holes is 6 mm from the housing surface. Do not exceed this depth.

Mounting accessories

The CLV can be easily secured to the base to suit the relevant application using one of the two optional mounting brackets (*Fig. 8*). This facilitates precise adjustment in two planes. The dimensions of these brackets are shown in Section *18. Dimensioned drawings*. The elongated holes in the brackets allow the CLV to be adjusted with a freedom of rotation of approx. ± 15°.



Mounting bracket (small)
no. 2 020 077

Fig. 8. Mounting example: securing the CLV using the mounting bracket (accessory)

Aligning the CLV with the bar code

The alignment between the CLV and line or raster scanner depends on the application. The basic alignment between the two scanning methods and the conveyor object is shown in *Fig. 9*.

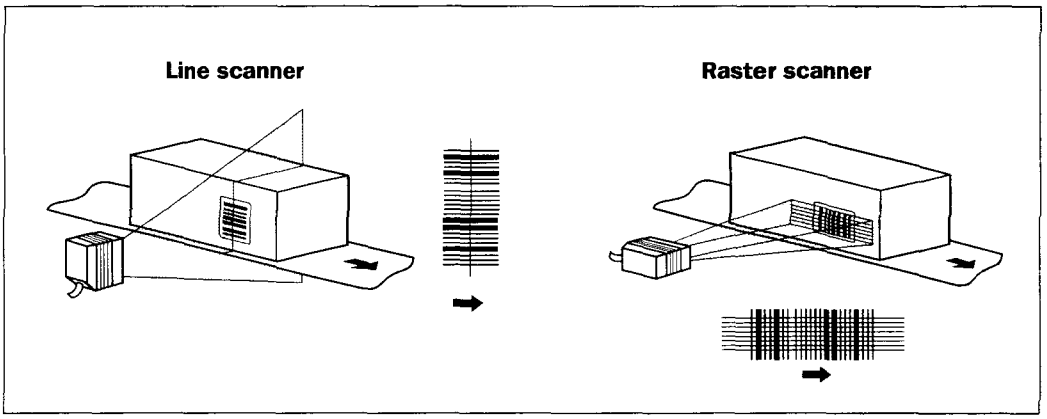


Fig. 9. Scanning method alignment relative to the bar code and conveyor direction

Reading angle and distance

When mounting the device, ensure that all of the possible reading angles at which the bar code can be positioned relative to the scan line are taken into account. *Fig. 10* shows this using a line scanner as an example. The reading window and code should be almost parallel, whereby total surface reflection (see below) should be avoided.

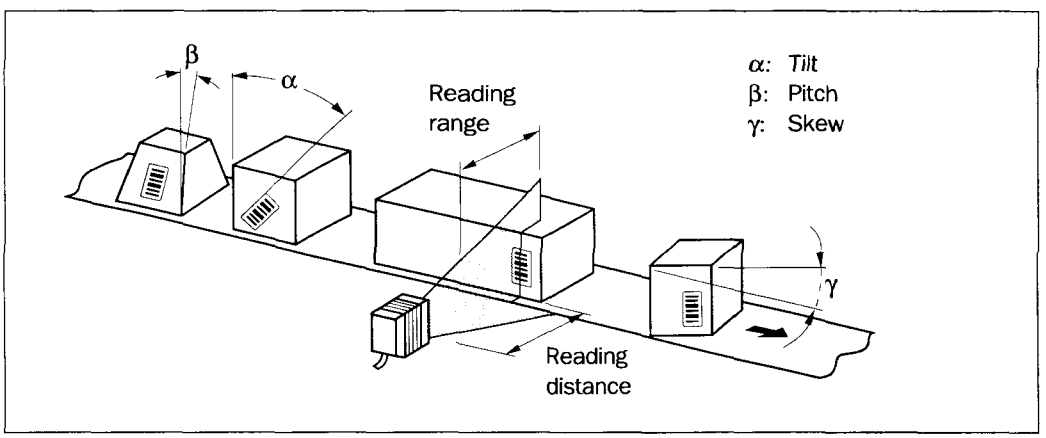


Fig. 10. Mounting example of CLV with line scanner: reading angles taken into account

The following angle limits should not be exceeded (CLV):

Angle	Tilt α	Pitch β	Skew γ
Limit value	*15° (depening on code print)*	*45°*	*45°*

Table 10

When selecting the mounting location for the device, the limit values of the reading range for the selected bar code resolution and the useful aperture angle (max. 60° with front light emission) must be taken into account. See also Section *16. Reading field diagrams.*

Avoiding surface reflection

If the reading beam strikes the surface of the bar code vertically, reflection interference may be caused when the returned light is received.

- ▶ Mount the CLV with front light emission (a) in such a way that the scan line(s) strike the bar code at an angle less than approx. 15° from the vertical reference (*Fig. 11*).
- ▶ The CLV with lateral light emission (b) must be mounted flush so that the scan line is emitted at an angle less than 105° relative to the housing.

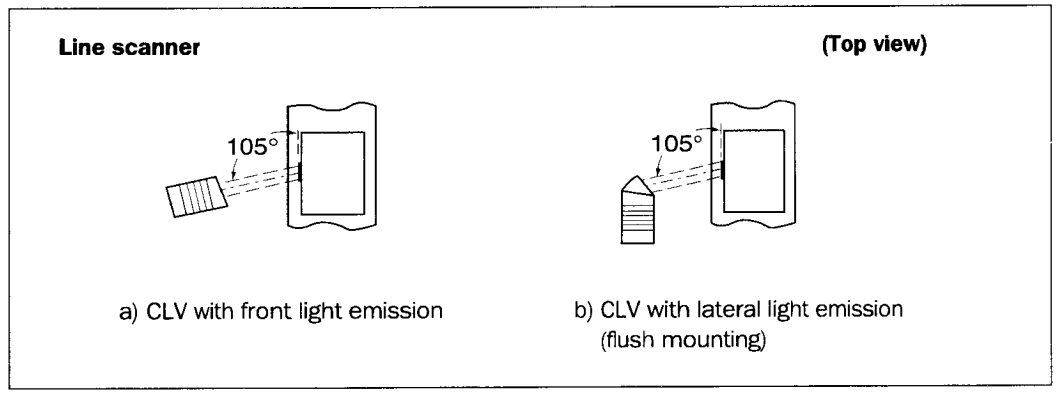


Fig. 11. Preventing surface reflection by rotating the CLV from the perpendicular

Count direction of code position CP

The CLV determines the position of the bar code within the scan line (CP value), *Fig. 12*. This can be used to separate several identical bar codes (identical code type, length and content) and output them accordingly.

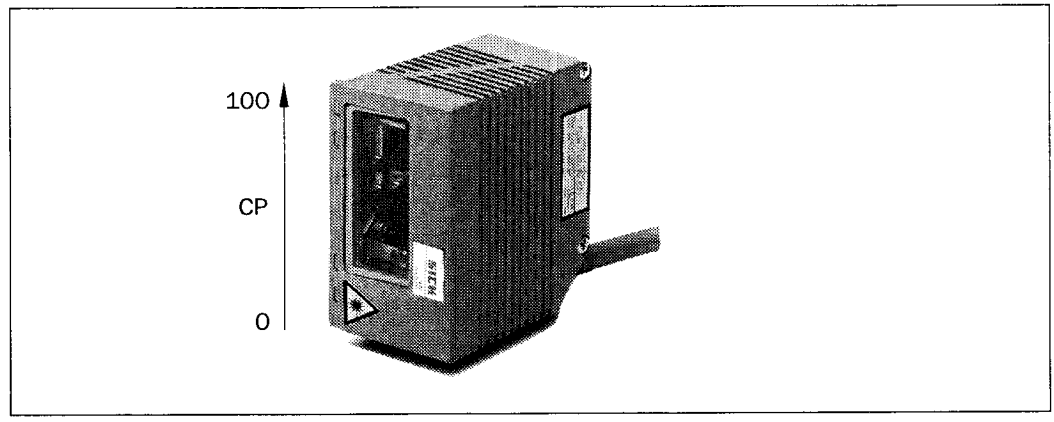


Fig. 12. CLV 410: Count direction of the code position CP

9. 2 Mounting the polling reflector

In order to generate the reading pulse automatically using internal reflector polling (default setting), one of the two polling reflectors supplied (special bar code) must be mounted opposite the CLV behind the conveyor section.

- ▶ Note the maximum ranges of the two reflectors (*Fig. 13*)
- ▶ Mount the polling reflector (self-adhesive) opposite the CLV (in the alignment line) in such a way that the CLV can view the reflector freely in the gaps between the conveyor objects and can scan it reliably (center of scan line).
  The scan line of the CLV should scan the code lines of the polling reflector vertically.
- ▶ Check the polling reflector installation for **100% read quality** using the Percentage Evaluation mode in the TERMINAL option of the user interface (see Section *10.6*).
  The CLV outputs the code content of the polling reflector and signals REPO as the code type

Function of reflector polling

In Reflector Polling pulse mode, the CLV activates the laser diode with every 20th scan and checks whether it detects the reflector:

- if the reflector is still detected, the CLV repeates the procedure after the 20th scan

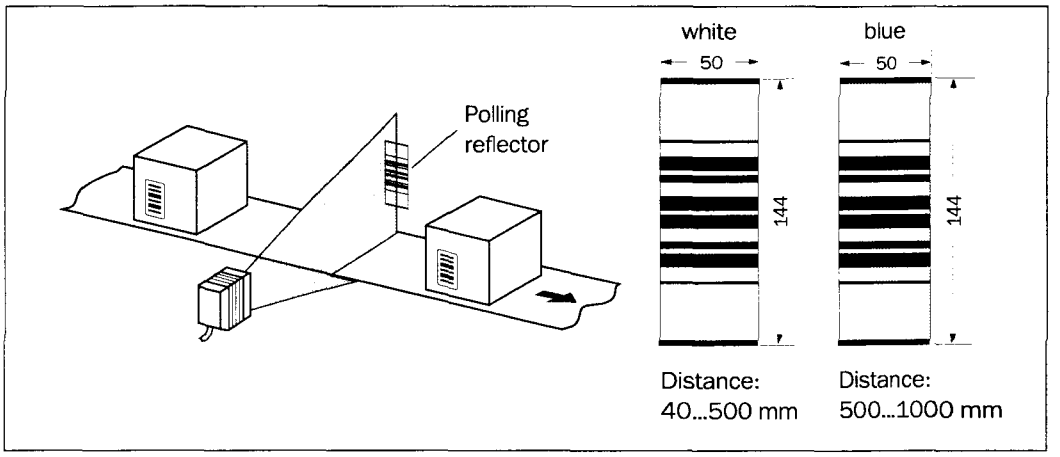


Fig. 13. Mounting the polling reflector

- the CLV starts the reading interval when the reflector is concealed by a conveyor object in the reading field. The interval ends when the CLV detects the reflector again. It then repeats the procedure above.

Notes:

This clock mode (max. delay approx. 100 ms at a scan rate of 200 Hz) is only suitable for applications that are not critical with respect to time.
When the CLV is switched on, it must be able to detect the polling reflector. The first reading interval can only start if this is the case.
In Reading mode, the CLV does not output the content of the polling reflector.

9. 3 Mounting the external reading pulse sensor (alternative)

If an external sensor (e.g. photoelectric switch) is used to generate the reading pulse, it must be mounted on the CLV in a suitable manner. Ensure that objects of different size carrying bar codes trigger the internal reading pulse in such a way that sufficient time is provided to read the code. Examples of the CLV with line scanner are provided in *Fig. 14.*

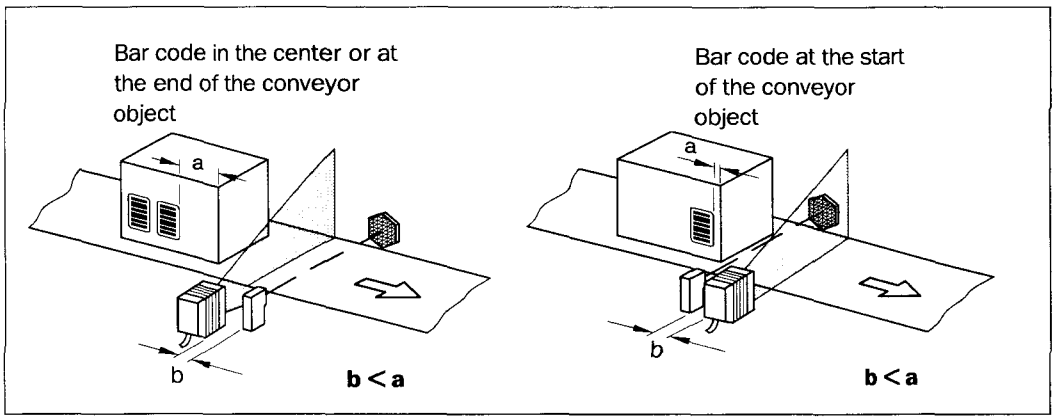


Fig. 14. Example of the position of the external reading pulse generator

▶ Choose the external sensor as the trigger source via the SENSOR INPUT field under EDIT READING PULSE on the DEVICE CONFIGURATION card of the user interface and then download the parameters to the CLV

10. Power on and setup

Bar code sample

Code type: Code 39
Module width: 0.5 mm

10. 1 Step-by-step setup instructions

Quick start

▶ **Setup with the default settings**

1. **Connect the CLV to the 4.5...30 V DC power supply**
   (see also Section *8.1 Pin assignment of the connector*)
2. **Align the CLV with the white polling reflector supplied (special code), distance approx. 300 mm**
   (see also Section *9.2 Mounting the polling reflector*)
3. **Present the bar code sample above at a distance of approx. 200 mm and cover the polling reflector**
   (see also Section *10.6.1 Reading mode*)
4. **Uncover the polling reflector again**
   The CLV confirms that the read was successful with acoustic signal from the beeper and the Result LED lights up
5. **The CLV can now be operated with the default settings!**
   (see Section *10.2 Default settings of the CLV* for the default settings)

Profile programming

▶ **Setup with profile bar codes (change parameter set)**

1. **Present the required printed profile bar code(s) on the card supplied to the CLV.**
   The CLV confirms every good read of the profile bar code with an acoustic signal from the beeper. If a further bar code is not presented to the CLV within 10 s, the CLV switches to Reading mode and outputs two consecutive acoustic signals (see also Section *10.3 Profile programming*)
2. **The CLV can now be operated with the modified settings!**

Teaching in application-specific bar codes

▶ **AutoSetup (modified code configuration)**

1. **Present bar code no. 10 to the CLV.**
   The CLV confirms the start of AutoSetup by means of an acoustic signal from the beeper and the Result LED lights up for an extended period of time.
   (see also Section *10.4 AutoSetup*)
2. **Present the application-specific bar code to the CLV at the maximum reading distance in the application**
   The CLV confirms the good read by means of an acoustic signal from the beeper and the Result LED lights up. It then switches to Reading mode and outputs two consecutive acoustic signals.
3. **The CLV can now be operated with the modified code configuration! The code type presented to the CLV is then evaluated.**

Alternative procedure

▶ **Setup with CLV Setup software (change parameter set)**

1. **Connect the PC to the CLV**
   (see also Section *8.4 Connecting the PC to the CLV)*
2. **Start the CLV Setup program on the PC**
   (see also Section *10.5 Parametrization with the CLV Setup software)*
3. **Upload the configuration from the CLV**
4. **Change the configuration cards as required.**
   The parameters and their functions are explained in the online help.
5. **Download the configuration to the CLV and store the values permanently**
6. **Save the modified parameter set on the PC as a configuration file!**

Alternative:

5. **Print out the profile bar codes and present them to the CLV in the specified sequence**
   (see also Section *10.3 Profile programming)*

▶ **Setup with command strings from the host**

(not described here, further information is available on request)

10. 2 Default settings

A concise overview of the default CLV settings that are effective when the device is switched on for the first time after delivery is shown in *Table 11.*
The tried-and-tested default parameters have been selected so that CLV can be used directly in many applications without requiring modification.

Parameter	Default setting (CLV 410)
Code types (active)	Code 39, Code 128, Code 93, Codabar, EAN, EAN 128, UPC, 2/5 Interleaved
Code length	Freely definable (all code types, except EAN and UPC, 2/5 Interleaved: 4...50 characters)
Multiple read	3 (all code types)
Min./max. no. of codes	1
Resolution	0.5 mm
Scanning frequency	500 Hz
Min. reading distance	50 mm
Reading pulse generation	Start: polling reflector End: polling reflector
Beeper	Result function: Good Read, volume: low
Switching outputs	Result 1: Device Ready; Result 2: Good Read; Result 3: No Read
Protocol (Host)	Start character: STX, stop character: ETX
Transmission rate (host)	9600 bits/s
Data format (host)	8 data bits, no parity, 1 stop bit
Output format (host)	Header: blank, separator: blank, terminator: blank, error string: NOREAD+separator
Output sequence	Code position
Output time	Read result: end of pulse Separator: after code
Test string	Inactive

Table 11

TIP: You can call up the entire default settings from the CLV Setup program as follows:

▶ Choose FACTORY DEFAULTS in the FILE menu or

▶ Click the  symbol.

Printing out the default settings

The CLV must not be connected with the PC (offline mode). The default setting values are stored permanently in the user interface and on the CLV. The parameter values are displayed in the menu options of the individual configuration cards. You can print out the entire default settings by clicking the  icon.

Note:

IMPORTANT

When you make changes to the default settings, we recommend that you save them as a different configuration file (*.scl) on the PC using the SAVE AS option in the program.

Temporary host interface defaults

In order to allow you to access the CLV with the PC at any time, you can set the host interface temporarily to the default setting (9600 bits/s, 8 data bits/ 1 stop bit, no parity) using the profile bar codes:

- ▶ **Present profile bar code no. 11 to the CLV in Reading mode and supply an appropriate clock pulse to the device.**
  The CLV resets the host interface to the default values and confirms this with an acoustic signal from the beeper. It then resumes Reading mode immediately
- ▶ **To restore the previous host interface configuration on the CLV, present profile bar code no. 12 to the CLV.**
  The CLV confirms that the values have been reset with an acoustic signal and resumes Reading mode immediately.

Alternative:

- ▶ **Switch the CLV off and on again to return to the original configuration**

10. 3 Profile programming

Parametrization without a PC

Profile programming uses special bar codes to change the CLV parameters directly without having to connect the PC with user interface. The profile bar codes are simply presented to the CLV. The device then transfers the coded parameter values to the current parameter set and stores them permanently. The changes remain valid after the programming procedure has been completed and affect the further reading procedure. The CLV waits 10 s after each profile bar code. If no more profile bar codes are presented, it resumes standard Reading mode and confirms with two consecutive acoustic signals.

IMPORTANT

SInce the CLV overwrites important parameter values (e.g. those generated with AutoSetup) without requiring confirmation, we recommend that you upload the valid parameter set to the PC and store it as a configuration file (*.scl) with the SAVE AS option in the user menu before you change the parameter settings.

You can program the CLV at any time in Reading mode. Alternatively, you can present one or more profile bar codes to the CLV for reading **within 5 seconds** after the device has been switched on and the self-test has been completed (free-running). The CLV does not output any reading results during profile programming and does not respond to an external reading pulse.

Printed profile bar codes

A total of 10 printed bar codes are provided on the Configuration Profiles for CLV 410 Bar Code Scanner card and are used to make important changes to the CLV configuration. Two of these codes are shown in *Fig. 15* (based on the default settings or the application-specific parameter set). By folding the individual segments on the card, you can ensure that the CLV only reads the required profile bar code. The function of the profile bar codes is explained in *Table 12*.

IMPORTANT

If you cannnot access the host interface of the CLV with the CLV Setup program (e.g. baud rate or data format differ from the default settings), present the following profile bar codes to the CLV:

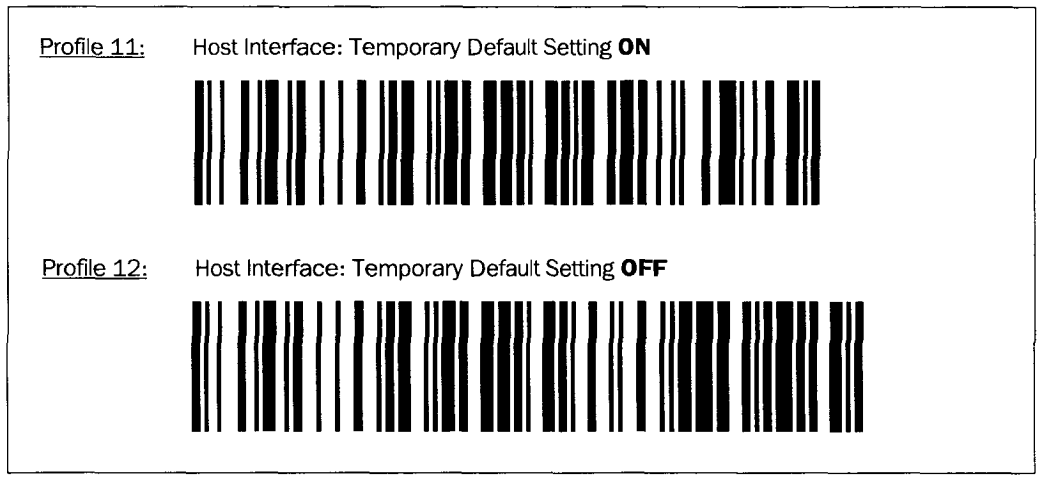


Fig. 15. Profile bar codes for temporary default settings on the host interface

Barcode	Function
Profile 1	Default settings for all parameter values on the CLV (Code configuration: all code types are enabled for evaluation). **Overwrites the code configuration generated by AutoSetup!**
Profile 2	*Changes the configuration on the host interface only:* - Data transmission rate: 38400 Bd - Data format: 8 data bits, no parity, 1 stop bit - Repeat request: none
Profile 3	Changes the configuration on the host interface only: - Activates RS 422/485 interface - SICK network protocol (standard) - Data transmission rate: 38400 Bd - Data format: 7 data bits, odd parity, 1 stop bit - Device number: 99
Profile 4	Changes the configuration on the host interface only: Outputs the read result immediately after the evaluation criteria have been fulfilled
Profile 5	Changes the configuration on the host interface only: - Outputs the error status ST in the separator - CLV outputs: CR LF in terminator (at the start of the line after every code)
Profile 6	Parameterizes the 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 the CLV as *Slave* in master/slave configuration
Profile 9	Parameterizes the CLV for pass-through mode: Outputs " / " and the device number in the header
Profile 10	Starts or ends AutoSetup
Profile 11	Resets the host interface parameters to the defaults temporarily
Profile 12	Returns the host interface parameters to the original values

Table 12

TIP: (in preparation) The function of the individual parameters is explained in the online CLV Setup Help. The manual entitled Menu-Driven Parametrization of the CLV Bar Code Scanner can also be used as reference for more complex applications.

▶ Profile programming procedure

Prerequisite: Valid parameter set (default settings or application specific) *stored permanently in CLV (EEprom).*

Step	Action	Response from CLV
1	Present the required, printed profile bar code or the profile bar code generated with the software (**in the order in which it was printed**) to the CLV at a distance of approx. 200 mm. Trigger reading pulse!	CLV confirms a good read with an acoustic signal and transfers the new values to the valid parameter set. This does not have any effect yet[1]. CLV sets the timer and waits 10 s for the next profile bar code (the reading interval remains active).
2	If the CLV is switched off, switch on the device and continue as described in step 1, reading pulse is generated automatically	CLV switches to teach-in mode for 5 seconds after the acoustic signal (free-running mode).
3	Present the next profile bar code within 10 s	As described in step 1.
4	Complete the procedure by waiting *10 s after the last profile bar code* has been presented	CLV now stores the new values permanently *in the EEprom and switches to Reading* mode (two consecutive acoustic signals from the beepers). The new parameters take effect immediately.

1) in the case of profile nos. 11 and 12, the host interface parameters are affected immediately

Table 13

Note:

When changing the reading pulse type, we recommend that you present the corresponding profile bar code (3 LT...) last so that reading of further profile bar codes *in free-running mode is not interrupted.*

Printing out profile bar codes via the user interface

Printing out profile bar codes

You can print out the profile bar codes offline (CLV not connected to PC), for example, using the *modified* values in the configuration cards. One or more profile bar codes are printed out on a page, depending on the number of changes made to the default settings. You can set the size, position and number of codes printed out on the page as required. Longer profile bar codes must be printed out in landscape format (using the printer configuration window).

▶ *Procedure for printing out profile bar codes*

Step	Action
1	Start the CLV Setup program on the PC
2	Open the stored configuraiton file (*.scl) for the CLV
3	Change the relevant parameters in the configuration cards
4	Define the print conditions using the CONFIGURE PRINTING menu option in the PROFILES menu or accept the defaults
5	Print out the profiles using the PRINT PROFILES menu option in the PROFILES menu
6	Save the modified parameter set to a new configuration file (*new.scl)

Table 14

10. 4 AutoSetup (code configuration)

Teaching in application-specific bar codes

The AutoSetup function allows you to set the application-specific parameters automatically to read

- a bar code (from a code type with a fixed code length)
- at a fixed reading distance.

For this purpose, the PC with the user interface must not be connected .
During AutoSetup, the CLV automatically determines the code type, code length and the optimum scanning rate in free-running mode for the bar code presented at the maximum reading distance. **All other code types are disabled for further evaluation**. The CLV writes the parameter values to the parameter set directly and stores it permanently (EEprom).

IMPORTANT

Since the CLV overwrites important code configuration parameters without requiring confirmation from the user, we recommend that you upload the valid CLV parameter set to the PC and store it as a configuration file (*.scl) using the SAVE AS menu option in the user interface before you change the CLV parameters.

AutoSetup can be started at any time in Reading mode by presenting profile bar code no. 12 and triggering the corresponding reading pulse. Alternatively, the CLV can read profile bar code no. 12 in free-running mode directly after the device has been switched and within the wait time of 5 seconds after the self-test has been completed.
The CLV does not output any reading results during teach-in mode and does not respond to an external reading pulse.

Note:

The CLV does not enter any real values for the Minimum Distance and Minimum Bar Width parameters, since it cannot determine absolute dimensions. When you upload the parameter set from the CLV to the PC, therefore, the values in the READING CONFIGURATION card do not correspond to the actual values.

TIP: AutoSetup can also be called under the TERMINAL menu of the user interface by choosing the corresponding entry in the VIEW menu. The CLV, however, does not output any reading results here. By connecting the PC, you can also subsequently check the read quality of the bar code that was read in by switching to PERCENTAGE EVALUATION mode.

▶ AutoSetup procedure with profile barcodes

Prerequisite: Valid parameter set (defaults or application-specific) stored permanently in the CLV (EEprom).

Step	Action	Response from CLV
1	Present profile bar code no. 10 printed on the card at a distance of approx. 200 mm. Trigger reading pulse!	CLV confirms the good read with an acoustic signal and the Result LED lights up for an extended period of time. AutoSetup is started, the CLV is in free-running mode.
2	If the CLV is switched off, switch on the device, then proceed as described in step 1, reading pulse is triggered automatically	CLV switches to teach-in mode for 5 seconds after the first acoustic signal (free-running mode).

Table 15

Step	Action	Response from CLV
3	Present the application-specific bar code at the **maximum reading distance in the application** for up to 10 seconds (see also *16. Reading field diagrams*)	a) CLV confirms the good read with an acoustic signal and permanently overwrites the corresponding parameters in the code configuration. It then outputs two consective acoustic signals and switches to Reading mode. The Device Ready LED lights up. b) If the CLV does not detect a bar code within approx. 35 s (e.g. incorrect reading distance, poor print quality), three acoustic signals are output. AutoSetup is then restarted automatically.
4	After the three acoustic signals, adjust the reading distance or skew (scan line angle relative to bar code)	a) As 1 a b) The CLV cancels AutoSetup automatically after three unsuccessful attempts
5	Cancel AutoSetup prematurely: present profile bar code no. 10 *again*	CLV cancels Autosetup automatically and switches to Reading mode (two consecutive acoustic signals). The current parameter set is not modified.

Table 15 (contd)

▶ **Test read of the bar code taught in with AutoSetup**

Prerequisite: AutoSetup successfully completed

Step	Action	Response from CLV
1	Call PERCENTAGE EVALUATION mode from the TERMINAL menu of the user interface (see also Section *10.6 Operating modes/functions*)	CLV displays the evaluation results for 100 scans.
2	Present the application-specific bar code again. Test: check the reading result at the maximum and minimum reading distance if the bar code is located in a variable reading range in the application	CLV displays the reading quality obtained at the corresponding distance.

Table 16

10. 5 Parametrization with the CLV Setup software

10. 5. 1 Installing the user and parametrization software

In order to switch between operating modes and set the parameters manually, you need the Windows-based CLV Setup software supplied with the device. The program runs on Windows 3.11™, Windows 95™ and Windows NT™. The user interface can also be used when it is not connected to the CLV to configure application-specific parameter sets (offline mode). The CLV must be connected to the PC, however, to transfer modified parameter values (download) directly (online mode).

▶ Copy the CLV Setup and CLV Setup Help software to the hard disk of your PC and install the programs. Instructions on how to do this are provided in the readme file on disk 1.

The user interface (*Fig. 16*) is largely self-explanatory. The introduction and online CLV Setup Help function demonstrate how easy it is to use.

The data displayed on the configuration cards is first stored temporarily to the main memory of the PC. You can save this data permanently to a configuration file (*.scl) on the PC using the SAVE AS command in the FILE menu.

From this point onwards, it is assumed that the user has started the program and that the CLV is connected to the PC. Any existing data connections to the host must be disconnected.

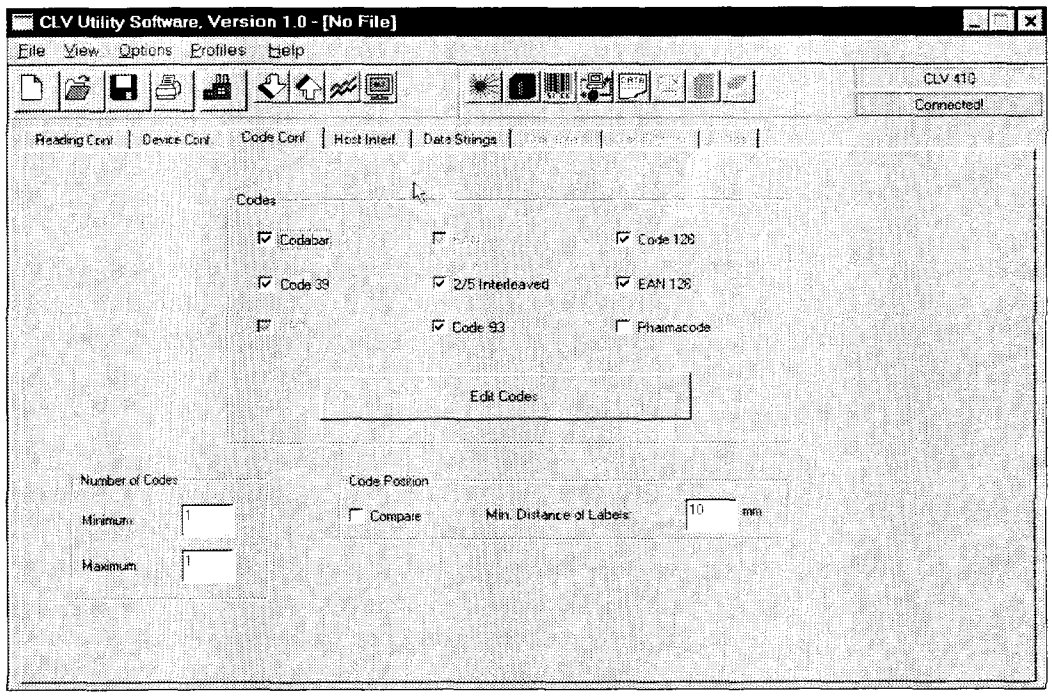


Fig. 16. Windows-based CLV Setup program

Initial steps after the user interface has been started

Displaying the default settings in the configuration cards

IMPORTANT

After the SICK logo has been displayed and you have confirmed the initial screen (important notes), the configuration cards and menu bars of ther user interface are displayed. **The menu options in the individual configuration cards display the parameter values of the default settings.** These values may differ, therefore, from those in the active parameter set of the CLV that has been parametrized or is to be parametrized.

Displaying the active CLV parameter set

To view the active CLV parameter set and change it via the configuration cards, you must first either

- ▶ transfer (upload) it from the CLV to the PC or
- ▶ open the active configuration file (*.scl) on the PC.

Temporary default host interface settings

IMPORTANT

If you cannot access the CLV via the host interface after you start the device (red indicator at the top right displays NO CONNECT!)

- ▶ upload the parameter set from the CLV or
- ▶ present profile bar code no. 11 after you switch on the CLV (see also Section *10.3 Profile parametrization*)

10. 5. 2 Setting the parameters via the configuration cards

Upload

IMPORTANT

When you start the program, the configuration cards always display the **default parameter settings** (see *10.2 Default settings*). If you have operated the CLV with application-specific settings, you must either upload the active parameter set from the CLV to the PC or (if present) open the corresponding configuration (*.scl) stored on the PC.

Download

IMPORTANT

The changes made to the configuration cards do not take effect until they have been transfered to the CLV. When you download the file, the CLV asks you whether you want to store the new parameter set temporarily or permanently.

TIP: If the current parameter set has been changed and transferred to the CLV permanently, we recommend that you back up this parameter set by saving it as a configuration file (*new.scl) on the PC using the SAVE AS command.

Help

Quick help

The parametrization procedure is supported by the online CLV Setup Help function. The online help runs on an HTML browser (e.g. Netscape™ or Internet Explorer™). The PC searches for this browser and opens it automatically. If it cannot be found, a window is displayed asking you to specify the directory in which the browser is stored on the hard disk.
You can call context-sensitive help on the parameter you are currently processing by pressing F1. You can choose the configuration card on which you want help in the top, horizontal frame. The associated parameters are then displayed in the left-hand frame. When you click one of these parameters, a detailed description is displayed in the right-hand frame. To display the help overview, choose the Contents command in the HELP menu.

TIP: To prevent several browser windows from being opened, we recommend that you use the **ALT + TAB keys** in Windows to switch quickly between the CLV Setup and CLV Setup Help applications.

► Procedure for setting parameters via the configuration cards

Step	Action
1	Connect the CLV to the PC
2	Start the CLV Setup program on the PC
2	Open the configuration file (*.scl) for the relevant CLV or click the ⇧ *(upload) icon (CLV transfers the active parameter set to the PC)*
3	Modify the required parameters in the configuration cards
4	Click the ⇩ (download) icon (CLV receives the modified parameter set)
5	*Choose the storage option**) for the CLV in the dialog window
6	Save the modified parameter set as a new configuration file (*new.scl) on the PC

*) permanently?: yes:
The CLV saves the modified parameter set in the main memory (RAM) to the EEprom.
These values remain stored when you switch off the device. The next time you switch on the CLV, these values are loaded to the main memory of the CLV and are used as the active parameter set.
permanently?: no:
The CLV only transfers the modified parameter set to the main memory (RAM). These values are lost when you switch off the device. The parameter set last stored in the EEprom is loaded to the main memory and used as the active parameter set the next time you switch on the CLV.

Table 17

TIP: (in preparation) The manual entitled Menu-Driven Parametrization of the CLV Bar Code Scanner explains the parameters and their functions and can be used as a reference for more complex applications.

Note:

Printing out parameter sets You can print out and archive new parameter sets by clicking the  icon.

Function of the configuration cards

Reading Configuration

This card is used to change the scanning frequency, reading distance, resolution, start/stop ratio and the evaluation range of the scan line.

Device Configuration

This card is used to change the device number, reading pulse, output time of the reading result and the separator in the data output string as well as the functional assignment of the three switching outputs Result 1...3 and the beeper.

Code Configuration

This card is used to activate/deactivate the individual code types that are to be evaluated and to change the number of identical reads as well as the minimum and maximum number of bar codes to be read/output.
We recommend that you only activate those codes that are actually relevant in order to enhance the reading reliability with fast applications.

Host Interface

This card is used to change the protocol, start and stop characters, data format and the transmission rate.

Data Strings

This card is used to change the data output format of the host interface. ASCII characters and reading diagnosis data can be transferred to the host in the header, separator and terminator (default setting: no characters). The output format for no reads and the content of the error string can be modified. The test string function can also be activated here. If more than one bar code is to be read during each reading pulse, you can specify the output sequence and sort criteria.

10. 6 Operating modes/functions

The CLV features the following operating modes/functions:

- Reading mode
- Percentage evaluation
- Profile programming
- AutoSetup
- Parametrization
- Operating data

10. 6. 1 Reading mode

Standard mode

The CLV switches to this mode automatically when it is switched on and after the self-test has been successfully completed. In the default setting, the CLV generates the reading pulse by means of reflector polling. The reading result is output at the end of the reading pulse.

You can use the software to display the reading result from the CLV directly:

▶ Choose the TERMINAL command in the FILE menu or click the icon. The terminal window is then displayed in READING MODE

▶ Present the polling reflector to the CLV (start of reading interval), and then the bar code to be read followed by the polling reflector again (end of reading interval)

10. 6. 2 Percentage evaluation

Read quality evaluation

This temporary operating mode is only accessible via the user interface and is used to assess the quality of the reading function. In this case, the CLV evaluates 100 scans statistically (independent of the set pulse type) in free-running mode. It outputs the reading result continuously. You can view the results with the user interface.

▶ Choose the TERMINAL command as described above

▶ Click the terminal mode PERCENT EVAL on the right of the screen (*Fig. 17*)

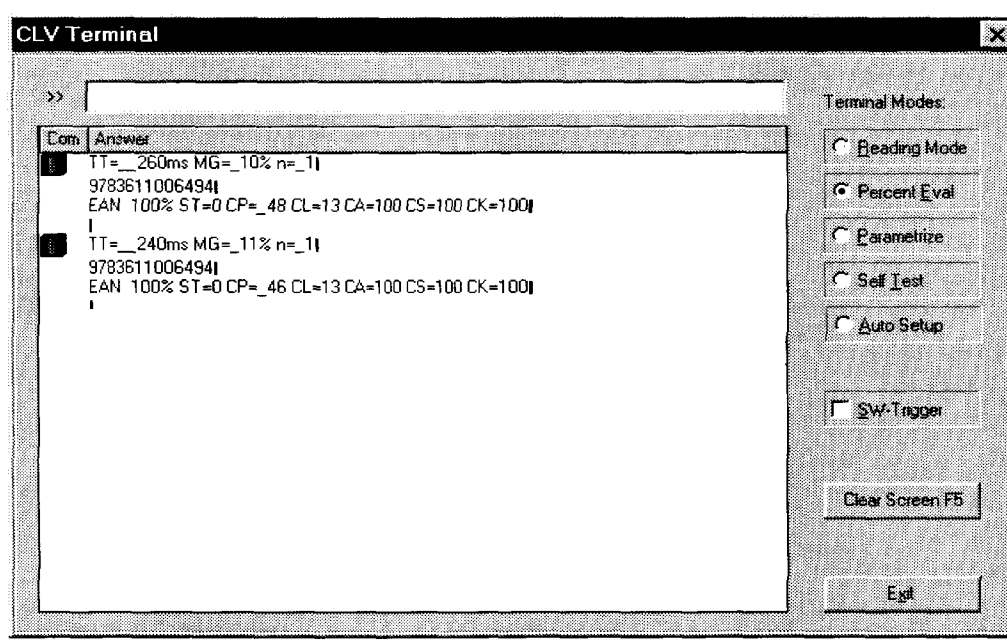


Fig. 17. Percentage Evaluation in the TERMINAL option of the user interface

▶ Present the bar code shown in *Fig. 18*, for example, to the CLV at a reading distance of approx. 200 mm (see Section *14. Sample bar codes* for further patterns). The CLV reads the bar code and displays the result on the screen. An acoustic signal is output at the same time to confirm the read. The Result LED lights up or blinks, depending on the read quality (see also Section *7. Function of the LEDs*)

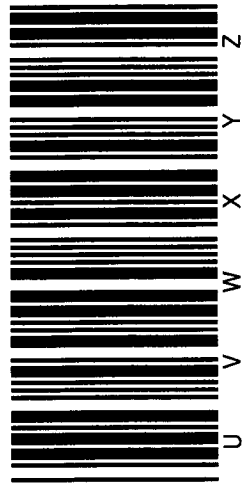
Good Read:

```
T T=  160 ms  MG=_10%  n=_1
C39  100%  ST=0  CP=_46  CL=12  CA=  3  CS=109  CK=  1
UVWXYZ
```

where:

T T*)=	Duration of reading interval
MG*)=	Time average of identification quality
n*)=	Number of codes detected
C39*)=	ID, code type Code 39
100%*)=	Identification quality
ST*)=	Read status (0= Good read)
CP*)=	Code position
CL*)=	Code length
CA*)=	Required scans
CS*)=	Code reliability
CK*)=	Code continuity
UVWXYZ=	Code content

Sample code (Code 39):



Module width 0.5 mm

No Read:

```
T T=  160 ms  MG=_10%  n=_0
no code !
```

where:

T T*)=	Duration of reading interval
MG*)=	Time average of identification quality
n*)=	Number of codes detected
no code =	No codes detected

Note:

Profile bar codes (see *10.3 Profile programming*) read in by the CLV in Percentage Evaluation mode do not modify the parameter set and, therefore, do not affect the reading process. You also cannot use this method to teach in match code 1.

*) Reading diagnosis data - the CLV does not send this data to the host in Reading mode (default settings)

Fig. 18. Percentage Evaluation mode: reading results display

10. 6. 3 Profile programming and AutoSetup

These functions are used to modify parameter values automatically.
See Section *10.3 Profile programming* and *10.4 AutoSetup.*

10. 6. 4 Parametrization mode

This function allows you to enter command strings directly in the TERMINAL menu of the user interface (e.g. error query) and can be used to configure special device.
To call the function, choose the PARAMETERIZE command in the VIEW menu or in the TERMINAL menu if the CLV is connected.

10. 6. 5 Operating data

This function allows you to interrogate and reset important counters in the user interface that are updated continuously by the CLV during the reading procedure. To open the dialog window, click the icon with the CLV connected. The CLV data is then loaded to the window directly and displayed.

11. Replacing a CLV 410

11. 1 Transferring the application-specific parameter set

If you have to replace a CLV on site and therefore transfer the active parameter set to the new device, there are two methods of doing so. The parameter set can only be transferred to a device of the same type.

1. Transferring the parameter set locally using profile bar codes

Prerequisite: the active parameter set is available in archived form as printed profile bar codes.

It is not necessary to connect the PC to the CLV Setup program.

Step	Action
1	Disconnect the power supply to the AMV/AMS Connection Module
2	*Disconnect the CLV connector from the AMV/AMS Connection Module.* Remove the CLV from the bracket on the reading station. Mark the position and alignment on the bracket/station.
3	Mount the new CLV and connect it to the AMV/AMS
4	Reconnect the power supply to the AMV/AMS Connection Module
5	Present the first archived profile bar code to the CLV within **5 seconds** after the first acoustic signal. The CLV confirms the good read with an acoustic signal and waits 10 s for the next profile bar code.
6	Present all of the other profile bar codes consecutively **in the order in which they were printed.**
7	*Finally, allow the last 10 s wait time to expire.* The CLV then outputs two consecutive acoustic signals and switches to Reading mode. The Device Ready LED lights up. **The new CLV can now be used with the transferred parameter set.**

Table 18

Notes:

The procedure for printing out the profile bar codes is described in *Table 14* in Section *10.3 Profile programming.*
If none of the profile bar codes of the parameter set for the device to be replaced has been printed out and if the configuration file (*.scl) has not been saved on the PC, you can try, depending on the reason why the device is to be replaced, to upload the parameter set from the CLV to be replaced to the user interface and then download it to the new CLV.

▶ ***Transferring the parameter set by means of a download***

If the profile bar codes of the parameter set have not been printed out but a configuration file (*.scl) does exist, you must connect the PC with the CLV Setup software to the new CLV (see Section *8.4 Connecting the PC to the CLV*).
In the following section, it is assumed that the new CLV is using the default settings.

Step	Action
1	Replace the CLV as described in steps 1 to 3 in *Table 18*
2	Disconnect any data connections to the host
3	Connect an RS 232 data connection cable to the AMV/AMS and PC
4	Reconnect the power supply to the AMV/AMS Connection Module
5	Start the CLV Setup program on the PC
6	If you cannot access the new CLV (red display No CONNECT! at top right) click the ⇧ (upload) icon (CLV transfers its parameter set to the PC)
7	Open the configuration file (*.scl) stored for the old CLV
8	Click the ⇩ (download) icon (new CLV receives the application-specific parameter set)
9	Choose the Permanently storage option for the CLV in the dialog window
10	Close the configuration file (*.scl) again.
11	Disconnect the RS 232 data connection cable from the CLV
12	Re-establish the data connection to the host.

Table 19

TIP: If a parameter set is duplicated on other devices with the same application conditions, you may have to change the device number of the individual CLVs subsequently using the DEVICE CONFIGURATION card for this parameter set so that it can be evaluated in the host and then download the parameter set again.

11. 2 Disassembly and environmentally friendly disposal of the CLV

If the CLV is to be disposed of (after it has reached the end of its service life), the national waste disposal regulations applicable at the time at which the device is taken out of service must be observed.

- The housing of the CLV (chassis and cover) is made of die-cast zinc and can be submitted for recycling after the glass plate of the reading window has been removed.
- The electronic modules and connection cables can be easily removed. However, *they must not be disposed of as domestic waste but rather sent to a suitable plant* for treatment as problem waste.

12. Troubleshooting

12. 1 Self-monitoring function

The CLV is equipped with the following monitoring functions:

- After it is switched on, the device always performs a self-test before it is initialized in order to check the important hardware components.
- During operation, the CLV constantly monitors the function of its laser diode and the speed of its polygon mirror wheel. A watchdog circuit also responds to any malfunctions in the device.
- If the CLV detects a malfunction during the self-test or operation, it outputs the error status ST=3 if this has been enabled for transfer to the host in the separator of the output string (default setting: no).

12. 2 Error messages

The CLV does not output any error messages apart from the error status ST.

12. 3 Causes of error and troubleshooting

The following tools and resources are required to perform the troubleshooting measures described in *Table 20*:

- these Operating Instructions
- set of tools
- a measuring tape
- a multimeter for measuring voltage and current values
- a PC with the CLV Setup software
- an RS 232 data connection cable, e.g. no. 2 020 319 from SICK

We recommend that you perform the troubleshooting measures in the following order

Malfunction	Possible cause	Check	Remedy
1. *The CLV is not ready.*	1. The operating voltage (4.5 ...30V DC) is not connected	1a. Check power supply.	1a. Check the wiring! (see *Section 8.1*) Measure the voltage value
- The Dev. Rdy. LED is not lit		1b. Mechanical noise?	1b. Listen to the housing
- The Result 1 switching output (default: Dev. Rdy) is disabled	2. The CLV is not in Reading mode	2. Return to Reading mode	2a. User interface: call READING MODE 2b. or switch the device off and on again
	3. The CLV has detected a malfunction during the self-test	3a. Switch the device off and on again. Does the LED now light up after approx. 10 s?	3a. If so, the device is ok. If not, contact the SICK Service department
		3b. Has the CLV sent the status ST=3 in the data output string (prerequisite: ST is enabled for output in the separator)?	3b. If so, contact the SICK Service department
2a. Reading mode: (Dev. Rdy. LED lit) **Pulse: reflektor polling**	1. Incorrect reading pulse source set in parameters	1. Are the device parameter settings for the reading pulse correct?	1. User interface: choose REFLECTOR POLLING in EDIT READING PULSE MODE on the DEVICE KONFIGURATION card, download to CLV!
The CLV cannot be clocked.	2. Reading distance incorrect	2. Is the reading distance within the defined reading field?	2. Change reading distance (see *16. Reading field diagrams)*
- The Laser On LED flickers but is not lit constantly.	3. Polling reflector incorrect	3. Is the polling reflector suitable for the reading distance?	3. Choose correct reflector (see *Section 9.2*)
- Red-light scanner: the scan line is very faint	4. Incorrect pulse sequence (reflector is not covered to start the reading interval)	4. Is the reflector polling sequence correct? (read: 1. cover reflector, 2. read bar code, 3. uncover reflector)	4. Adjust sequence, see also *Section 10.6.1*

Table 20

Malfunction	Possible cause	Check	Remedy
2b. Reading mode: (Dev. Rdy LED lit) **Pulse: external sensor** ***The CLV cannot be clocked via the Sensor 2 switching input.*** - The Laser On LED does not light up - Red-light scanner: the scan line does not appear	1. Incorrect clock pulse source defined in parameters 2. The photoelectric switch is not aligned with the reflector (photoelectric proximity switch or inductive transducer not dumped) 3. The external sensor is not connected correctly 4. No ground potential (if sensor supplied by CLV)	1. Are the device parameter settings for the reading pulse correct? 2. Check the function of the external sensor and whether it is obstructed 3. Check sensor wiring 4. Is the jumper inserted between pin 5 and pin 15?	1. User interface: choose SENSOR INPUT in EDIT READING PULSE MODE on the DEVICE CONFIGURATION card, download to the CLV 2. Align the sensor correctly 3. Measure the output signal of the sensor and the input signal on the CLV 4. If not, insert jumper
2c. Reading mode: (Dev. Rdy LED lit) **Pulse: ser. interface** ***The CLV cannot be clocked.*** - The Laser On LED does not light up - Red-light scanner: the scan line does not appear	1. Incorrect clock pulse source defined in parameters 2. The CLV is not receiving any command strings for the pulse via the data interface	1. Are the device settings for the reading pulse correct? 2a. Check the CLV host interface parameters 2b. Check the data connection between the CLV and host 2c. Check the host command string	1. User interface: choose SERIAL INTERFACE in EDIT READING PULSE MODE on the DEVICE CONFIGURATION card, download to the CLV! 2a. User interface (after upload from CLV): check DATA FORMAT, PROTOCOL, START and STOP CHARACTER on the HOST INTERFACE card 2b. Pin assignment and connection diagram, see *Section 8.1* 2c. User interface (after upload from CLV): check SERIAL INTERFACE in EDIT READING PULSE on the DEVICE CONFIGURATION card. Check host interface in TERMINAL
3. Reading mode: (Dev. Rdy LED lit) ***The Result LED does not light up at the end of the reading pulse.*** - The CLV outputs the status ST=2 in Reading mode (if ST is enabled for the separator) - The Result 2 switching output (default: good read) does not supply a pulse	1. Read not successful since no bar code was in the reading field during the reading pulse 2. Match code comparison: the read bar code does not match the specified match code 3. Scan line positioned incorrectly 4. Bar code presented at incorrect *reading distance* 5. Reading configuration of the CLV parametrized incorrectly for the presented bar code 6. Reading angle at which the bar code appears is too large (e.g. bar code slanted on object) 7. CLV is in total reflection	1. Check timing between pulse and presence of bar code in the reading field 2. Not applicable 3. Is the bar code at the center of the scan line (optimal)? 4. Is the reading distance feasible *with this device type in relation* to the module width of the bar code? 5. Are the values for min. reading distance and min. bar thickness correct? 6. Tilt, skew or pitch of bar code on scan line incompatible? 7. The scan line should strike bar code at a skew of approx. 15°	1. See malfunctions 2a, 2b or 2c. Synchronize clock pulse accordingly 2. None 3. Align the CLV. User interface: call PERCENTAGE EVALUATION mode and test the readability of the bar code 4. Adjust distance. See Section *16. Reading field diagrams* 5. User interface: enable all code types on the CODE CONFIGURATION card. Download to CLV temporarily. Call PERCENTAGE EVALUATION mode, choose sample code with matching module width from *Section 14* and check the reading range from min. to max. reading distance (read quality >70%!). Adjust read configuration if necessary 6. Readjust CLV if necessary to optimize reading angle. See *Section 9.1* 7. Optimize CLV alignment. See *Section 9.1*

Table 20 (contd)

Malfunction	Possible cause	Check	Remedy
3. Reading mode: (Dev. Rdy LED lit) ***The Result LED does not light up at end of reading pulse.*** (contd)	8. Evaluation criteria for bar code types set incorrectly (CODE CONFIGURATION)	8a. Are code type and length parametrized correctly? Determine *code type* to be read: enable all code types, set code lengths to FREE, download to CLV temporarily. Call PERCENTAGE EVALUATION, present *bar code, the code type is* displayed followed by the read quality.	8a. User interface: activate detected code type under EDIT CODES on the CODE CONFIGURATION card, disable all other types, download to CLV
		8b. Determine *Code length* to be read: enable code type, set code length to FREE, download to CLV temporarily! Call PERCENTAGE EVALUATION, present bar code, the code length is displayed	8b. User interface: set the code length for the relevant code type in EDIT CODES on the CODE CONFIGURATION card, download to CLV!
	9. Code position reading zone (CP values) have been changed (default: Min. CP=0, Max. CP=100)	9a. Check setting on READING CONFIGURATION card 9b. Does active evaluation zone *coincide with position of bar* code in the scan line?	9. User interface: call PERCENTAGE EVALUATION and test readability of bar code at the center of the scan line
	10. The defined min. number of bar codes to be read is higher than the actual number in the reading pulse	10. User interface (after upload from CLV): Check NUMBER OF CODES menu option on CODE CONFIGURATION card	10. Adjust value accordingly (for one code: min/ max. = 1), download to CLV!
	11. Bar code quality not sufficient	11a. No. of idle zones sufficient (min. 10x module width, min. 2.5 mm)? SEGMENTATION setting *on* READING CONFIGURATION card set to START/ STOP?	11a. Check read with fault-free reference code. Bar code: enlarge label, *reduce module width or print* ratio (min. 2:1)
		11b. Is print contrast sufficient?	11b. Submit device for test (e.g. by SICK Service department)
		11c. Print tolerances (acc. to specification) exceeded?	11c. As 11b
4. Reading mode: (Dev. Rdy LED lit) ***CLV does not transfer reading result to host.*** The Data LED does not flicker at end of reading pulse.	1. The CLV is not in Reading mode	1. Is the Dev. Rdy LED lit?	1. If not, switch device off and on *again.* If so, user interface: choose READING MODE
	2. No reading pulse supplied	2. Is the Laser On LED lit at the *corresponding* clock pulse?	2. See malfunction 2a, 2b or 2c
	3. Data connection cable wired incorrectly	3. Check wiring	3. See *8.1* for pin assignment and connection diagram
	4. Voltage level incorrect	4. Values ok?	4. Measure voltage values
	5. Host interface parameters incorrect	5a. Check data format, protocol, start and stop charactes and output format	5a. User interface (after upload from CLV): check settings on the HOST INTERFACE and DATA STRINGS card and change if necessary. Download to CLV!
		5b. *With output sorting according* to code length list: check specified lengths (at least one ≠ 0)	5b. *User interface (after upload* from CLV): check settings on the DATA STRINGS card and change them if necessary. Download to CLV!
5. Reading mode: (Dev. Rdy LED lit) ***CLV outputs status ST=3 in Reading mode.*** (If ST is enabled for the separtor)	- CLV has diagnosed a device malfunction	- Switch device off and on again. Does LED light up after approx. 10 s ?	- If so, the device is ok. If not or if the malfunction occurs again: contact the *SICK Service department*

Table 20 (contd)

Malfunction	Possible cause	Check	Remedy
6. Reading mode: (Dev. Rdy LED lit) ***Output of bar code content incorrect or incomplete.***	1. 2/5 Interleaved: CLV suppresses the first character of the code in the data output string	1. Does the CLV suppress the leading zero?	1. User interface (after upload from CLV): activate the TRANSMIT LEADING ZERO field for 2/5 INTERLEAVED under EDIT CODES on the CODE CONFINGURATION card. Download to the CLV!
	2. CLV suppresses the last character of the code in the data output string	2. Output of the last character is disabled for this code type	2. User interface (after upload from CLV): check the settings for the code type under EDIT CODES on the CODE CONFINGURATION card and *change them if necessary,* download to the CLV!
	3. CLV outputs non-definable characters	3. Data format set incorrectly	3. User interface (after upload from CLV): check the values under DATA FORMAT on the HOST INTERFACE card and change them if necessary, download to CLV!
	4. The control characters contained in the code, header, separator or terminator appear as @ in the data output string (possible with Code 39, Code 128, *Code 93 and EAN 128*)	4a. CLV replaces each control character in the protocol frame with @. Because control characters are transferred in code: Hex-ASCII output activated?	4a. User interface (after upload from CLV): check settings for relevant code types under EDIT CODES on the CODE CONFINGURATION card and change them if necessary, download to CLV!
		4b. Are characters outside the code referred to in the format mask?	4b. User interface (after upload from CLV): check settings under EDIT CODE LENGTH LIST on the DATA STRINGS card
7. Reading mode: (Dev. Rdy LED lit) ***Read ok, however, the CLV does not output the reading result until after the end of the reading pulse in Immediate output mode.***	1. The min. number of bar codes to be read is higher than the actual number that occur in the reading pulse	1. User interface (after upload from CLV): check NUMBER OF CODES menu option on the CODE CONFIGURATION" card	1. Adjust the value accordingly (for one code: min/ max. = 1), download to CLV!
	2. Evaluation criteria (CODE CONFIGURATION) for bar code types are incorrect	2. User interface (after upload from CLV): check settings under EDIT CODES on the CODE CONFIGURATION card (enabled code type, code length)	2. Only enable the actual bar code types that are to be read, download to CLV! See also point *3.8*
8. Reading mode: ***The scan line is not visible during the reading pulse.*** The Dev. Rdy LED extinguishes	Reading interval terminated incorrectly: the *internal monitoring* function deactivated the laser diode after 10 min. for safety reasons	Check the function of the *reading pulse (particularly at* end of reading interval)	Clock the CLV again
9. Reading mode: (Dev. Rdy LED Lit) ***The Result 1..3 switching outputs do not supply a pulse.***	1. The result for the assigned result display function does not occur in the reading process	1. Not applicable	1. None
	2. Outputs switching incorrectly	2. Are outputs set to INVERT OUTPUT?	2. User interface (after upload from CLV): check settings for RESULT 1..3 under EDIT RESULT OUTPUTS on the DEVICE CONFIGURATION card
10. CLV responses are not acknowledged by beeper.	- Beeper deactivated (beeper volume: OFF)	- Check the beeper parameter settings	- User interface (after upload from CLV): check volume setting under RESULT OUTPUT on the DEVICE CONFIGURATION *card*

Table 20 (contd)

Malfunction	Possible cause	Check	Remedy
11. AutoSetup: ***CLV does not read the presented, application-specific bar code*** (no acknowledgement from beeper)	1. CLV not in AutoSetup mode	1. Is Dev. Rdy LED lit? If so, the CLV is in Reading mode again	1. User interface (after upload from CLV): call AUTO SETUP again in the VIEW menu
	2. With profile programming: CLV wait time of 5 s after power-up exceeded	2. See 1.	2. Switch CLV off and on again, present profile bar code no. 10 within 5 s
	3. Profile programming: CLV wait time of 10 s after presentation of first profile bar code exceeded	3. See 1.	3. As 2
	4. Reading distance for presented bar code incorrect	4. Is reading distance for this module width ok?	4. Adjust reading distance. See section *16. Reading field diagrams*
	5. CLV is in total reflection	5. Is bar code presented at a skew of less than 15° ?	5. Rotate bar code accordingly, see also *Section 9.1*
	6. Bar code quality insufficient	6. See point 3.11 a, b, c	6. See point 3.11 a, b, c
12. Profile programming	1. CLV not in teach-in mode	1. Is the Dev. Rdy LED lit? If so, the CLV is in Reading mode again	1. Switch CLV off and on again, present required profile bar code immediately (see also *Section 10.3*)
	2. CLV wait time of 5 s after power-up exceeded	2. See 1.	2. As 1.
	3. CLV wait time of 10 s after presentation of first profile bar code exceeded	3. See 1.	3. As 1.

Table 20 (contd)

SICK service and repair

If correct operation of the CLV cannot be restored using the troubleshooting measures provided above, the device may be defective. The CLV does not contain any system components that can be repaired by the user.

Please contact the SICK Service department:

- Through your local SICK subsidiary or branch office; the address and telephone number are provided in the frame on the rear of these Operating Instructions

Please contact the SICK Service department first before sending in the device!

13. Maintenance

The CLV does not require maintenance. The self-monitoring functions enable the device to operate fault-free at the reading station. The CLV indicates errors with the status ST in the data output string (if enabled). If operated under extreme conditions (excessive dust, abrasion, humidity), we recommended that you clean the reading window at regular intervals using a mild, water-soluble detergent to maintain the reading performance.

IMPORTANT

When cleaning the reading window, avoid any scratching or scouring movements on the surface of the glass.

If necessary, also clean the LEDs.

14. Samples bar codes (scannable)

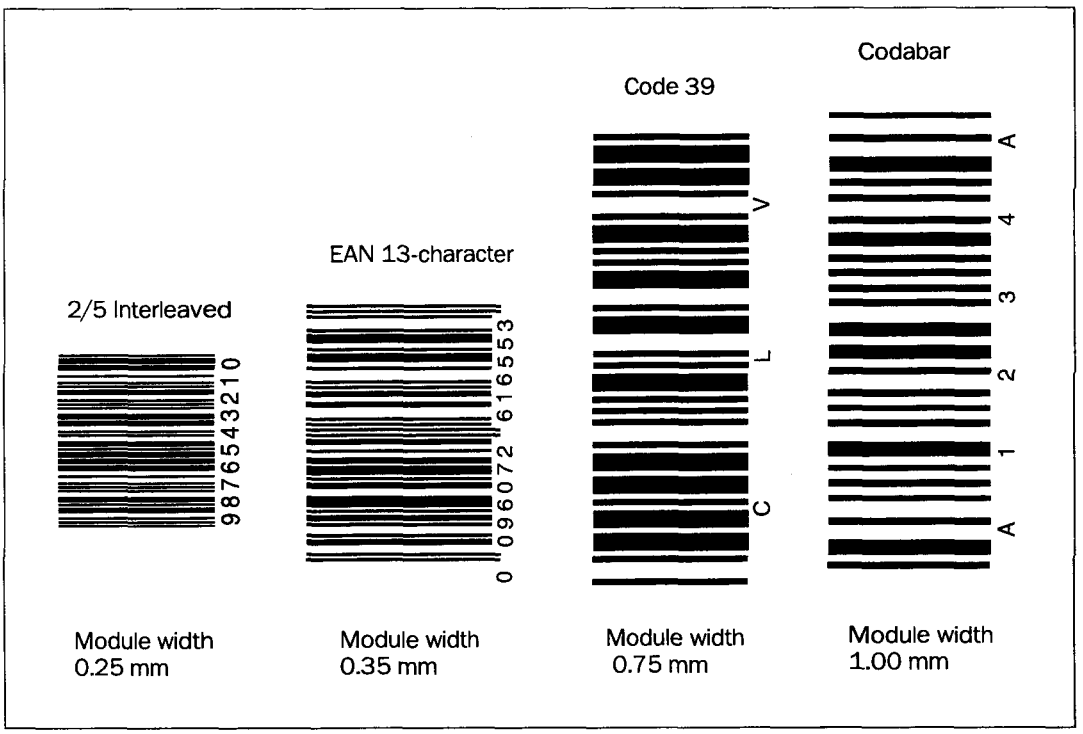


Fig. 19. Bar codes with different module widths

15. Additional safety instructions (laser protection)

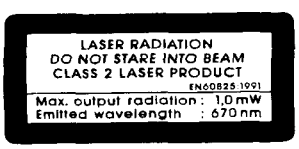
In order to prevent damage to health, please observe the following at all times:

- ▶ Observe the most recent laser protections specifications to DIN EN 60825-1
- ▶ Do not stare into the laser beam (comparable with sunlight)
- ▶ Do not direct the laser beam at the eyes of other persons
- ▶ When installing the device, check for possible causes of reflection of the laser beam during operation, e.g. reflective surfaces

Internal safety circuits

The CLV is equipped with monitoring circuits that deactivate the laser diode in the event of irregularities in the laser beam generation. Activation and deactivation of the laser diode is controlled by the reading pulse. In Percentage Evaluation and Free-running modes, the laser diode is activated constantly. With Reflector polling, it is activated with every 20th scan.
A safety circuit (time stage) automatically terminates reading pulses that have not been completed correctly after 10 minutes (independent of the pulse type) and deactivates the laser diode. The next reading pulse activates the laser diode again.

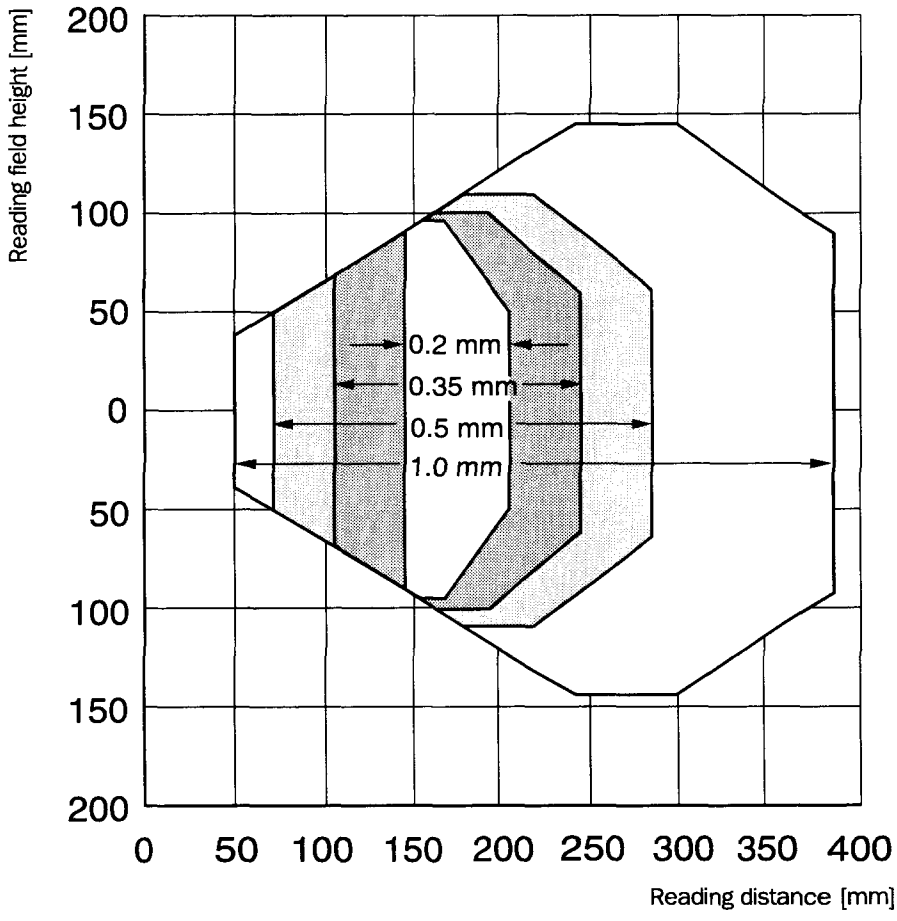
Warning labels



You can attach the additional laser warning labels (German, French) over the English sticker on the CLV if required.
If the CLV is installed in a machine/panel with the result that the warnings on the device are concealed, additional warning labels (not included in the scope of delivery) must be attached to the machine near the laser emission aperture.

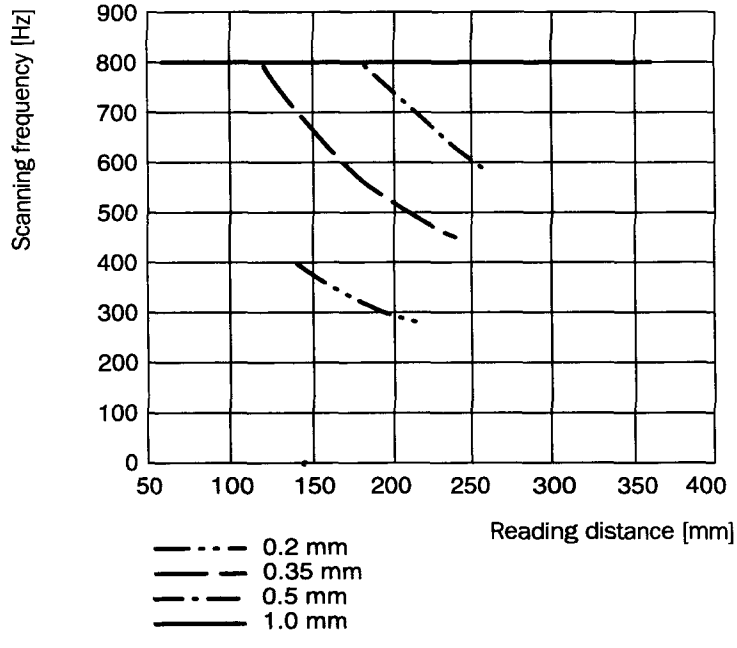
16. Reading field diagrams

Line/raster scanner with front light emission (standard devices):



Line/raster scanner with lateral light emission:

The entire reading field is offset by 18 mm with respect to the reading window.
Max. aperture angle: 50°.



Reading conditions:

Test code	Code 39/ITF
Print ratio	2:1
Print contrast	> 90%
Tilt	±10°
Ambient light	*< 2000 lx*
Good read rate	> 75%

Table 21

Raster scanner with front light emission: raster height 15 mm (8 lines) at a reading distance of 200 mm

Fig. 20. Reading ranges and scanning frequency characteristic field of the CLV 410

17. Technical data

Type	CLV 410
Version	Line scanner (standard device), option: raster scanner, high density
Light emission	front, option: lateral
Laser diode (wavelength)	Red-light (λ= 670 nm)
Life time of laser diode	MTBF 20,000 h
Laser class of device	Class 2 (to DIN EN 60825-1), safety shutdown after 10 min
Useful aperture angle	max. 60° (front light emission)/ max. 50° (lateral light emission)
Scanning/decoding frequency	200 ... 800 Hz
Resolution	0.2 ... 1.0 mm
Reading range	40 ... 400 mm (standard device, see also *16. Reading field diagrams*)
Raster height (option)	15 mm (8 lines) at 200 mm reading distance (with lateral light emission)
Bar code print contrast (PCS)	≥ 60%
Ambient light compatibility	2000 lx (on bar code)
No. of bar codes per scan	1...3
No. of bar codes per reading interval[1)]	1...10 (autodiscriminating)
Bar code types	Code 39, Code 128, Code 93, Codabar, EAN, EAN 128, UPC, 2/5 Interleaved, Pharmacode
Bar code length	Max. 50 characters (max. 100 characters across all bar codes per scan)
Print ratio	2:1 ... 3:1
No. of multiple reads	1 ... 99
Optical displays	4 x function LEDs
Acoustic read indicator	Beeper, can be deactivated or assigned result functions
Reading pulse	Reflector polling/ switching input/ free-running/ software trigger (data interface)
Data interface	RS 232 or RS 422/485, with variable data output format
Data transmission rate	*300 ... 57 600 bits/ s*
Protocols	SICK standard and SICK network
Physical configurations	Point-to-point, network (bus), daisy chain (pass-through or master/slave)
Function switching inputs	Sensor 1 (reading pulse) and Sensor 2(teach-in match code 1); opto-decoupled, $V_{in\ max}$ = +30V, internal delay max. 30 ms
Functional switching outputs	3 x OUT (Result 1...3); PNP, $I_{out\ max}$ = 600 mA, variable pulse duration (10...990 ms)
Electrical connection	15-pin D Sub HD connector, cable length 0.9 m
Operating voltage/power consumption	4.5 ... 30 V DC/ approx. 2.5 W
Housing	Die-cast zinc
Enclosure rating/protection class	IP 54 (to DIN 40 050)/Class 3 (to VDE 0106)
EMC/vibration/shock-tested	*to IEC 801/IEC 68-2-6 test FC/IEC 68-2-27 test EA*
Weight	approx. 250 g with connection cable
Operating/storage temperature	0 ... +40 °C/ -20 ... +70 °C
Max. rel. humidity	90%, non-condensing

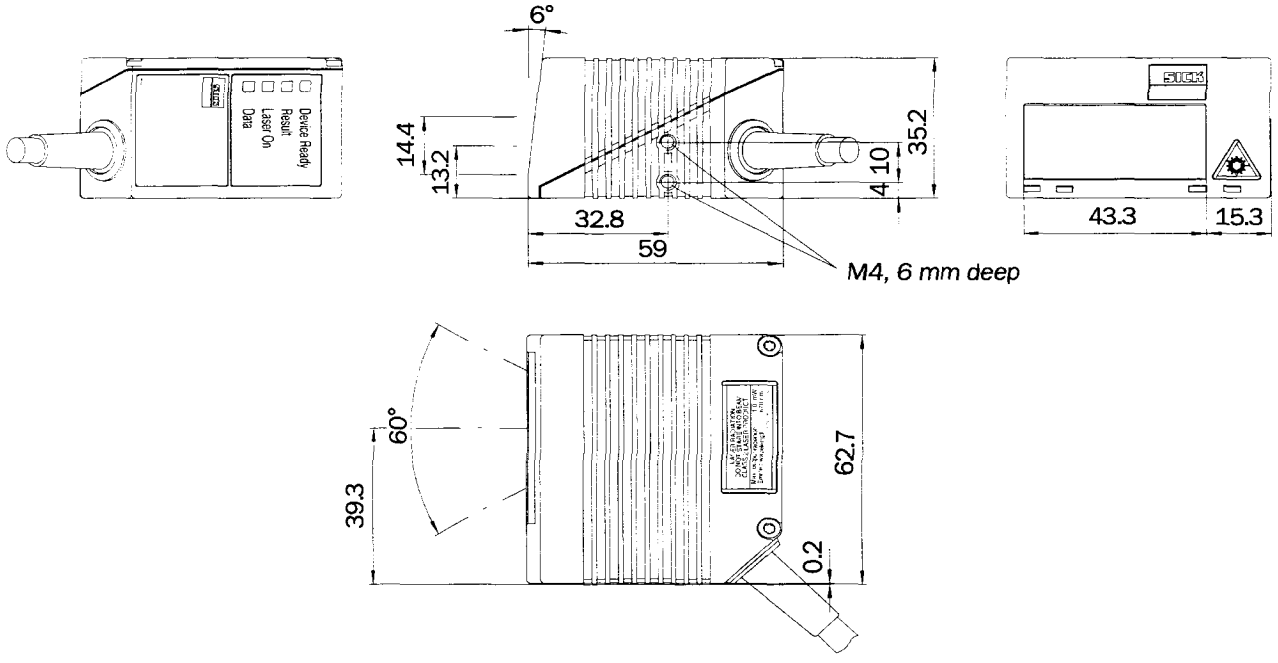
1) Reading interval: time window for code evaluation generated internally by reading pulse

Table 22

18. Dimensioned diagrams

All values in mm

Line/raster scanner with front light emission:



Line/raster scanner with lateral light emission:

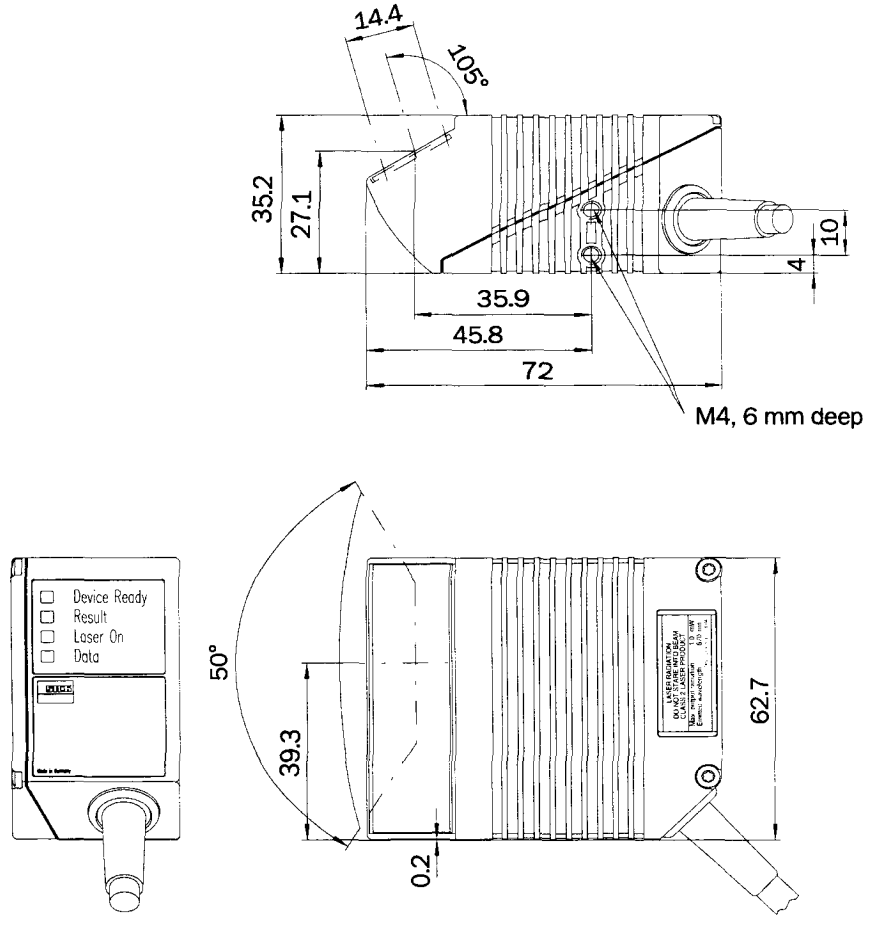
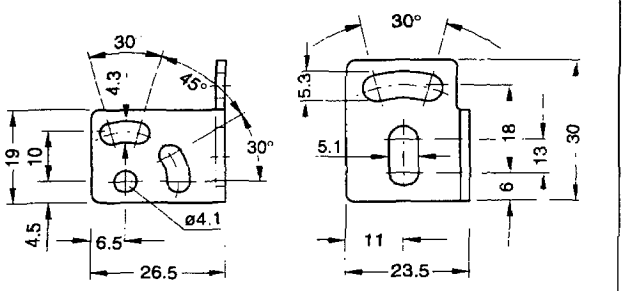


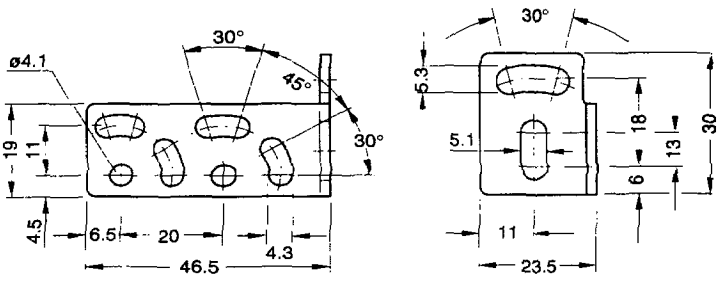
Fig. 21. Dimensions of the CLV 410



Order no. 2 020 077

Supplied for securing the CLV:
2 bolts M4 x 8 mm
2 washers A4.3 mm
2 lock washers B 4

Fig. 22. Optional mounting bracket (small)



Order no. 2 020 078

Supplied for securing the CLV:
2 bolts M4 x 8 mm
2 washers A4.3 mm
2 lock washers B 4

Fig. 23. Optional mounting bracket (large)

19. Index

Quick reference

20. Overview: supplementary technical documentation

Title	Contents	Part no.
AMV/AMS 40 Operating Instructions (English)	Detailed description of CLV connection to the host/PLC/sensor via the AMV/AMS 40 Connection Module	8 008 292

Table 23

Australia
Phone +61 / 3 94 97 41 00
0 08 / 33 48 02 – toll free
Fax +61 / 3 94 97 11 87

Austria
Phone +43 / 2 23 66 22 88-0
Fax +43 / 2 23 66 22 88-5

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Phone +32/24 66 55 66
Fax +32/24 66 60 26

Brazil
Phone +55 11/55 61 26 83
Fax +55 11/53 54 15 3

China/ Hong Kong
Phone +8 52/27 63 69 66
Fax +8 52/27 63 63 11

Denmark
Phone +45/45 82 64 00
Fax +45/45 82 64 01

Finland
Phone +3 58/9-7 57 27 88
Fax +3 58/9-7 57 23 11

France
Phone +33/1-64 62 35 00
Fax +33/1-64 62 35 77

Germany
Phone +49/2 11 53 01-2 70
Fax +49/2 11 53 01-1 00

Great Britain
Phone +44/17 27-83 11 21
Fax +44/17 27-85 67 67

Italy
Phone +39/2-92 14 20 62
Fax +39/2-92 14 20 67

Japan
Phone +8 13/33 58-13 41
Fax +8 13/33 58-05 86

Netherlands
Phone +31/3 02 29 25 44
Fax +31/3 02 29 39 94

Norway
Phone +47/67 56 75 00
Fax +47/67 56 66 10

Poland
Phone +48/2 26 44 83 45
Fax +48/2 26 44 83 42

Singapore
Phone +65/7 44 37 32
Fax +65/8 41 77 47

Spain
Phone +34/34 80 31 00
Fax +34/34 73 44 69

Sweden
Phone +46/8-6 80 64 50
Fax +46/8-7 10 18 75

Switzerland
Phone +41/4 16 19 29 39
Fax +41/4 16 19 29 21

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Phone +88 62/3 65 62 92
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Fax +16 12/9 41-92 87

Representatives and agencies in all major industrial nations.

SICK optic electronic

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