The CLV61x bar code scanner is an intelligent SICK 4Dpro sensor and is used exclusively for automatic, stationary identification and decoding of bar codes on moving or stationary objects. The data content of the decoded bar codes is sent to a superordinate computer for further processing. Depending on the model, the CLV61x is either used directly via a serial data interface (RS-232) or indirectly via the SICK CAN sensor network on a coordinating device (e.g., master).

Correct use also includes compliance with all information in these operating instructions as well as in the supplementary “CLV61x Bar Code Scanner” Technical Information (no. 8015592).

This document describes:
• Optional mounting accessories (brackets)
• The prevention of ground potential equalization currents in applications with widely distributed systems
• Pin and lead color assignments of cables
• Electrical wiring plans for the CDB620 connection module relating to the CLV61x

### Intended Use

The CLV61x bar code scanner is an intelligent SICK 4Dpro sensor and is used exclusively for automatic, stationary identification and decoding of bar codes on moving or stationary objects. The data content of the decoded bar codes is sent to a superordinate computer for further processing. Depending on the model, the CLV61x is either used directly via a serial data interface (RS-232) or indirectly via the SICK CAN sensor network on a coordinating device (e.g., master).

Correct use also includes compliance with all information in these operating instructions as well as in the supplementary “CLV61x Bar Code Scanner” Technical Information (no. 8015592).

The product family CLV61x consists of the three series ECO, CAN, and FIELDBUS (FIELDBUS in combination with the optional CDF600-21xx fieldbus module). Depending on the model, the series offer the following options:
- Reading range variants (e.g., Short Range, Long Range)
- Line scanner or raster scanner
- Clear view of the bar codes to be measured on the objects.

### Identifying Bar Codes

Identifying partly damaged or low-quality bar codes as well as an additional CAN interface.

### About This Document

The purpose of these operating instructions is to allow you to put the CLV61x into operation quickly and easily and to achieve initial read results as a stand-alone device.

The operating instructions describe the commissioning process for an application with a single CLV61x. This is done, for example, using the device version CLV610-C0000 from the CAN series and its default setting. The CDB620 connection module, for example, is used for the industrial-standard signal distribution of the CLV61x.

The operating instructions are valid for the following variants:
- CLV610-C0000 (CAN, Mid Range, line scanner, reading window on front, SMART decoder)
- CLV615-F2000 (FIELDBUS, Long Range, line scanner, reading window on side, CAN, SMART decoder)

In the following, the bar code scanner CLV61x is referred to in simplified form as “CLV61x.”

### Supplementary Documents

More detailed information about mounting and electrical installation as a stand-alone device is available in the “CLV61x Bar Code Scanner” Technical Information (no. 8015592).

This document describes:
- Optional mounting accessories (brackets)
- The prevention of ground potential equalization currents in applications with widely distributed systems
- Pin and lead color assignments of cables
- Electrical wiring plans for the CDB620 connection module relating to the CLV61x

### Operation of the CLV61x CAN in the SICK CAN Sensor Network

The setup and wiring of the SICK-specific CAN network as well as the integration of the CLV61x CAN and FIELDBUS in series in the network is described in the “SICK CAN Sensor Network Operating Instructions.”

### Operation of the CLV61x FIELDBUS in PROFIBUS DP

The integration of the CLV61x FIELDBUS series in PROFIBUS DP via the CDF600-21xx fieldbus module is described in the “CDF600-21xx Fieldbus Module PROFIBUS DP” Operating Instructions (no. 8015335) and the supplementary “CDF600-21xx Fieldbus Module PROFIBUS DP” Technical Information (no. 8015337).

### Mounting CLV61x

1. Select a suitable mounting location for the CLV61x with a clear view of the object to be scanned. The mounting location and position depend on the respective reading range of the CLV61x version. The available reading range is dependent on the distance from the code and the required resolution. The mounting location must therefore be chosen whilst taking into account the respective reading field length and height, as well as resolution and depth of focus (*see section “Reading field Page 5”*).

2. Mount the CLV61x on a bracket using both screws.

### Mounting Requirements

- 2 x M5 screws for mounting the CLV61x on a mounting device (bracket). Screw length is dependent on the mounting base (wall thickness of bracket). When using optional SICK brackets, screws for the CLV61x are included.

### Equipment Required

- **2 x M5 screws** for mounting the CLV61x on a mounting device (bracket). Screw length is dependent on the mounting base (wall thickness of bracket). When using optional SICK brackets, screws for the CLV61x are included.

### Mounting Requirements

- The permitted ambient conditions for the operation of the CLV61x must be complied with (e.g., temperature, radiation, ground potential *see section “Technical Specifications (Excerpt) Page 5” and section “Risk of injury/risk of damage via electrical current (Page 2)”).

- The device must only be mounted using the pairs of threaded mounting holes provided for this purpose.

- Stable mounting device with sufficient load-bearing capacity and suitable dimensions for the CLV61x. Weight depends on model, max. 206 g (not including cables). For dimension drawing, see section “Device overview CLV61x” on page 3.

### Shock and vibration-free mounting.

- Clear view of the bar codes to be measured on the objects.

### Mounting CLV61x

1. Select a suitable mounting location for the CLV61x with a clear view of the object to be scanned. The mounting location and position depend on the respective reading range of the CLV61x version. The available reading range is dependent on the distance from the code and the required resolution. The mounting location must therefore be chosen whilst taking into account the respective reading field length and height, as well as resolution and depth of focus (*see section “Reading fields Page 5”*).

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### Mounting Requirements

- 2 x M5 screws for mounting the CLV61x on a mounting device (bracket). Screw length is dependent on the mounting base (wall thickness of bracket). When using optional SICK brackets, screws for the CLV61x are included.

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### Mounting Requirements

- The permitted ambient conditions for the operation of the CLV61x must be complied with (e.g., temperature, radiation, ground potential *see section “Technical Specifications (Excerpt) Page 5” and section “Risk of injury/risk of damage via electrical current (Page 2)”).

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- Stable mounting device with sufficient load-bearing capacity and suitable dimensions for the CLV61x. Weight depends on model, max. 206 g (not including cables). For dimension drawing, see section “Device overview CLV61x” on page 3.

### Shock and vibration-free mounting.

- Clear view of the bar codes to be measured on the objects.
4. In order to avoid a total reflection of the scanning line, tip the CLV61x with the following skew angle from the perpendicular to the bar code surface.

- **Line scanner (front reading window) - 105°**
- **Line scanner (lateral reading window) - 105°**

Avoid surface reflection through correct arrangement.

Connection Module CDB620
- Mount the CDB620 connection module in the vicinity of the CLV61x. Through the serial data interfaces (RS-232) recommended cable length max. 5 m between both devices. Mount the CDB620 in such a way that the device can be accessed at all times. In relation to this, see “CDB620 Connection Module” Operating Instructions (no. 8012119).

**Step 2: Electrical Connection**

- The electrical installation must only be performed by qualified electricians.
- The currently applicable safety regulations must be observed when working in electrical systems.
- Electrical connections between the CLV61x and other devices may only be created or fixed when there is no power to the system. Otherwise, the devices may be damaged.
- When using extension cables with open ends, ensure that bare wire ends do not come into contact with each other (risk of short-circuit when supply voltage is switched on). Wires must be appropriately insulated from each other.
- Wire cross sections of the supply cable from the customer’s power system should be designed in accordance with the applicable standards.
- If the supply voltage for the CLV61x is not supplied via the optional CDB620 connection module, the CLV61x must be protected by a separate max. 2 A slow-blow fuse at the beginning of the supply circuit.
- In order to retain the IP 65 enclosure rating for the CLV61x connecting cable even when using an extension cable (e.g., no. 6034417, 2 m/6.56 ft), insert rubber seal no. 4038847 between the plug and socket of the D-Sub plug. Connection of the cables and screw in the plug connection.
- Circuits connected to the CLV61x must be designed as SELV circuits (SELV = Safety Extra Low Voltage).

**Warning**

**RISK OF DAMAGE**

**Risk of injury/risk of damage via electrical current!**

The CLV61x is designed to be operated in a system with professional grounding of all connected devices and mounting surfaces to the same ground potential. Incorrect grounding of the CLV61x can, due to equipotential bonding currents between the CLV61x and other grounded devices in the system, place the metal housing under a dangerous voltage, cause malfunction and destruction of devices as well as damage to the cable shielding through heating, and thus cause cable fires.

- Work on the electrical system must only be performed by qualified electricians.
- Ensure ground potential at all grounding points.
- In the event of damage to the cable insulation, immediately switch off the power supply and have the damage repaired.

**Note:** See the “Electrical Installation” chapter in the “CLV61x Bar Code Scanner” Technical Information (no. 8015952) on the product site on the web (www.sick.com/CLV61x) for measures to eliminate hazards.

1. Connect the 15-pin D-Sub-HD plug of the CLV61x cable to the CDB620 connection module.
2. Connect a read pulse sensor, such as a photoelectric sensor at the “Sera 1” switching input of the CDB620. See the “Electrical Installation” chapter in the “CLV61x Bar Code Scanner” Technical Information (no. 8015952).
3. Connect the serial AUX interface (RS-232) of the CLV61x to the PC (9-pin D-Sub plug) with a suitable data cable (e.g., no. 2014054, 2 m) using the internal plug “AUX” (9-pin D-Sub) of the CDB620. If the PC does not have an RS-232 interface, use a suitable adapter cable with RS-232 <> USB converter (e.g., no. 6042499, 1.5 m).

Electrical connection of the CLV61x for commissioning as a stand-alone device.

4. Switch on the supply voltage for the CDB620 and the PC. All LEDs on the CDB620 will light up briefly.

The CLV61x starts with a delay and uses the default parameters set in the factory for the initialization. After a successful self-test, the LED on the CLV61x lights up blue to indicate the “Device Ready” status.

**Step 3: Configuration with PC**

User Modes and Statuses of the CLV61x:
- Quick Start (initial commissioning for read operation)
- Read operation
- Percentage evaluation (for diagnostic purposes)
- Configuration via SOPAS ET configuration software
- Firmware download

**Configuration**

**Note:** In case of error, the SOPAS ET configuration software is used by default to adjust the CLV61x parameters to the application and to the diagnostics.

**Installing and Starting the Configuration Software**

1. Download and install the SOPAS ET software on the PC from the website “www.sick.com/software/”. In this case, select the “Complete” option as suggested by the install wizard.
2. Start “Standard” user interface for standalone applications.
3. Establish a connection between software and CLV61x e.g., via the serial AUX interface (57.6 kBit).

The connection wizard starts automatically. Under interface selection, select the standard protocol.

4. Select the CLV61x from the devices that are now available and displayed. The **Quick Start** device page appears.

**SOPAS ET Program Window**

**Device tree (left), device page Quick Start (right)**

**User Level, Parameter Download**

The user is automatically logged onto the CLV61x at user level “Authorized Client” (password: client). The user can change parameters, which will be immediately transferred to the CLV61x (default). Initially they will have only temporary effect there, without being saved, until the supply voltage is switched off. If the parameters are to be retained, they must be permanently saved (see section “c. Completing the Configuration Page 2”).

**a. Configuration via the “Quickstart” Device Page**

The “Quickstart” device page offers an overview of the most important parameters and enables quick evaluation of code content. Functions such as “Evaluation Window,” “Percentage Evaluation,” “Code Configuration,” and “Scanning Frequency” are available via the Quickstart.

**Evaluation Window**

The evaluation window shows the code content, the code type, the increment index, the code security, and the device number of the reading CLV61x.

**Percentage Evaluation**

The percentage evaluation permanently assesses the quality of the reading. Bar codes are not assessed. Here, the bar codes must not be subjected to any conveying movement.

The CLV61x performs 100 scans in each case and evaluates the reading quality. The CLV61x continuously emits read results every 2 s via the AUX interface, together with the read diagnostic data.

**Code Configuration**

In the factory default setting, the CLV61x decodes the following code types:
- Code 39
- Interleaved 2 of 5
- Code 128 family

To activate or deactivate further code types:
- Device tree -> Parameters -> Code configuration.

**b. Summary of Further Useful Adaptation Options**

**Object Trigger Control**

The CLV61x can, as described in the standard application, be operated with a connected read pulse sensor, such as a photoelectric sensor on the “Sensor 1” switching input. To select a different pulse type or switching input:

- Device tree -> Parameters -> Object trigger control.

**c. Completing the Configuration**

- Permanently save the entire configuration:
  - Parameter set in CLV61x: click the **button**
  - Configuration file on the PC: click the **button**.

**Important:** In order to commission the CLV61x CAN or FIELDBUS series in the SICK CAN scanner network together with further SICK products, select the “Advanced” user interface when starting the configuration software program. Path: Start > Programs > SICK > SOPAS ET Engineering Tool > SOPAS.

The “Standard” user interface option is not suitable for this.

**Default Setting CLV61x (Summary)**

**SOPAS ET Program Window**

**Device tree (left), device page Quick Start (right)**

**User Level, Parameter Download**

The user is automatically logged onto the CLV61x at user level “Authorized Client” (password: client). The user can change parameters, which will be immediately transferred to the CLV61x (default). Initially they will have only temporary effect there, without being saved, until the supply voltage is switched off. If the parameters are to be retained, they must be permanently saved (see section “c. Completing the Configuration Page 2”).

**Evaluation Window**

In case of error, the SOPAS ET configuration software is used by default to adjust the CLV61x parameters to the application and to the diagnostics.

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1. Download and install the SOPAS ET software on the PC from the website “www.sick.com/software/”. In this case, select the “Complete” option as suggested by the install wizard.
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The connection wizard starts automatically. Under interface selection, select the standard protocol.

4. Select the CLV61x from the devices that are now available and displayed. The **Quick Start** device page appears.

**SOPAS ET Program Window**

**Device tree (left), device page Quick Start (right)**

**User Level, Parameter Download**

The user is automatically logged onto the CLV61x at user level “Authorized Client” (password: client). The user can change parameters, which will be immediately transferred to the CLV61x (default). Initially they will have only temporary effect there, without being saved, until the supply voltage is switched off. If the parameters are to be retained, they must be permanently saved (see section “c. Completing the Configuration Page 2”).
Step 4: Fine Adjustment

1. Align the CLV61x so that the angle between the scanning line and the bar code stripes is almost 90°.
2. Manually guide objects with bar codes successively into the reading field of the CLV61x in a realistic manner and check the reading result. If objects are only guided in an unstructured manner, it may be necessary to check several different positions of the bar codes. Here, it must be ensured that the limit values of the permitted read angles are not exceeded.
3. Adjust the CLV61x so that the good read rate is 100%.
Overview of all interfaces and connection options for CLV61x ECO/CAN

Overview of pin assignment

Overview of all interfaces and connection options for CLV61x FIELDBUS
Acoustic Status Indicator (Beeper)

Depending on the user mode of the CLV61x, the beeper uses different melodies or single tones to indicate the following results:

- Fulfillment/non-fulfillment of a configured condition in read operation (e.g., Good Read)
- The completion of device functions triggered by the user or ended by quitting (confirmation of operation steps)
- Completion of functions (positive/negative confirmation)

Beeper Default Setting:

Switched on, volume: quiet, read operation: output condition “Good Read”.

User Mode | Function/Sound
--- | ---
Switching on | Successful self-test and start of read operation: melody
Read operation | Confirmation of Good Read in default setting: a tone, Adjustable event condition
Percentage Evaluation | Start: melody; 100 scans per read: a tone
End: melody
Configuration | Parameter download to CLV61x: Start, melody, successful completion: melody
Firmware download | Parameter upload from CLV61x: no sound
Reboot CLV61x | Successful completion: melody
Loading the sdd file to the CLV61x | End: melody

Technical Specifications (Excerpt)

<table>
<thead>
<tr>
<th>Models</th>
<th>CLV610-C0000 (no. 1057125)</th>
<th>CLV615-F2000 (no. 1058334)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Series</td>
<td>CLV610-C0000: CAN</td>
<td>CLV615-F2000: FIELDBUS</td>
</tr>
<tr>
<td>Scanning method</td>
<td>Line scanner</td>
<td></td>
</tr>
<tr>
<td>Reading window</td>
<td>CLV610-C0000: on front</td>
<td>CLV615-F2000: on side</td>
</tr>
<tr>
<td>Reading range/Code resolution</td>
<td>CLV610: Mid range/ 0.2 mm ... 1.0 mm</td>
<td>CLV615: Long range/ 0.35 ... 1.0 mm</td>
</tr>
<tr>
<td>Code types</td>
<td>All current 1D code types</td>
<td></td>
</tr>
<tr>
<td>Focus</td>
<td>Fixed focus</td>
<td></td>
</tr>
<tr>
<td>Scanning frequency</td>
<td>400 Hz ... 1,000 Hz</td>
<td></td>
</tr>
<tr>
<td>Light source</td>
<td>Visible red light (655 nm)</td>
<td></td>
</tr>
<tr>
<td>Laser class</td>
<td>Class 2 according to EN/IEC 60825-1:2014 (identical to EN/IEC 60825-1:2007)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Complies with 21 CFR 1040.10 except for the tolerance according to Laser Notice No. 50 from June 24, 2007 and its followers.</td>
<td></td>
</tr>
<tr>
<td>Ambient light compatibility</td>
<td>2,000 lx (on bar code)</td>
<td></td>
</tr>
<tr>
<td>Optical indicators</td>
<td>1 RGB-LED, multi-colored</td>
<td></td>
</tr>
<tr>
<td>Acoustic indicators</td>
<td>Beeper, can be deactivated, can be allocated for event signaling</td>
<td></td>
</tr>
<tr>
<td>Host interface</td>
<td>Serial (RS-232), 2.4 kBd... 115.2 kBd</td>
<td></td>
</tr>
<tr>
<td>AUX interface</td>
<td>Serial (RS-232), 57.6 kBd (fixed)</td>
<td></td>
</tr>
<tr>
<td>CAN interface</td>
<td>CAN sensor network</td>
<td></td>
</tr>
<tr>
<td>Fieldbus connection</td>
<td>CAN interface</td>
<td></td>
</tr>
<tr>
<td></td>
<td>CLV615-F2000 only: Via serial interface to external CDF600-21xx fieldbus module (PROFIBUS DP)</td>
<td></td>
</tr>
<tr>
<td>Switching inputs</td>
<td>2 x physical, 2 x additional external via optional CMC600 module</td>
<td></td>
</tr>
<tr>
<td></td>
<td>V_in = max. 30 V, I_in = max. 5 mA Opto-decoupled, reverse polarity protected</td>
<td></td>
</tr>
<tr>
<td>Switching outputs</td>
<td>2 x physical, 2 x additional external via optional CMC600 module</td>
<td></td>
</tr>
<tr>
<td></td>
<td>V_out = VS– 1.5 V, I_out ≤ 100 mA, Short-circuit protected, temperature protected</td>
<td></td>
</tr>
<tr>
<td>Electrical connection</td>
<td>Standard cable 0.9 m/2.95 ft (+10%) with 15-pin D-Sub-HD plug</td>
<td></td>
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<tr>
<td>Electrical safety</td>
<td>EN 60950-1: 2011-01</td>
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<tr>
<td>Protection class</td>
<td>II (VDE 016 / IEC 10110-1)</td>
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<tr>
<td>Enclosure rating</td>
<td>IP 65 (DIN 40 050)</td>
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<tr>
<td>Vibration resistance</td>
<td>EN 60068-2-6: 2008-02</td>
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<tr>
<td>Shock resistance</td>
<td>EN 60068-2-27: 2009-05</td>
<td></td>
</tr>
<tr>
<td>Ambient temperature</td>
<td>Operation: 0 °C ... +40 °C Storage: -20 °C ... +70 °C</td>
<td></td>
</tr>
<tr>
<td>Permissible relative air humidity</td>
<td>90%, non-condensing</td>
<td></td>
</tr>
</tbody>
</table>

1) With switching outputs without load
2) Without connecting cable and plug
For detailed technical specifications, see the Online Data Sheet on the product site on the web (www.sick.com/CLV61x).

**Warnings**

⚠️ **CAUTION**

**Optical radiation: Laser class 2**

The CLV61x uses a red laser diode and corresponds to laser class 2.

The entire reading window is a laser output aperture.

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**Installation site and design of the combination of black and yellow laser warning label and type label with laser performance data.**

**Meaning of the laser warning label:** Laser radiation - Do not look into the laser beam - laser class 2

**Controlling the Laser Diode**

In real operation (triggered read mode), the CLV61x switches the laser diode on and off again with the trigger signals of the conveyor system (object in reading range). Triggering occurs here via the switching inputs of the CLV61x or by a command via one of the data interfaces.

A laser timeout configured with SOPAS ET (device page ILLUMINATION CONTROL) can be used to automatically switch off the laser diode for this type of object trigger control if the pulse has stopped for too long (e.g., conveyor system has stopped). If the function is activated, the laser timeout is 10 min (default). The current internal reading interval of the CLV61x remains open.

The laser diode is permanently or repeatedly switched on in the following device statuses:

- In the “Percentage Evaluation” and “Auto Setup” user modes (only used temporarily for configuration or diagnosis)
- In reading operation in the pulsing types “Auto cycle” (adjustable pulse/pause ratio) or “free.”

If timeout is activated, it will have no effect here.

**Important!** The CLV61x has no optical indicator (LED) for laser diode activity.

**Maintenance and Care**

The CLV61x operates without the need for maintenance, except for cleaning the reading window if it gets contaminated.

- In order to obtain maximum reading performance from the CLV61x, the reading window must be cleaned at regular intervals (e.g., weekly). This applies especially when using the CLV61x in harsh environments (dust, abrasion, moisture, etc.).
- For reading, the reading window has to be generally clean and dry.

**Cleaning the Reading Window**

The type of screen material used in the reading window can be found on the type label of the device:

- CLV61x-xxxx
  - y = 0: Glass
  - y = 1: Plastic

**NOTE**

**Damage to the Reading Window!** Reduced reading performance due to scratches or streaks on the reading window.

- Do NOT use any aggressive cleaning agents with powder additives (increased abrasion) or agents e.g., acetone for cleaning.
- Avoid any movements that could cause scratches or abrasions on the reading window.

1. Switch off the device for the duration of the cleaning (laser protection!) or if this is not possible, wear laser protection goggles, which absorb the wavelength used and effectively prevent damage to the eyes.
2. Remove dust from the reading window (glass) using a soft clean brush.
3. Clean the reading window (plastic additionally for glass if required) with a clean, soft, damp cloth (mild, anti-static cleaning agent).

**Important!**

- If the reading window is scratched or damaged (cracked, broken), the window must be replaced by SICK service personnel. Contact SICK Service to arrange this.
- Static charge causes dust particles to adhere to the reading window. This effect can be avoided by using the SICK anti-static plastic cleaner (no. 5600006) in combination with the SICK lens cloth (no. 400335).

**Transport and Storage**

The CLV61x must be transported and stored in its original packaging. The device must not be stored in airtight containers, so that any residual moisture is able to escape.

Storage conditions: dry, dust-free, no direct sunlight, -20 °C ... +70 °C, relative air humidity max. 90% (non-condensing).

**Repairs**

Repair work on the CLV61x may only be performed by qualified and authorized service personnel from SICK AG.

**Disassembly and Disposal**

Any CLV61x which can no longer be used must be disposed of in an environmentally friendly manner in accordance with the respective applicable country-specific waste disposal regulations. The CLV61x is electronic waste and must under no circumstances be disposed of with general waste! SICK AG is not currently able to take back devices that can no longer be used.

**Sources for Obtaining Additional Information**

Additional information about the CLV61x and its optional accessories can be found on the following online product page:

**CLV61x**

- www.sick.com/CLV61x
  - Ordering information
  - Operating instructions in German (no. 8015588) and English (no. 8015598), in other languages if applicable
  - Technical information for CLV61x bar code scanners in German (no. 8015591) and English (no. 8015592)
  - EC Declaration of Conformity
  - Detailed technical specifications (online data sheet)
  - Dimensional drawing and 3D CAD dimension models in various electronic formats
  - SOPAS ET configuration software with online help
  - Information about suitable accessories (e.g. cables, mounting brackets, trigger sensors)
  - Publications dealing with accessories

**Integration of CLV1x FIELDBUS in PROFIBUS DP**

- www.sick.com/CDF600-2
  - CDF600-21xx PROFIBUS DP fieldbus module operating instructions in German (no. 8015334) and English (no. 8015335)
  - Technical information for CDF600-21xx PROFIBUS DP fieldbus module (no. 8015336) and English (no. 8015337)

**Documents on Request**

- Overview of command strings for CLV61x

Support is also available from your sales partner: www.sick.com/worldwide