



## Lector65x Dynamic Focus

Image-based code reader  
with dynamic focus control

**SICK**  
Sensor Intelligence.



### Correct use

The Lector65x Dynamic Focus image-based code reader with integrated illumination is an intelligent SICK-4Dpro sensor. It is used for automatic, fixed identification and decoding of codes on moving or stationary objects. It reads all commonly used 1D codes (bar codes/stacked codes) and 2D codes (matrix codes).

The Lector65x Dynamic Focus uses its host interface to send the read data to a higher-level computer for further processing.

### About this document

In this document, the Lector65x Dynamic Focus is referred to in simplified form as a “device.”

The purpose of this quickstart is to allow you to put the device into operation quickly and easily and to achieve initial read results. This quickstart describes a stand-alone application for one device based on the default settings. The optional CDB650-204 connection module is used for the industrial-standard signal distribution of the device.

This quickstart is applicable for the variants according to the type code. → See “Type code” on page 6.

### Supplementary and other relevant documents

More information, such as application examples and downloads of associated documents (operating instructions) and associated software can be found on the SICK product page on the Internet:

[www.sick.com/Lector65x](http://www.sick.com/Lector65x)

Information about configuration can be found in the online help function of the SOPAS ET configuration software.

### Safety information

- This chapter is about the safety of commissioning personnel, as well as operators of the system in which the device is integrated.
- Read this quickstart carefully before commissioning the device in order to familiarize yourself with the device and its functions. The quickstart is considered as part of the device and must be kept in an accessible location in the immediate vicinity of the device at all times!
- During operation, the surface temperature of the device housing (particularly on the rear of the device where the cooling fins are located) can reach 70 °C.
- To comply with the IP 65 enclosure rating in operation, the following requirements must be met: If this is not done, the device does not fulfill any specified IP enclosure rating.
  - The black cover for the microSD card slot (rear of device) must be screwed tight to the device.
  - The SICK cables plugged into the M12 and M8 connections must be screwed tight.
  - Electrical connections that are not being used must be fitted with yellow protective caps or plugs, which must be screwed tight (as on delivery).
  - Only operate the device without the cover for the microSD card slot for a short period while inserting or removing the memory card. During this time, protect the device against moisture and dust.
- Opening the screws of the device housing, including the optics protective hood, will invalidate any warranty claims against SICK AG. For further warranty provisions, see the General Terms and Conditions of SICK AG, e.g. on the delivery note of the device.
- Data integrity: SICK AG uses standardized data interfaces, such as standard IP technology, in its products. The emphasis here is on the availability of products and their features. SICK AG always

assumes that the integrity and confidentiality of the data and rights affected by the use of these products will be ensured by the customer. In all cases, appropriate security measures, such as network separation, firewalls, virus protection, and patch management, must be taken by the customer on the basis of the situation in question.

### Optical radiation

Depending on the model, the Lector65x Dynamic Focus falls into LED risk group RG 1 or RG 2 and laser class 1. → “Technical data (excerpt)” on page 5.

For details of hazards and protective measures see below.

### Laser radiation

#### Aiming laser

#### ⚠ CAUTION

#### Optical radiation: Class 1 laser

The accessible radiation of the aiming laser does not pose a danger when viewed directly for up to 100 seconds. It may pose a danger to the eyes and skin in the event of incorrect use.

- Do not open the housing. Opening the housing will not switch off the laser. Opening the housing may increase the level of risk.
- Current national regulations regarding laser protection must be observed.

### LED radiation

#### Risk group 1:

**Color of illumination: white. Color of spot: green**

#### ⚠ CAUTION

#### Optical radiation: LED risk group 1, visible radiation, 400 nm to 780 nm

The LEDs may pose a danger to the eyes in the event of incorrect use.

- Do not look into the light source intentionally.
- Do not open the housing. Opening the housing will not switch off the light source. Opening the housing may increase the level of risk.
- Comply with the current national regulations on photobiological security of lamps and lamp systems.

#### Risk group 2:

**Color of illumination: blue**

#### ⚠ CAUTION

#### Warning! Optical radiation: LED risk group 2, visible radiation, 400 nm to 780 nm

Potentially dangerous optical radiation. Can be damaging to the eyes.

- Do not look into the light source for extended periods of time.
- Never point the light source at people.
- Avoid light source reflections caused by reflective surfaces. Be particularly careful during mounting and alignment work.
- Do not open the housing. Opening the housing will not switch off the light source. Opening the housing may increase the level of risk.
- Comply with the current national regulations on photobiological security of lamps and lamp systems.

### For laser and LED radiation:

It is not possible to entirely rule out temporary disorienting optical effects, particularly in conditions of dim lighting. Disorienting optical effects may come in the form of dazzle, flash blindness, afterimages, photosensitive epilepsy, or impairment of color vision for example.

- **CAUTION** – if any operating or adjusting devices other than those specified here are used or other methods are employed, this can lead to dangerous exposure to radiation.
- If the device is operated in conjunction with external illumination systems, the risks described here may be exceeded. This must be taken into consideration by users on a case-by-case basis. It may be advisable to consult the manufacturer.

→ More information “Technical data (excerpt)” on page 5.

### Important!

A device with LEDs in risk group RG 2 carries a black and yellow warning label in English on the optics protective hood. A corresponding self-adhesive label in French is also included with delivery.

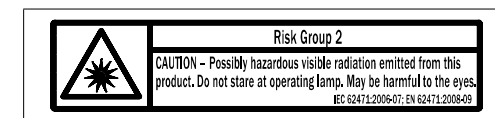


Fig. 1: LED risk group 2 warning label (English version)  
Risk group 2 CAUTION – possibly hazardous visible radiation emitted from this product. Do not stare at operating lamp. May be harmful to the eyes.  
IEC 62471:2006-07; EN 62471:2008-09

## Commissioning and configuration

### Scope of delivery

- The version of the device ordered, including two M5 sliding blocks. Electrical connections fitted with protective caps or plugs. Without connecting cables.
- Self-adhesive warning label in French for integrated illumination in LED risk group RG 2
- AF 2 hexagon key for opening and closing the cover of the microSD card slot
- Printed quickstart in German (No. 8016182) and English (No. 8016183). Other language versions may be available in PDF format from the online product page: [www.sick.com/Lector65x](http://www.sick.com/Lector65x)
- Optional accessories, such as brackets and connecting cables, are only supplied if ordered separately

### Step 1: Mounting and alignment

#### Equipment required

- Two or four M5 screws for mounting the device on a bracket supplied by the customer. Screw length is dependent on the mounting base (wall thickness of bracket). When using optional SICK brackets, screws for the device are included with delivery.

#### Mounting requirements

- The permissible ambient conditions for operating the device must be observed (e.g. assigned region, ambient temperature, ground potential). → See "Technical data (excerpt)" on page 5. → See warning "Risk of injury and damage caused by electrical current!" on page 2.
- Dissipation of lost heat from device:
  - It is important to ensure good heat transfer from the device to the mounting base (e.g. profile) via the bracket, particularly in the case of high ambient temperatures!
  - If the device is highly enclosed, make sure there is enough space between the rear of the device and the wall to allow the waste heat to be properly dissipated into the air by means of convection.
- Stable bracket with sufficient load-bearing capacity and suitable dimensions for the device. Weight depends on model, max. 950 g (not including cables). → Dimensional drawing, see "Device layout" on page 4.
- Shock and vibration-free mounting
- Clear view of the codes to be detected on the objects

#### Mounting the device

1. If required for the country in question, stick the French warning label supplied over the English warning label for LED risk group RG 2
2. Connect the designated cable(s) to the device.
3. Mount the device. Perform one of the following steps:
  - Mount the optional SICK bracket (e.g., mounting bracket part no. 2069169) to the device using the two sliding nuts.
  - Mount the device on a bracket using M5 screws. To do this, either use the 4 threaded mounting holes on the rear of the device or, alternatively, use the two M5 sliding nuts in the lateral slots.

Insert the screws into the threaded mounting holes or sliding nuts by a maximum of 5 mm!

→ Dimensional drawing, see "Device layout" on page 4

#### Aligning the reading window of the device with the code

Remember to consider the shape and alignment of the field of view in front of the device.

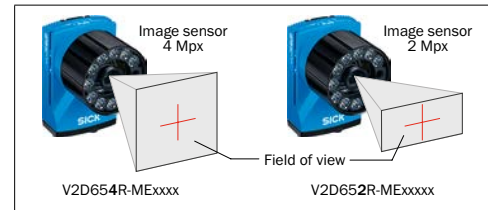


Fig. 2: Image-sensor-dependent viewing ranges in front of the device; size stretching is distance-dependent

#### Taking account of the working distance, which is dependent on resolution

Using the Auto-Setup function, the device automatically adjusts its focal distance to suit the working distance from the code.

Resulting reading ranges: → see "Field of view diagram" on page 7.

#### Taking account of the reading angle

- Tilt the device away from the plane that is perpendicular to the surface of the code to avoid as many interfering reflections as possible. Typically, this angle will be between 10° and 20°.

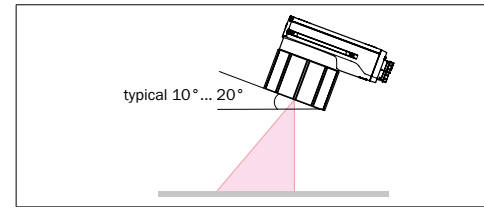


Fig. 3: Selection of the skew angle, depending on the application

In the case of codes created on metal, e.g. by dot peening, an angle of between 0° (bright field light) and 45° (dark field light) may be advisable.

#### Mounting the optional CDB650-204 connection module

Mount the CDB650-204 connection module in the vicinity of the device. When using the serial data interfaces (RS-232), the recommended cable length between the devices is max. 5 m.

Mount the CDB650-204 in such a way that the device can be accessed at all times. To do this, see the CDB650-204 connection module operating instructions.

### Step 2: Electrical installation

- **The electrical installation must only be performed by electrically qualified persons.**
- **Standard safety requirements must be met when working in electrical systems!**
- Electrical connections between the device and other devices may only be created or disconnected when there is no power to the system. Otherwise, the devices may be damaged.
- When using connecting or extension cables with an open end, make sure that bare wire ends are not touching (risk of short-circuit when the supply voltage is switched on). Wires must be appropriately insulated from each other.
- Wire cross-sections in the supply cable from the customer's power system should be designed in accordance with the applicable standards.
- If the supply voltage for the device is not supplied via the optional CDB650-204 connection module, the device must be protected by a separate max. 2 A slow-blow fuse at the beginning of the supply circuit.
- All circuits connected to the device must be designed as SELV circuits. (SELV = Safety Extra Low Voltage).

### ⚠ WARNING

#### Risk of injury and damage caused by electrical current!

The device 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 Lector65x Dynamic Focus can result in equipotential bonding currents between the device and other grounded devices in the system. This can lead to hazardous voltages being applied to the metal housing, cause devices to malfunction or sustain irreparable damage, and damage the cable shield as a result of a heat increase, causing cables to set alight.

- Ensure that the ground potential is the same at all grounding points.
- If the cable insulation is damaged, disconnect the power supply immediately and have the damage repaired.

1. Connect the communication interface of the device to the PC (Ethernet or USB, depending on model).
2. Supply the device with voltage as per the type label specifications.

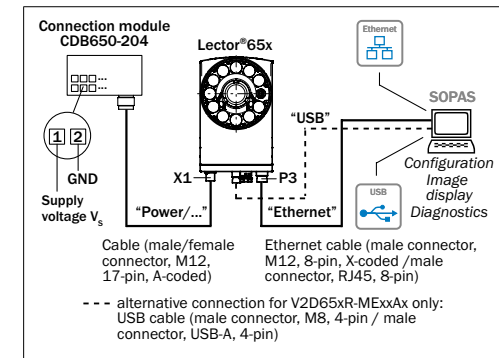


Fig. 4: Connection block circuit diagram for commissioning a Lector65x Dynamic Focus with connection variant 1 (V2D65xR-MEExAx)

### Step 3: Configuration

#### a. Configuration without PC

The two function buttons and the LEDs with their second display level are used for adjusting the reading performance of the device without a PC.

The device uses the Auto-Setup function to adjust itself automatically to suit the working distance, lighting conditions, and quality of the code presented (not

applicable to Pharmacode). According to the default setting, the values calculated for the three parameter modules during this process are saved, thereby overwriting the existing configuration.

1. Start "Edit" mode.  
For the sake of clarity, the LED status indicators, function buttons, and bar graph are shown below in compressed form.

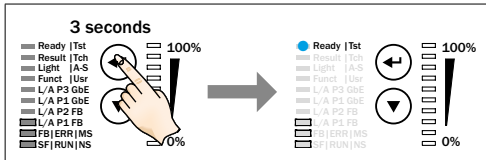


Fig. 5: Configuration – Step 1

2. Aligning the device to code

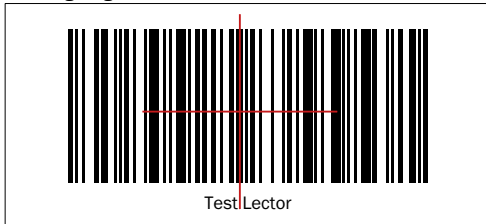


Fig. 6: Configuration – Step 2

3. Select Auto-Setup.

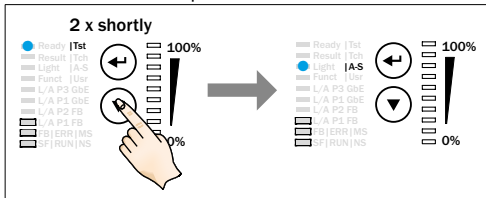


Fig. 7: Configuration – Step 3

4. Start Auto-Setup.

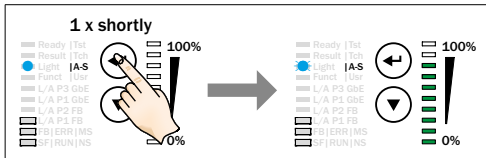


Fig. 8: Configuration – Step 4

#### Device feedback in Auto-Setup

The bar graph shows the progress of the Auto-Setup function in percent. 100% means the Auto-Setup

has finished. The color of the "Auto-Setup" LED now signals the success status.

LED A-S (Auto-Setup)	Color	Status
	Blue	Auto-Setup selected
	Blue	Auto-Setup started
	Green	Auto-Setup successfully finished
	Yellow	Auto-Setup partially successful (in at least one of the 3 parameter modules)
	Red	Auto-Setup was unsuccessful

● = illuminated; ● = flashing

Tab. 1: LED A-S (Auto-Setup)

#### Important!

If the "A-S" LED lights up yellow or red, the read result is insufficient. Check the alignment and the distance of the device from the code. → See "Step 1: Mounting and alignment" on page 2.

5. Exit "Edit" mode and save the parameters.

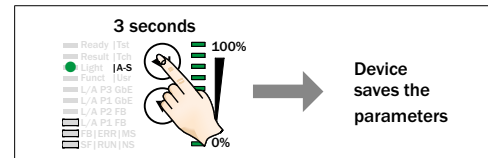


Fig. 9: Configuration – Step 5

Alternatively, the device saves the parameters automatically if 5 minutes elapse without a key being pressed, and it returns to read mode.

#### b. Configuration with PC

The SOPAS ET configuration software is used by default to adjust the device parameters to the application and in case of error to the diagnostics.

The device supports this process by displaying the images it has recorded in the SOPAS ET software (requirement concerning SOPAS ET: V. 2.38 or higher). If the reading performance of the device has been adapted without a PC, SOPAS ET is generally used to continue the configuration process (reading clock, read result formats, data interface, etc.).

#### Installing and starting the configuration software

1. Download and install the latest version of the SOPAS ET configuration software, as well as current device description files (\*.sdd), from the

online product page for the software by following the instructions provided there.

[www.sick.com/SOPAS\\_ET](http://www.sick.com/SOPAS_ET)

In this case, select the "Complete" option as selected by the installation wizard.

Administrator rights may be required on the PC to install the software.

2. Select the required user interface upon startup:
  - "Standard" user interface for standalone applications
  - "Advanced" user interface if the device is integrated in a network (e.g., CAN bus).
3. Establish a connection between the software and the device via Ethernet or USB (depending on model).  
The connection wizard starts automatically.
4. The following IP address is configured by default on the device:
  - IP address P1: 192.168.1.1
  - IP address P3: 192.168.0.1
  - Subnet mask: 255.255.255.0
5. Select the Lector65x from the list of available devices. SOPAS establishes communication with the device and loads the associated device description file for the device. The program window, which is divided into three sections, opens.



Fig. 10: SOPAS ET program window example

- ①. "Wizard and help" area
- ②. "Image display" area
- ③. "Configuration" area

#### Configuring the device

1. In the ONLINE IMAGE window, click the EDIT button.  
The device now starts recording images consecutively and uses the current settings to decode them. The effects of any parameter changes are directly visible.

In EDIT mode or when using the Auto-Setup wizard, the following functions are deactivated:

- Switching inputs and outputs
- Data output via the host interface

#### Configuring reading performance with the Wizard

- Start the Auto-Setup wizard on the left in the program window and follow the instructions in the dialog box.  
The device uses the Auto-Setup function to adjust itself automatically to suit the working distance, lighting conditions, and quality of the code presented (not applicable to Pharmacode). The values calculated for the three parameter modules are stored temporarily at first. SOPAS ET Standard applies the parameters to the two configuration bars CAMERA & ILLUMINATION and CODES.

#### Continuing the configuration

1. For custom optimization of the image and code settings of the device click the CAMERA & ILLUMINATION and CODES configuration bars on the right and adjust the parameter values.
2. To make the changes directly visible, go to the image display window (ONLINE IMAGES) and click the EDIT button.
3. Make settings for additional functions during planned operation such as reading clock, read result formats, data interface, etc.
4. Go to the image display window (ONLINE IMAGES), click the OPERATION button and test the settings in read mode (real operation).

#### Completing the configuration

- Permanently save the entire configuration:
  - Parameter set in the device: Click the button.
  - Configuration file on the PC: Click the button.

## Device description

### Device layout

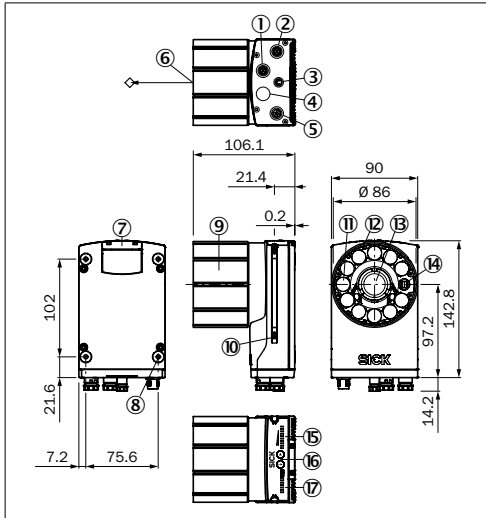


Fig. 11: Device layout (all dimensions in mm)

- ①. Connection P1, function and design dependent on model
- ②. Connection P3, function and design dependent on model
- ③. Connection X2, function and design dependent on model
- ④. Connection P2, function and design dependent on model
- ⑤. Connection X1, function and design dependent on model
- ⑥. Reference point for working distance (center of front window) from device to object
- ⑦. Black cover for the microSD memory card slot
- ⑧. M5 blind tapped holes, 5 mm deep (4 x), for mounting the device
- ⑨. Optics protective hood for lens unit and integrated illumination
- ⑩. Sliding nut M5, 5.5 mm deep (2 x), pivoting for an alternative method of mounting the device
- ⑪. Feedback LED, green
- ⑫. Ring light (11 x LEDs)
- ⑬. Lens unit
- ⑭. Outlet opening for light beam from aiming laser
- ⑮. Bar graph display (10 x LEDs)
- ⑯. Function button (2 x)
- ⑰. LEDs for status indicator (2 levels), 10 x

### Integrated illumination unit

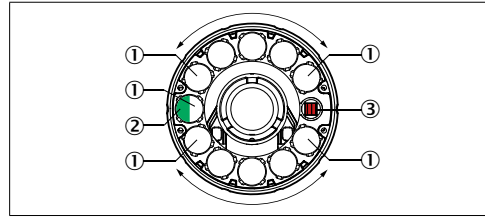


Fig. 12: Integrated illumination unit

- ①. Illumination = 11 x LEDs
- ②. Feedback LED, green (e.g. for "Good Read"), after a successful read operation (default) it briefly generates a light spot on the object within the field of view
- ③. Opening in illumination unit for targeting laser (alignment), 1 x red laser LED, can be disengaged. Generates a red cross in the field of view on the object

### Status indicators, functions

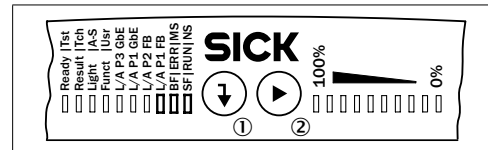


Fig. 13: LED status indicators, function buttons and bar graph display

- ①. Return pushbutton
- ②. Arrow pushbutton

### Status indicators on the first display level

Indicator	LED	Color	Status
Ready	●	Green	Device ready to read
	●	Red	Hardware or software error
Result	●	Green	Read operation successful
	●	Red	Read operation unsuccessful
Light	●	Green	Read mode: Illumination on, internal read gate open
Funct	●	Green	Function can be defined by user
	●	Yellow	Function can be defined by user
	●	Blue	Function can be defined by user
	●	Red	Function can be defined by user

● = illuminated; ● = flashing

Tab. 2: Status indicators on the first display level

### Status indicators on the second display level

Indicator	LED	Color	Status
Tst (Test)	●	Blue	Test (reading diagnostics) selected
	●	Blue	Test started
Tch (Teach-in)	●	Blue	Teach-in selected (default: match code)
	●	Blue	Teach-in started
	●	Green	Teach-in successful
	●	Red	Teach-in unsuccessful (match code default setting: unable to teach in any code)
A-S (Auto-Setup)	●	Blue	Auto-Setup selected
	●	Blue	Auto-Setup started
	●	Green	Auto-Setup successfully finished
	●	Yellow	Auto-Setup partially successful (in at least one of the 3 parameter modules)
	●	Red	Auto-Setup was unsuccessful
Usr (User)	●	Green	Function can be defined by user
	●	Yellow	Function can be defined by user
	●	Blue	Function can be defined by user
	●	Red	Function can be defined by user

● = illuminated; ● = flashing

Tab. 3: Status indicators on the second display level

### Test (reading diagnostics)

Percentage analysis: The device records a series of images and uses the current reading performance settings to decode them. The read rate of the last 10 read operations is displayed in % using the bar graph.

### Teach-in

When you teach in a match code, the device reads the code that is presented and saves it permanently (in accordance with the default setting) as a target code for future code comparisons during read mode. Pharmacode is only supported following activation with SOPAS ET.

### Auto-Setup

The device adjusts itself automatically to suit the lighting conditions, working distance, and quality of

the code presented. It saves the calculated values permanently in accordance with the default setting.

### Overview of electrical connections

→ See "Connection variant overview, connections and interfaces" on page 8.

→ See "Overview of design of connections and pin assignment" on page 8.

### MicroSD memory card (optional accessory)

#### Function

With the optional plug-in memory card, the device backs up the last permanently saved parameter set externally as well (cloning). Furthermore, the device can also optionally record images, e.g. in the case of "no reads". For the parameter safety concept and other functions of the memory card, refer to the online help for the device.

The memory card is not included with delivery.

To ensure that the memory card functions reliably, only use types approved by SICK (see accessories on [www.sick.com/Lector65x](http://www.sick.com/Lector65x)). The device supports memory cards up to max 16 GB. The memory card has no write protection that can be activated.

### NOTE

#### Possible data loss or irreparable damage to the memory card!

The device does not signal the respective access to the memory card (read or write).

- Do not remove the memory card or turn off the supply voltage if there are parameter values in the device that access the memory card that have been set to "continuous" with the SOPAS ET configuration software (e.g. image acquisition).
- To remove the memory card safely during operation, select the REMOVE CARD function under ANALYSIS TOOLS/MICROSD CARD in SOPAS ET configuration software and wait for SOPAS ET to provide confirmation.

### Inserting the memory card

On the device, the card slot can be accessed on the rear of the device. It is located behind the black cover above the type label. → See "Device layout" on page 4.

Maintaining the IP 65 enclosure rating: → See "Safety information" on page 1.

1. To release the cover, use the socket key provided (AF 2) to undo both (captive) hexagon socket screws.
2. Push the cover away from the device until the card slot can be accessed.
3. Making sure it is in the correct position (with the contacts facing the device and pointing down), insert the memory card into the slot until it locks into place.
4. Screw the cover back on.

## Transport and storage

Transport and store the device in its original packaging, ensuring that the protective caps or plugs have been screwed onto the electrical connections. Do not store outdoors. To ensure that any residual moisture present can escape, do not store the device in airtight containers. Do not expose to aggressive media (e.g. solvents such as acetone)

Storage conditions: dry, dust-free, no direct sunlight, storage temperature  $-20\text{ }^{\circ}\text{C}$  to  $70\text{ }^{\circ}\text{C}$ , as little vibration as possible, relative air humidity max. 90% (non-condensing).

## Maintenance and care

The device is maintenance-free. No maintenance is required in order to ensure compliance of the aiming laser with laser class 1 and LED risk group RG 1 or RG 2 for the integrated illumination unit.

- In order to obtain maximum read performance from the device, the reading window in the optics protective hood must be checked for contamination at regular intervals (e.g. weekly). This is especially true when using the device in harsh environments (dust, abrasion, moisture, etc.). The reading window must be kept clean and dry for reading.
- If the reading window is dirty, gently clean the window with a soft, damp cloth (mild cleaning agent).

### Important!

If the reading window is scratched or damaged (cracked, broken), the optics protective hood must be replaced by SICK service personnel. Contact SICK Service to arrange this.

Static charge may cause 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. 4003353).

## Repairs

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

## Disassembly and disposal

### ⚠ CAUTION

#### Risk of injury due to hot device surface!

In read mode, the surface of the device housing (particularly the rear of the device) can reach temperatures of up to  $70\text{ }^{\circ}\text{C}$ .

- Before commencing disassembly, switch off the device and allow it to cool down as necessary.

Any device 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 device is electronic waste and must under no circumstances be disposed of with general waste!

## Sources for obtaining additional information

Additional information about the device and its optional accessories can be found in the following places:

### Lector65x image-based code reader

[www.sick.com/Lector65x](http://www.sick.com/Lector65x)

For example:

- Lector65x Dynamic Focus quickstarts in German (No. 8016182) and English (No. 8016183) and possibly other languages as well
- Lector64x/65 operating instructions in German (part no. 8016184), English (part no. 8016185) and French (part no. 8020972) and possibly other languages as well.
- EU declaration of conformity
- Detailed technical specifications (online data sheet)
- Dimensional drawing and 3D-CAD dimension models
- Information on accessories (including cables, brackets, trigger sensors, external illumination units)
- Publications dealing with accessories

## CDF600-21xx PROFIBUS DP fieldbus module

[www.sick.com/CDF600-2](http://www.sick.com/CDF600-2)

- CDF600-21xx PROFIBUS DP Fieldbus Module Operating Instructions in German (No. 8015334) and English (No. 8015335), in other languages if required
- Technical Information for the CDF600-21xx PROFIBUS DP Fieldbus Module in German (No. 8015336) and English (No. 8015337)

## CDF600-22xx PROFINET fieldbus module

[www.sick.com/CDF600-2](http://www.sick.com/CDF600-2)

- CDF600-2200 PROFINET (M12 variant) Fieldbus Module Operating Instructions in German (No. 8015921 and English (No. 8015922), in other languages if required
- Technical information for the CDF600-22xx PROFINET fieldbus module in German (part no. 8015923) and English (part no. 8015924)

## Documents on request

- Overview of command strings for the Lector65x.

Support is also available from your sales partner:

[www.sick.com/worldwide](http://www.sick.com/worldwide)

## Copyright notices for open-source programs

SICK uses open-source software in the Lector65x. This software is licensed by the rights holders using the following licenses among others: the free licenses GNU General Public License (GPL Version 2, GPL Version 3) and GNU Lesser General Public License (LGPL), the MIT license, zLib license, and the licenses derived from the BSD license.

This program is provided for general use, but WITHOUT ANY WARRANTY OF ANY KIND. This warranty disclaimer also extends to the implicit assurance of marketability or suitability of the program for a particular purpose.

More details can be found in the GNU General Public License.

View the complete license texts here:

[www.sick.com/licensetexts](http://www.sick.com/licensetexts)

Printed copies of the license texts are also available on request.

## Technical data (excerpt)

Type	Lector65x Dynamic Focus (V2D65xR-MExxxx)
Focus	Dynamic and externally triggered electrical focus adjustment for working distance
Illumination for field of view	11 x LED, visible light. <ul style="list-style-type: none"> <li>• White (T = <math>6,000 \pm 500\text{ K}</math>)</li> <li>• Blue (<math>\lambda = 455 \pm 20\text{ nm}</math>)</li> </ul>
Feedback LED (spot in field of view)	1 x LED, visible light. Green ( $\lambda = 525 \pm 15\text{ nm}$ )
LED risk group of illumination unit	Risk group 1: <b>"White + Feedback LED"</b> option <ul style="list-style-type: none"> <li>• Risk group 1 (low risk) according to IEC 62471-1: 2006-07/EN 62471-1: 2008-09.</li> <li>• Radiance: <ul style="list-style-type: none"> <li>• <math>L_b &lt; 10 \times 10^3\text{ W}/(\text{m}^2\text{sr})</math> within 100 s; at a distance of <math>\geq 200\text{ mm}</math></li> <li>• <math>L_r &lt; 7 \times 10^5\text{ W}/(\text{m}^2\text{sr})</math> within 10 s; at a distance of <math>\geq 200\text{ mm}</math></li> </ul> </li> </ul>
	Risk group 2: <b>"Blue"</b> option <ul style="list-style-type: none"> <li>• Risk group 2 (moderate risk) according to IEC 62471-1: 2006-07/EN 62471-1: 2008-09 due to exposure to blue light.</li> <li>• Radiance: <ul style="list-style-type: none"> <li>• <math>L_b &lt; 10 \times 10^3\text{ W}/(\text{m}^2\text{sr})</math> within 50 s (RG 2); at a distance of <math>\geq 200\text{ mm}</math></li> <li>• <math>L_r &lt; 7 \times 10^5\text{ W}/(\text{m}^2\text{sr})</math> within 10 s (RG 1); at a distance of <math>\geq 200\text{ mm}</math></li> </ul> </li> <li>• Risk RG 1 (low risk) corresponding to <math>L_b &lt; 10 \times 10^3\text{ W}/(\text{m}^2\text{sr})</math> within 100 s for distances <math>&gt; 1\text{ m}</math>.</li> </ul>
Aiming laser (field of view)	1 x, visible light. Red ( $\lambda = 630\text{ nm}$ to ... 680 nm), can be disengaged
Laser class	Class 1 according to EN/IEC 60825-1: 2014 (class 1M according to EN/IEC 60825-1:2007). Complies with 21 CFR 1040.10 except for tolerances according to Laser Notice No. 50 from June 24, 2007 and its followers. $P < 1.40\text{ mW}$
Code resolution	$\geq 0.20\text{ mm}$ , distance-dependent
Working distance	➔ See "Field of view diagram" on page 7.
Lens unit	➔ See "Type code" on page 6.

Type	Lector65x Dynamic Focus (V2D65xR-MExxxx)
Image sensor resolution	→ See "Type code" on page 6.
Image sensor type	→ See "Type code" on page 6.
Image recording rate	<ul style="list-style-type: none"> <li>At 2 Mpx: 70 Hz</li> <li>At 4 Mpx: 40 Hz</li> </ul>
Ambient light compatibility	2,000 lx on code
Bar code types (1D)	2/5 Interleaved, Codabar, Code 128, Code 32, Code 39, Code 93, GS1 DataBar GS1-128/EAN 128, Pharmacode, UPC/GTIN/EAN
Postal codes	Postnet, Planet, USPS 4SCB, Australia Post, Post Netherlands, Royal Mail, Post Sweden
2D code types	Data Matrix ECC200, GS1 Data Matrix, MaxiCode, PDF417, QR code
Image memory	Internally 512 MB, externally on optional microSD card (max. 16 GB)
Serial <sup>1)</sup> RS-232/422	Host (300 Bd ... 115.2 kBd), for data output
Serial RS-232 <sup>1)</sup>	Aux (57.6 kBd), for configuration or diagnostics
USB <sup>1)</sup>	Aux (USB 2.0), for configuration, diagnostics or image transmission
Ethernet	Aux, Host, image transmission (FTP). 10/100/1,000 Mbit/s, TCP/IP, Ethernet/IP. MAC address(es), see type label.
CAN	20 kbit/s ... 1 Mbit/s Protocol: SICK CAN sensor network
PROFIBUS <sup>1)</sup>	Optional via external fieldbus module CDF600-21xx
PROFINET <sup>1)</sup>	Optional via external fieldbus module CDF600-22xx
Digital switching inputs <sup>1)</sup>	<ul style="list-style-type: none"> <li>2 x physical</li> <li>2 x additional external via optional CMC600 module in connection module CDB650-204 or CDM420-0006.</li> <li><math>V_{in} = \text{max. } 32 \text{ V}</math>, <math>I_{in} = \text{max. } 5 \text{ mA}</math>, opto-decoupled, reverse polarity protected, adjustable debounce time</li> </ul>

Type	Lector65x Dynamic Focus (V2D65xR-MExxxx)
Digital output signal switching devices <sup>1)</sup>	<ul style="list-style-type: none"> <li>4 x physical</li> <li>2 x additional external via optional CMC600 module in connection module CDB650-204 or CDM420-0006.</li> <li><math>V_{out} = V_s - 1.5 \text{ V}</math>, <math>I_{out} \leq 100 \text{ mA}</math>. Short-circuit protected, temperature protected. Not galvanically isolated from the supply voltage.</li> </ul>
Electrical connections	→ See "Connection variant overview, connections and interfaces" on page 8.
Optical indicators	<ul style="list-style-type: none"> <li>10 x RGB LED, status indicators</li> <li>1 x LED: Feedback LED, green</li> <li>10 x RGB LED, bar graph, blue</li> </ul>
Acoustic indicators	1 x beeper for signaling events, can be deactivated
External backup of parametric data	Optional on plug-in microSD memory card or via optional CMC600 module in connection module CDB650-204 or CDM420-0006.
Supply voltage $V_s$	DC 24 V ± 20%, SELV in accordance with EN 60950-1: 2011-01
Current consumption	Max. 2.0 A (with switching outputs with load)
Power consumption	Typically 20 W (with switching outputs without load)
Weight	Max. 950 g, model-dependent
Material housing	Cast aluminum
Material reading window	→ See "Type code" on page 6. Glass or plastic (PMMA), 2 mm thick, with scratch-proof coating.
Safety	Acc. to EN 60950-1: 2011-01
Electrical protection class	III according to EN 60950-1: 2011-01
Enclosure rating	→ See "Type code" on page 6. <ul style="list-style-type: none"> <li>According to EN 60529: 2000-09</li> <li>Maintaining the enclosure rating: → See "Safety information" on page 1.</li> </ul>
Vibration resistance/Shock resistance	<ul style="list-style-type: none"> <li>According to EN 60068-2-6: 2008-02</li> <li>According to EN 60068-2-27: 2009-05</li> </ul>
EMC	<ul style="list-style-type: none"> <li>Electromagnetic immunity: EN 61000-6-2:2005-08-01</li> <li>Radiated emission: EN 61000-6-3:2007-01-01 + EN 61000-6-3/A1:2011-03-01</li> </ul>

Type	Lector65x Dynamic Focus (V2D65xR-MExxxx)
Ambient temperature	<ul style="list-style-type: none"> <li>Operation <sup>2)</sup>: 0 °C ... +50 °C</li> <li>Storage -20 °C ... +70 °C</li> </ul>
Permissible relative humidity	0% ... 90%, non-condensing

- 1) Excluded from system variants Lector654 Dynamic Focus for Systems, connection variant 2 (type V2D65xR-MEExFx)  
2) Notes regarding adequate dissipation of lost heat: → See "Mounting requirements" on page 2.

Tab. 4: Technical data

For further technical specifications, see the online data sheet on the product page on the Internet: [www.sick.com/Lector65x](http://www.sick.com/Lector65x)

### Type code

#### NOTE

Not all combinations according to the type code are possible. The available device variants can be found online at: [www.sick.com/Lector65x](http://www.sick.com/Lector65x).

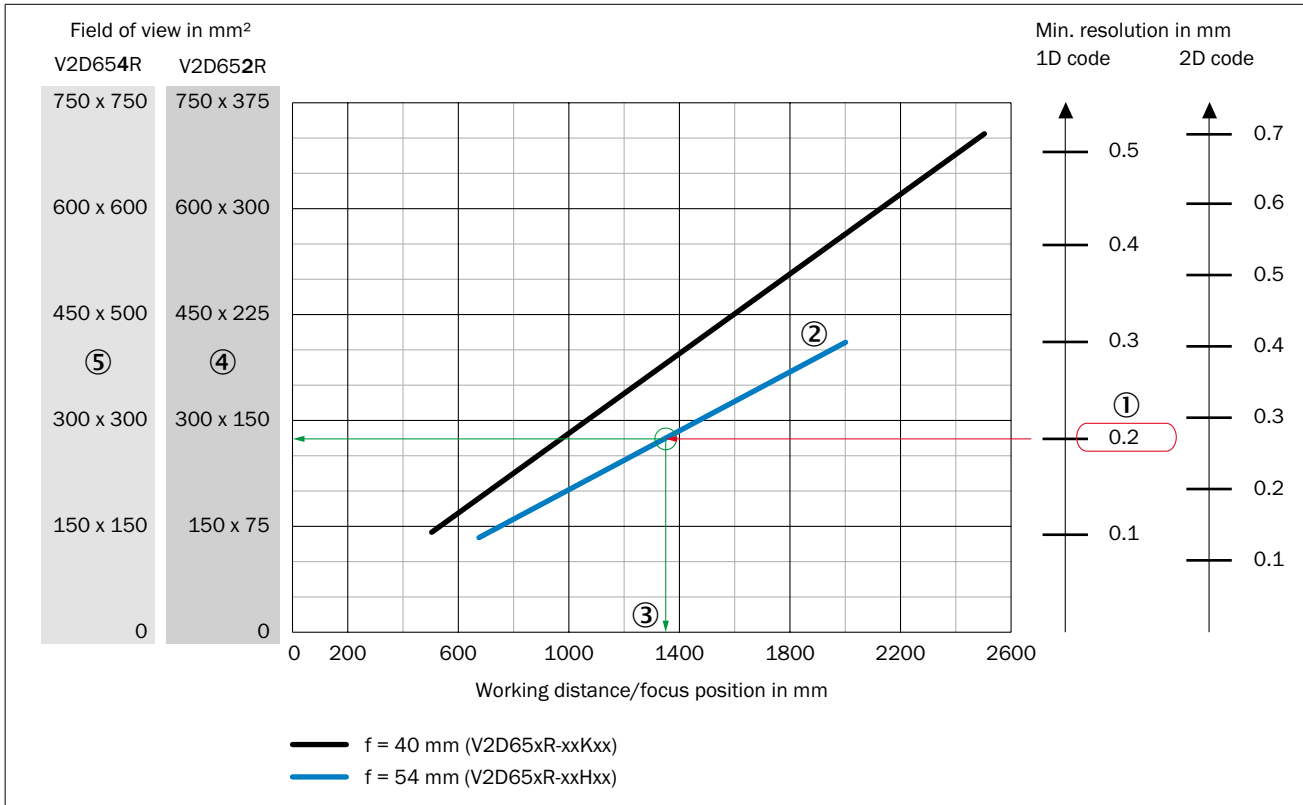
V	2	D	6	5	x	R	-	M	E	x	x	x	x
1	2	3	4	5	6	7		8	9	10	11	12	13

Position	Description
<b>1 ... 5</b>	<b>Product family</b> V2D65 Lector65x
<b>6</b>	<b>Image sensor resolution</b> 2 2 megapixels (2,048 px x 1,088 px) Lector652: 2.1 megapixels (2,048 px x 1,088 px) 4 4.2 megapixels (2,048 px x 2,048 px)
<b>7</b>	<b>Function</b> R Reading D Standard 1D/2D-decoder, DPM decoder, OCR
<b>8</b>	<b>Image sensor type</b> M Monochrome
<b>9</b>	<b>Lens type</b> E Electrical focus (dynamic, auto, teach-auto)
<b>10</b>	<b>Illumination</b> R Red/Amber W White B Blue
<b>11</b>	<b>Focal length (lens mounted in the Lector)</b> H 54 mm K 40 mm

Position	Description
<b>12</b>	<b>Connection variant <sup>1)</sup></b> A Connection variant 1 F Connection variant 2 H Connection variant 3
<b>13</b>	<b>IP protection class and front screen</b> 5 IP 65, front screen: plastic 6 IP 65, front screen: glass

1) → See "Connection variant overview, connections and interfaces" on page 8.

## Field of view diagram



## Interpreting the diagram

You can use the diagram to determine the following data:

- The maximum working distance for a selected code resolution
- The dimensions of the available field of view

*Example:*

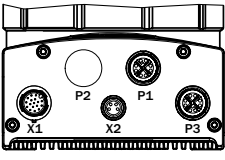
Given (in red):

- Code resolution ①: 0.2 mm
- Lens focal length ②: 54 mm

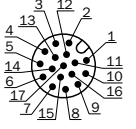
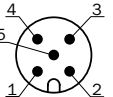
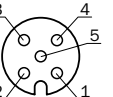



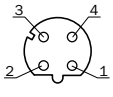
Read out (in green):

- Maximum working distance ③: 1,350 mm
- Field of view V2D652R ④: approx. 275 mm x 137 mm
- Field of view V2D654R ⑤: approx. 275 mm x 275 mm

**Connection variant overview, connections and interfaces**

Overview	Connection	V2D65xR-MExxAx Connection variant 1	V2D65xR-MExxFx Connection variant 2 (for systems)	V2D65xR-MExxHx Connection variant 3 (with Dual-Port PROFINET)
	X1	Power/SerialData/CAN/IO	CAN IN	Power/SerialData/CAN/IO
	X2	USB	Triggering of external illumination	USB
	P1	GB Ethernet	GB Ethernet	Ethernet (100 Mbit/s)
	P2	-	CAN OUT	Ethernet (100 Mbit/s)
	P3	GB Ethernet	GB Ethernet	GB Ethernet

**Overview of design of connections and pin assignment**

	Power/SerialData/CAN/IO	CAN IN	CAN OUT	USB	Triggering of external illumination	GB Ethernet	Ethernet
Connection	X1	X1	P2	X2	X2	P1/P3	P1/P2
	 <p>Male connector, M12, 17-pin, A-coded</p>	 <p>Male connector, M12, 5-pin, A-coded</p>	 <p>Female connector, M12, 5-pin, A-coded</p>	 <p>Female connector, M8, 4-pin</p>	 <p>Female connector, M8, 3-pin</p>	 <p>Female connector, M12, 8-pin, X-coded</p>	 <p>Female connector, M12, 4-pin, D-coded</p>
Pin	Signal	Signal	Signal	Signal	Signal	Signal	Signal
1	GND	Shield	Shield	+5 V	Sensor 1	TRD0_P	TX+
2	Supply voltage $V_s$	Supply voltage $V_s$	Supply voltage $V_s$	Data-	-	TRD0_N	RX+
3	CAN L	GND	GND	Data+	Result 4	TRD1_P	TX-
4	CAN H	CAN H	CAN H	GND	SensGND	TRD1_N	RX-
5	TD+ (RS-422), Host	CAN L	CAN L	-	-	TRD3_P	
6	TD- (RS-422), Host TxD (RS-232), Host	-	-	-	-	TRD3_N	
7	TxD (RS-232), Aux	-	-	-	-	TRD2_P	
8	RxD (RS-232), Aux	-	-	-	-	TRD2_N	
9	SensGND	-	-	-	-	-	
10	Sensor 1, switching input	-	-	-	-	-	
11	RD+ (RS-422), Host	-	-	-	-	-	
12	RD- (RS-422), Host RxD (RS-232), Host	-	-	-	-	-	
13	Result 1, switching output	-	-	-	-	-	
14	Result 2, switching output	-	-	-	-	-	
15	Sensor 2, switching input	-	-	-	-	-	
16	Result 3, switching output	-	-	-	-	-	
17	Result 4, switching output	-	-	-	-	-	