en

OPERATING INSTRUCTIONS

Lector64x Flex, Lector65x Flex

Image-based code reader
with manually adjustable focus

SICK
Sensor Intelligence.

Correct use

The Lector64x Flex and Lector65x Flex image-based code readers featuring a selectable application-specific optic kit (lens unit, integrable illumination with spacers plus optics protective hood) are intelligent SICK 4Dpro sensors.

Fig. 1: Lector64x Flex and Lector65x Flex: camera housing and optic kit (optional accessories)

The Lector64x Flex and the Lector65x Flex are used for automatic, fixed identification and decoding of codes on moving or stationary objects. They read all commonly used 1D codes (bar codes/stacked codes) and 2D codes (matrix codes). The Lector64x Flex and Lector65x Flex use their host interface to send the read data to a higher-level computer for further processing.

About this document

In this document, the Lector64x Flex and Lector65x Flex are, together with their installed optic kit, each referred to as a "sensor" for simplicity.

The purpose of these operating instructions is to allow you to commission the sensor quickly and easily and to achieve initial read results. These instructions describe a stand-alone application for a sensor based on the default settings. The optional CDB650-204 connection module is used for the industrial-standard signal distribution of the sensor.

These operating instructions are 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 and associated software, can be found on the SICK product page on the Internet:

www.mysick.com/en/lector64x

www.mysick.com/en/lector65x

Important information on the VI83I illumination unit and its variant-dependent LEDs in risk groups RG 1 or RG 2 can be found in 🕮 *Notes on VI83I illumination unit device (no. 8017270).*

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 sensor is integrated.
- Read these instructions carefully before commissioning the sensor in order to familiarize yourself with the sensor and its functions. The operating instructions must be kept in the immediate vicinity of the sensor where they can be accessed at all times.
- The Lector64x Flex and the Lector65x Flex comply with laser class 1M. The VI83I integrable illumination unit included in the optic kits conforms to LED risk group RG 1 or RG 2, depending on the variant.
  ➜ *See "Technical data (excerpt)" on page 6.*
  ➜ *See warning "Optical radiation" on page 1.*
  ➜ *See 🕮 Notes on VI83I illumination unit device (no. 8017270).*
- During operation, the surface temperature of the sensor (particularly on the rear 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 sensor will not fulfill any specified IP enclosure rating.
  - The optics protective hood must be screwed tightly onto the sensor.
  - The black cover for the microSD card slot at the rear of the sensor must be screwed tightly onto the sensor.
  - The SICK cables plugged into the M12/M8 connections must be screwed tight.
  - Electrical connections that are not being used must be fitted with yellow protective caps/plugs, which must be screwed tight (as they are on delivery).
  - Only operate the sensor without the cover for the micro SD card slot for a short period while inserting or removing the memory card. During this time, protect the sensor against moisture and dust.
- Opening the sensor housing, which is screwed closed – including the part that holds the electrical connections – 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 sensor.
- 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.

⚠ CAUTION
Optical radiation
Laser beam class 1M:
The accessible beam from the targeting laser does not represent a risk due to the normal restrictions imposed by human behavior.

LED risk group 1:
The accessible beam from the illumination unit (RG 1) does not represent a risk due to the normal restrictions imposed by human behavior.

LED risk group 2:
The accessible beam from the illumination unit (RG 2) does not represent a risk due to aversion responses to very bright light sources and the perception of heat.

For both types of beams:
It is not possible to entirely rule out temporary, disorienting optical effects on the human eye (e.g., dazzle, flash blindness, afterimages, impairment of color vision), particularly in conditions of dim lighting. No safety precautions are required.

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.

- ➢ Do not look into the light source when it is switched on.
- ➢ LED risk group 2: CAUTION – potentially hazardous optical radiation. Do not deliberately look into the illumination unit for a long time when in operation. Damage to the eyes is possible.
- ➢ Do not view the laser directly with optical instruments (e.g., magnifying glasses, microscopes).
- ➢ Comply with the latest version of the applicable regulations on photobiological safety of lamps and lamp systems as well as on laser protection.
- ➢ If the product 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.

➜ *More information"Technical data (excerpt)" on page 6.*

Important!
Illumination unit with LEDs in risk group RG 2
This illumination unit variant comes with a black and yellow self-adhesive warning label for visible optical radiation. This label must be attached during mounting. ➜ *See "3. Attaching the warning label for risk group RG 2" on page 2.*

Commissioning and configuration

Scope of delivery

- The version of the Lector64x Flex or Lector65x Flex (camera housing) ordered, with a C-mount threaded connection and two M5 sliding blocks. Light inlet and electrical connections fitted with protective caps/plugs. Lens unit, illumination unit, optics protective hood, and connecting cables not included.
- SW 2 hexagon key for opening and closing the cover of the micro SD card slot and mounting the integrable illumination unit from the optic kit
- SICK lens cloth no. 4003353
- Printed operating instructions in German (no. 8018721) and English (no. 8018722). Other language versions may be available in PDF format from the online product page:
  www.mysick.com/en/lector64x
  www.mysick.com/en/lector65x
- Optional accessories, such as the optic kit, 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 sensor 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 sensor are included with delivery.

Mounting requirements

- The permissible ambient conditions for operating the sensor must be observed (e.g., ambient temperature, ground potential). ➜ *See "Technical data (excerpt)" on page 6.* ➜ *See warning "Risk of injury and damage caused by electrical current!" on page 3.*
- Dissipation of lost heat from the sensor:
  - It is important to ensure good heat transfer from the sensor to the mounting base (e.g., profile) via the bracket, particularly in the case of high ambient temperatures.
  - If the sensor is highly enclosed, make sure there is enough space between the rear of the device and the wall to allow the lost heat to be properly dissipated into the air by means of convection.
- Stable bracket with sufficient load-bearing capacity and suitable dimensions for the sensor. Net weight 635 g (without optic kit and cables). ➜ *Dimensional drawing, see "Device structure (camera housing)" on page 4.*
- Shock and vibration-free mounting
- Clear view of the codes to be detected on the objects

Mounting the optic kit on the sensor

Fig. 2: Overview of how to mount the optic kit on the camera housing

Optic kit scope of delivery

- Application-specific lens unit
- Application-specific VI83I illumination unit (ring light), luminous field appropriate for focal distance of lens
- Two spacers, one with a plated-through connection for the electrical connection
- Screws: 4 x M2.5 x 6 mm, 4 x M2.5 x 12 mm, all screws have a hexagon cylinder head, SW 2
- IP 65 optics protective hood with screw thread and reading window

1. Mounting the lens unit

NOTE

Possible impairment of image quality!

Dust and fingerprints on optical boundary surfaces can reduce image quality and may also affect the decoding performance of the sensor.

➢ When mounting the optic kit, always ensure that the environment is free of dust.

➢ Do not touch the image sensor (CMOS) in the light inlet opening of the sensor or the glass lenses at either end of the lens unit.

When mounting the optic kit on the camera housing, always ensure that there is no power to the system.

1. Place the camera housing on a nonslip base.
2. Remove the protective cap from the round light inlet (Fig. 3 ⑦).
3. If applicable, carefully insert the (optional) filter in the light inlet.
4. Screw the lens unit into the C-mount thread. This will also lock the optional filter in place at the same time (if applicable).

2. Mounting the illumination unit (ring light)

NOTE

Risk of damage due to electrostatic discharge!

Electrostatic discharge from the human body may damage parts of the illumination unit or the camera housing.

The illumination variants for lenses with a focal distance of 12 mm or 16 mm do not feature any plastic lenses in front of the LEDs in the round recesses.

➢ Do not insert your fingers into the recesses.

➢ Do not touch the open contacts of the electrical connection (*Fig. 3, item ③*) for the illumination unit on the camera housing.

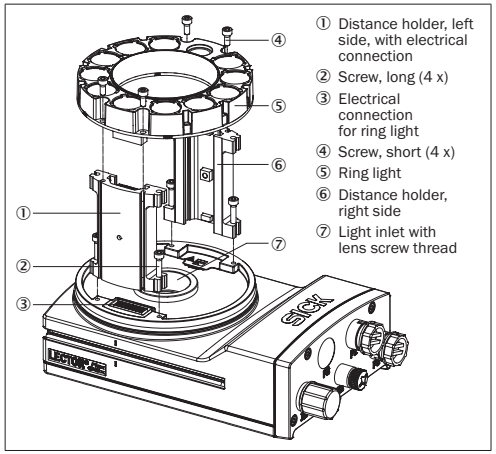

Fig. 3: Mounting the integrable illumination unit on the camera housing

1. Peel off the white protective sticker on the camera housing that covers the electrical connection ③ for the illumination unit.
2. Take two pairs of long screws and screw them into the threaded mounting holes to attach each spacer (① and ⑥) to the correct side of the camera housing.
3. Use the 4 short screws to attach the illumination unit ⑤ to the two spacers.
4. Manually adjust the sharpness and aperture of the lens unit.
5. Check the setting in the display window of the SOPAS configuration software.
6. Mount the optics protective hood.

3. Attaching the warning label for risk group RG 2

A warning label is included with delivery in the case of illumination variants with LEDs in risk group RG 2. ➜ *See 🕮 Notes on VI83I illumination unit device (no. 8017270).*

➢ Attach the warning label to the optics protective hood near the light outlet.

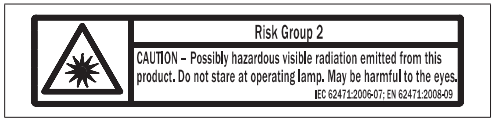

Fig. 4: LED risk group 2 warning label
Risk group 2 CAUTION – potentially hazardous optical radiation due to this product. Do not look into the lamp for extended periods during operation. Can be damaging to the eyes.
ICE 62471:2006-07; EN 62471:2008-09

Mounting the sensor

1. Connect the designated cable(s) to the sensor.
2. Optional: Attach the SICK bracket that has been ordered separately (e.g., mounting bracket no. 2069169) to the sensor using the two sliding blocks.
3. Otherwise, mount the sensor on a bracket using M5 screws. To do this, either use the 4 threaded mounting holes on the rear of the sensor or, alternatively, use the two M5 sliding blocks in the lateral slots.➜ *Dimensional drawing, see "Device structure (camera housing)" on page 4.*
   Insert the screws into the threaded mounting holes/sliding blocks by a maximum of 5 mm.

Aligning the sensor plus reading window with the code

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

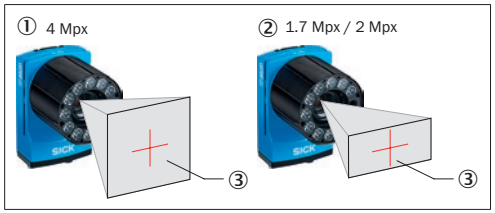

Fig. 5: Image sensor-dependent viewing ranges in front of the sensor; size stretching is distance-dependent
①. Lector with image sensor 4 Mpx
②. Lector with image sensor 1.7 Mpx or 2 Mpx
③. Field of view

Taking account of the operating distance, depending on the resolution

Resulting reading ranges: ➜ *See "Field of view diagram Lector64x Flex" on page 7.* ➜ *See "Field of view diagram Lector65x Flex" on page 7.*

Taking account of the reading angle

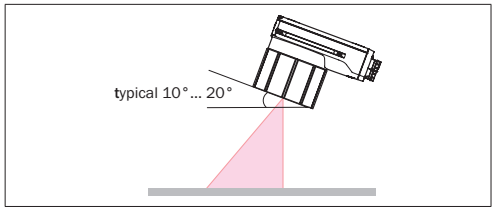

Fig. 6: Selection of the skew angle, depending on the application

➢ Tilt the sensor 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°.

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.

CDB650-204 connection module

➢ Mount the CDB650-204 connection module in the vicinity of the sensor. If you are using the serial data interfaces (RS-232), we recommend a max. distance of 5 m.
Mount the CDB650-204 in such a way that the device remains accessible at all times. To do this, see the CDB650-204 connection module operating instructions (no. 8016155).

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 Lector64x Flex or the Lector65x Flex 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 must be designed in accordance with the applicable standards.
- If the supply voltage for the sensor is not supplied via the CDB650-204 connection module, the sensor must be protected by a separate max. 2.0 A slow-blow fuse in the supply circuit.
- All circuits connected to the sensor must be designed as SELV circuits (SELV = Safety Extra Low Voltage).

⚠ WARNING

Risk of injury and damage caused by electrical current!

The sensor 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 Lector64x Flex or the Lector65x Flex can result in equipotential bonding currents between the sensor 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 supply voltage immediately and have the damage repaired.

1. Connect the communication interface of the sensor to the PC (Ethernet or USB, depending on type).
2. Supply the sensor with a voltage of DC 24 V ± 20%.

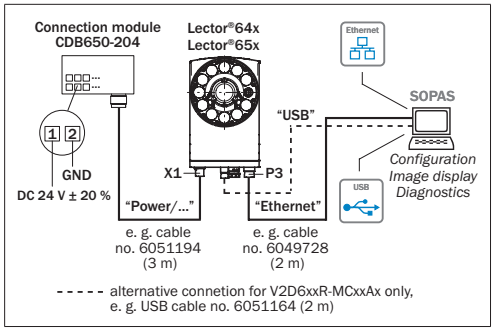

Fig. 7: Connection block circuit diagram for commissioning a Lector64x Flex and Lector65x Flex with connection variant 1 (V2D6xxR-MCxxAx)

Step 3: Configuration

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

The sensor 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 sensor 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.mysick.com/en/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. Start the "Single Device" program option.
Path: Start > Programs > SICK > SOPAS Engineering Tool > SOPAS (Single Device)
3. Establish a connection between the software and the sensor via Ethernet or USB (depending on type). The connection wizard starts automatically.
4. The following IP address is configured by default on the sensor:
   - IP address for P1: 192.168.1.1
   - IP address for P3: 192.168.0.1
   - Subnet mask: 255.255.255.0
5. Select the Lector64x Flex or the Lector65x Flex from the list of available sensors. SOPAS establishes communication with the sensor and loads the associated device description file for the sensor. The program window, which is divided into three sections, opens.

SOPAS Single Device program window

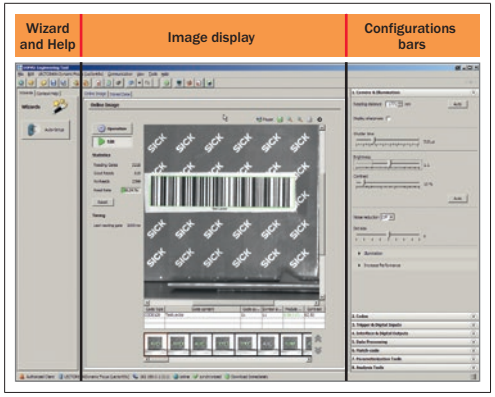

Fig. 8: SOPAS Single Device: Example of online image display once the device has been started with "Edit" mode and the field of view has been aligned with a code

6. In the Online Image window, click the Edit button. The sensor now starts recording images consecutively and uses the current settings to decode them. The effects of any parameter changes are directly visible.

The following functions are deactivated in Edit mode:
- Switching inputs and outputs
- Data output via the host interface.

7. Click the Camera & Illumination configuration bar. You can now access key parameters for fine adjustment of the brightness and sharpness.
8. Align the sensor with the code.

Fig. 9: Code

Adjusting the brightness and sharpness on the lens unit

1. Set the aperture ring (upper ring) on the lens unit to a value of 8, which is an appropriate starting value.
   To increase the depth of field (value > 8) or the image quality (value < 8), this value may need to be adjusted in conjunction with the online image display.
2. Adjust the sharpness ring (lower ring) on the lens unit according to the approximate current distance of the object bearing the code until you can see a clear and non-distorted image of the code on the online image display.
   The reference point for the operating distance is the center of the front screen on the screwed-on optics protective hood (➜ *see Fig. 10*). If the hood has been removed, the leading edge of the illumination unit can be used instead.
3. If necessary, use the SHUTTER TIMER, BRIGHTNESS, and Contrast slider controls to optimize the brightness and contrast.
4. If you have trouble adjusting the sharpness on the lens unit, you may wish to activate the sharpness diagnostics bar on the bottom left of the display window. To do this, click the DISPLAY SHARPNESS check box.
5. Keep adjusting the sharpness setting on the lens unit until the color of the bar graph changes to green.
6. Once the online image adjustment process has been successfully completed, use the locking screws to lock both adjusting rings of the lens unit in place.
7. Attach the round optics protective hood and screw it tight.

Continuing the configuration

1. Make settings for additional functions during planned operation such as codes, reading clock, read result formats, data interface, etc.
2. 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 sensor: Click the button.
Configuration file on the PC: Click the button.

Important!
To commission the sensor on a network (e.g., CAN bus) together with other SICK products, select the "SOPAS" program option. Path: Start > Programs > SICK > SOPAS Engineering Tool > SOPAS.

Structure and function

Device structure (camera housing)

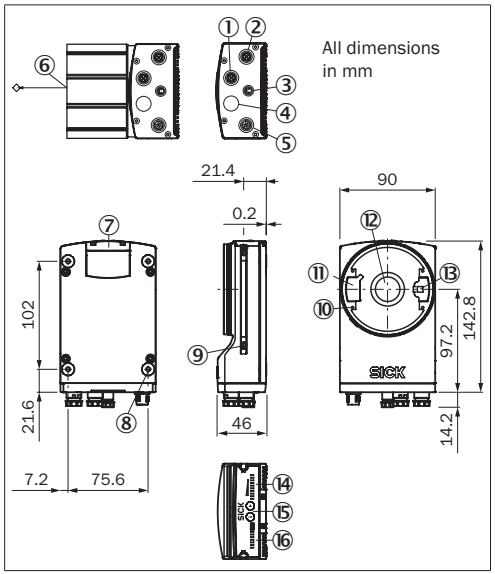

Fig. 10: *Structure Lector64x Flex and Lector65x Flex (camera housing)*

① *Connection P1, function and design dependent on type*
② *Connection P3, function and design dependent on type*
③ *Connection X2, function and design dependent on type*
④ *Connection P2, function and design dependent on type*
⑤ *Connection X1, function and design dependent on type*
⑥ *Reference point for operating distance (center of front screen) from sensor to object*
⑦ *Cover for the micro SD memory card slot*
⑧ *M5 blind tapped holes, 5 mm deep (4 x), for mounting the sensor*
⑨ *Sliding nut M5, 5.5 mm deep (2 x), pivoting, for an alternative method of mounting the sensor*
⑩ *Threaded mounting holes M2.5, 5.5 mm deep (4 x) for mounting the illumination unit spacers*
⑪ *Cover for illumination unit connection*
⑫ *Light inlet with protective cap and threaded connection for lens unit*
⑬ *Outlet opening for light beam from aiming laser*
⑭ *Bar graph display (10 x LEDs)*
⑮ *Function buttons (2 x)*
⑯ *LEDs for status display (2 levels), 10 x*

Integrable illumination unit (accessory)

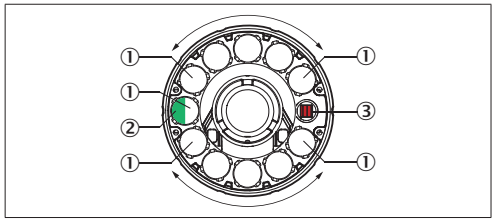

Fig. 11: Integrable illumination unit
①. Illumination = 11 x LEDs
②. Feedback LED, green (e.g., for "Good Read"), after a successful read operation (default) it briefly generates a light spot on the object within the field of view
③. Opening in illumination unit for targeting laser (alignment), 1 x red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

Status indicators, functions

Fig. 12: LED status indicators, function buttons and bar graph display
①. Return button
②. Arrow button

Status indicators on the first display level

Indicator	LED	Color	Status
Ready	●	Green	Sensor ready for reading
	●	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. 1: 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. 2: Status indicators on the second display level

Test (reading diagnostics)

Percentage analysis: The sensor 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 sensor 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.

Auto-Setup

The sensor adjusts itself automatically to suit the lighting conditions, operating 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 sensor backs up the last permanently saved parameter set externally as well (cloning). Furthermore, the sensor has the option of recording 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 sensor.*

The memory card is not included with delivery.

To ensure that the memory card functions reliably, only use types approved by SICK (no. 4051366 or no. 4077575). The sensor 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 sensor does not signal the applicable type of 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 sensor that access the memory card and have been set to "continuous" with the SOPAS 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 the SOPAS configuration software and wait for SOPAS to provide confirmation.

Inserting the memory card

On the sensor, the card slot can be accessed at the rear. It is located behind the black cover above the type label. ➜ *See "Device structure (camera housing)" 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 sensor until the card slot can be accessed.
3. Making sure it is in the correct position (with the contacts facing the sensor and pointing down), insert the memory card into the slot until it locks into place.
4. Screw the cover on tight.

Transport and storage

Transport and store the sensor in its original packaging, ensuring that the protective caps/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 sensor 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 °C to 70 °C, as little vibration as possible, relative air humidity max. 90% (non-condensing).

Maintenance and care

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

- ➢ In order to obtain maximum read performance from the sensor, the reading window in the optics protective hood must be checked for contamination at regular intervals (e.g., weekly). This applies especially when using the sensor 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 sensor may only be performed by qualified and authorized service personnel from SICK AG.

Disassembly and disposal

⚠ CAUTION

Risk of injury due to hot sensor surface!

In read mode, the surface of the sensor (particularly at the rear) can reach temperatures of up to 70 °C.

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

Any sensor which can no longer be used at the end of the product life cycle must be disposed of in an environmentally friendly manner in accordance with the applicable country-specific waste disposal regulations. The sensor is electronic waste and must under no circumstances be disposed of with general waste. SICK AG is not currently able to take back sensors that can no longer be used.

Sources for obtaining more information

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

Image-based code readers Lector64x Flex and Lector65x Flex

www.mysick.com/en/lector64x

www.mysick.com/en/lector65x

For example:

- Operating instructions for Lector64x Flex and Lector65x Flex in German (no. 8018721) and English (no. 8018722) as well as in other languages if applicable
- 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.mysick.com/en/cdf600-2

- CDF600-21xx PROFIBUS DP fieldbus module operating instructions in English (no. 8015335) and German (no. 8015334) as well as in other languages if applicable
- Technical information for the CDF600-21xx PROFIBUS DP fieldbus module in German (no. 8015336) and English (no. 8015337)

CDF600-2200 PROFINET IO fieldbus module

www.mysick.com/en/cdf600-2

- CDF600-2200 PROFINET IO fieldbus module operating instructions in English (no. 8015922) and German (no. 8015921) as well as in other languages if applicable

Documents on request

- Overview of command strings for the Lector64x Flex and Lector65x Flex

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

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View the complete license texts here: *www.sick.com/licensetexts*

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

Technical data (excerpt)

Type	Lector64x Flex (V2D64xR-MCxxxx), Lector65x Flex (V2D65xR-MCxxxx)
Focus	Manual adjustment of the sharpness and aperture on the optional lens unit
Illumination for field of view	Optional by means of, e.g., variants of the VI83I integrable illumination unit: 11 x LEDs, visible light. • White (λ = 6,000 ± 500 K) • Blue (λ = 455 ± 20 nm) • Red (λ = 620 ± 30 nm)
Feedback LED (spot in field of view)	Optional by means of, e.g., variants of the VI83I integrable illumination unit: 1 x LED, visible light. Green (λ = 525 ± 15 nm)
LED risk group of VI83I integrable illumination unit	Optional "**white + feedback LED**" (no. 2069006, no. 2074001, no. 2069099) Optional "**blue – medium + feedback LED**" (no. 2074012) Optional "**blue – wide + feedback LED**" (no. 2074009) • Risk group 1 (low risk) according to IEC 62471-1: 2006-07/EN 62471-1: 2008-09. Optional "**red + feedback LED**" (no. 2066563, no. 2074005, no. 2074003) • Radiance: • L_B: < 10 x 10^3 W/(m^2sr) within 100 s; at a distance of ≥ 200 mm • L_R: < 7 x 10^5 W/(m^2sr) within 10 s; at a distance of ≥ 200 mm
	Optional "**blue – narrow + feedback LED**" (no. 2074007) • Risk group 2 (moderate risk) according to IEC 62471-1: 2006-07/EN 62471-1: 2008-09 due to exposure to blue light. • Radiance: • L_B: < 10 x 10^3 W/(m^2sr) within 50 s(RG 2); at a distance of ≥ 200 mm • L_R: < 7 x 10^5 W/(m^2sr) within 10 s (RG 1); at a distance of ≥ 200 mm • Risk RG 1 (low risk) corresponding to L_B < 10 x 10^3 W/(m^2sr) within 100 s for distances > 1 m.
Aiming laser (field of view)	Visible light. Red (λ = 630 nm ... 680 nm), can be disengaged
Laser class	Class 1M according to IEC 60825-1: 2007-03. Complies with 21 CFR 1040.10 except for tolerances according to Laser Notice no. 50 of June 24, 2007. P < 1.40 mW

Type	Lector64x Flex (V2D64xR-MCxxxx), Lector65x Flex (V2D65xR-MCxxxx)
Code resolution	≥ 0.1 mm, depending on lens unit
Operating distance	➜ *See "Field of view diagram Lector64x Flex" on page 7.* ➜ *See "Field of view diagram Lector65x Flex" on page 7.*
Lens unit	Application-specific ➜ *See "Type code" on page 6.* www.mysick.com/en/lector64x www.mysick.com/en/lector65x
Image sensor resolution	➜ *See "Type code" on page 6.*
Image sensor type	➜ *See "Type code" on page 6.*
Image recording rate	Lector64x Flex • At 1.7 Mpx: 40 Hz Lector65x Flex • At 2 Mpx: 70 Hz • At 4 Mpx: 40 Hz
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 micro SD card (max. 16 GB)
Serial [1] RS-232/422/485	Host (300 Bd ... 115.2 kBd), for data output
Serial RS-232 [1]	Aux (57.6 kBd), for configuration/diagnostics
USB [1]	Aux (USB 2.0), for configuration/diagnostics and 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 [1]	Optional via external fieldbus module CDF600-21xx
PROFINET IO [1]	Optional via external fieldbus module CDF600-2200

Type	Lector64x Flex (V2D64xR-MCxxxx), Lector65x Flex (V2D65xR-MCxxxx)
Digital switching inputs [1]	• 2 x physical • 2 x additional external via optional CMC600 module in connection module CDB650-204 or CDM420-0006 • U_e = max. 32 V, I_e = max. 5 mA, opto-decoupled, reverse polarity protected, adjustable debounce time
Digital switching outputs [1]	• 4 x physical • 2 x additional external via optional CMC600 module in connection module CDB650-204 or CDM420-0006 • $U_a = U_V$ – 1.5 V, I_a ≤ 100 mA. Short-circuit protected, temperature protected. Not galvanically isolated from the supply voltage.
Electrical connections	➜ *See "Connection variant overview, connections and interfaces" on page 8.*
Optical indicators	• 10 x RGB LEDs: status indicators • 1 x LED: feedback LED, green • 10 x RGB LEDs: bar graph, blue
Acoustic indicators	1 x beeper for signaling events, can be deactivated
External backup of configuration data	Optional on plug-in micro SD memory card or via optional CMC600 module in connection module CDB650-204 or CDM420-0006.
Supply voltage	DC 24 V ± 20%, SELV (EN 60950-1: 2014-08) and LPS (EN 60950-1: 2014-08) or Class 2 (UL 1310) required
Current consumption	Max. 2.0 A (with switching outputs)
Power consumption	20 W (with switching outputs without load)
Weight	Max. 635 g, without optic kit
Material housing	Aluminum die cast
Material reading window	➜ *See "Type code" on page 6.* Glass or plastic (PMMA), 2 mm thick, with scratch-proof coating.
Electrical protection class	III according to EN 60950-1: 2014-08
Enclosure rating	➜ *See "Type code" on page 6.* • According to EN 60529: 2000-09 • Maintaining the enclosure rating: ➜ *See "Safety information" on page 1.*

Type	Lector64x Flex (V2D64xR-MCxxxx), Lector65x Flex (V2D65xR-MCxxxx)
Vibration resistance/Shock resistance	• According to EN 60068-2-6: 2008-02 • According to EN 60068-2-27: 2009-05
Ambient temperature	• Operation [2]: 0 °C ... +50 °C • Storage –20 °C ... +70 °C
Permissible relative humidity	0% ... 90%, non-condensing

1) Does not apply to system variants of type V2D64xR-MCxxFx and type V2D65xR-MCxxFx for systems, connection variant 2
2) Notes regarding adequate dissipation of lost heat: ➜ *See "Mounting requirements" on page 2.*

Tab. 3: Technical data

For additional technical data, see the online data sheet on the product page:
www.mysick.com/en/lector64x
www.mysick.com/en/lector65x

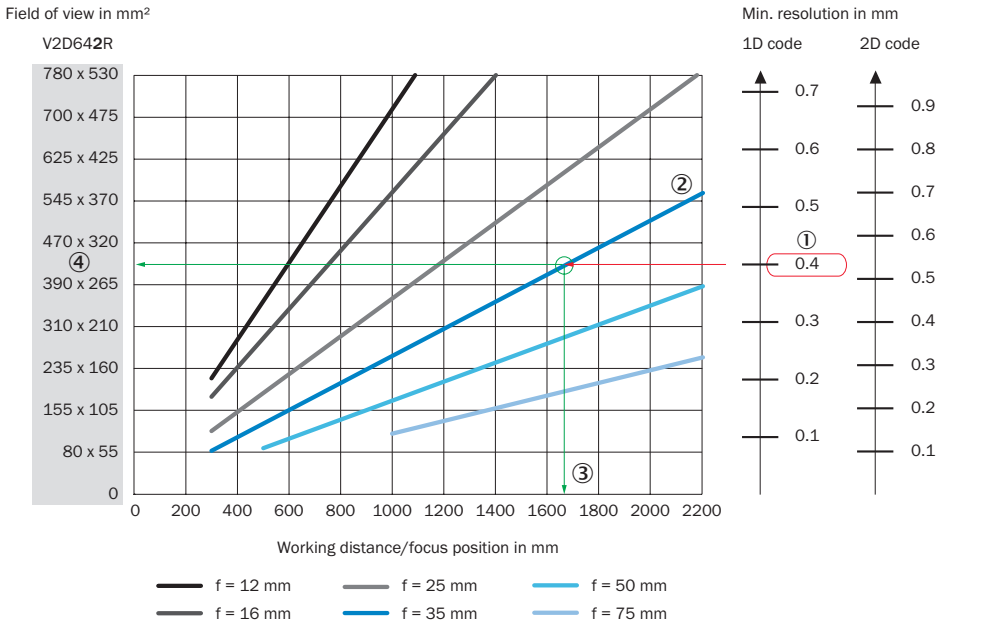
Type code

V	2	D	6	x	x	R	–	M	C	X	X	x	x
1	2	3	4	5	6	7		8	9	10	11	12	13

Position	Description
1 ... 5	**Product family** V2D64 Lector64x V2D65 Lector65x
6	**Image sensor resolution** V2D64 (Lector64x) 2 1.7 megapixels (1,600 px x 1,088 px) V2D65 (Lector65x) 2 2 megapixels (2,048 px x 1,088 px) 4 4 megapixels (2,048 px x 2,048 px)
7	**Function** R Reading
8	**Image sensor type** M Monochrome
9	**Lens unit type** C C-mount thread
10	**Illumination** X No illumination unit installed
11	**Focal distance (lens unit)** X No lens unit installed
12	**Connection variant [1]** A Connection variant 1 F Connection variant 2 H Connection variant 3
13	**IP protection class and front screen** 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 Lector64x Flex



Interpreting the diagram

You can use the diagram to determine the following data:

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

Example:

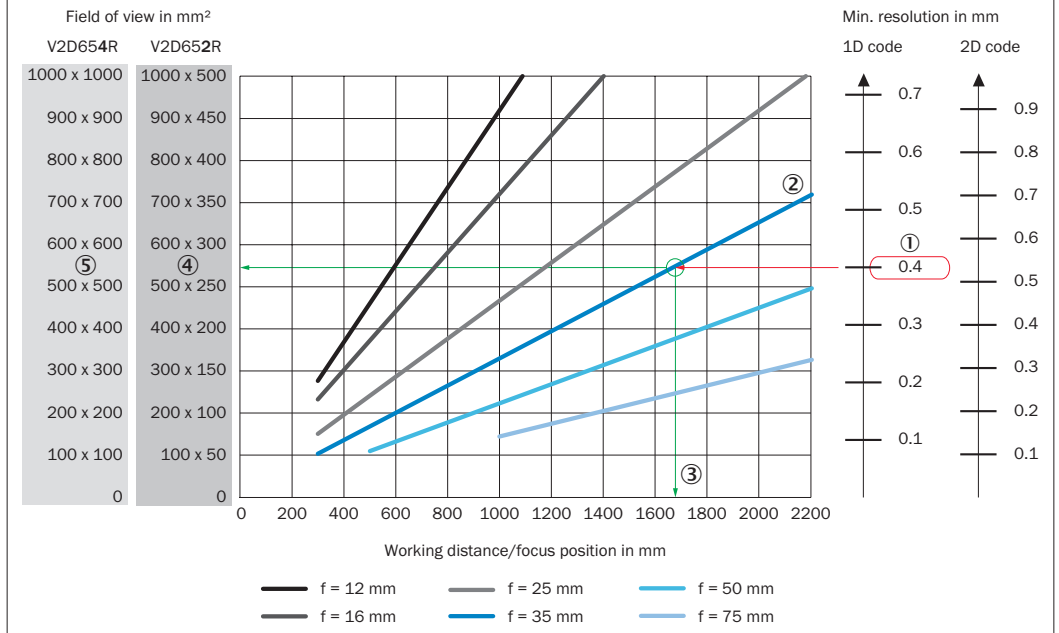
Given (in red):

- Code resolution ①: 0.4 mm
- Lens focal length ②: 35 mm

Read out (in green):

- Maximum operating distance ③: 1,680 mm
- Field of view V2D642R ④: approx. 430 mm x 292 mm

Field of view diagram Lector65x Flex



Interpreting the diagram

You can use the diagram to determine the following data:

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

Example:

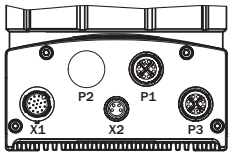
Given (in red):

- Code resolution ①: 0.4 mm
- Lens focal length ②: 35 mm

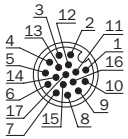
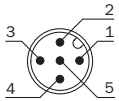
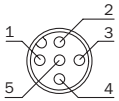
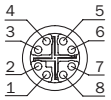
Read out (in green):

- Maximum operating distance ③: 1,680 mm
- Field of view V2D652R ④: approx. 550 mm x 275 mm
- Field of view V2D654R ⑤: approx. 550 mm x 550 mm

Connection variant overview, connections and interfaces

Overview	Connection	V2D6xxR-MCxxAx Connection variant 1	V2D6xxR-MCxxFx Connection variant 2 (for systems)	V2D6xxR-MCxxHx 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
							
	17-pin M12 male connector, A-coded	*5-pin M12 male connector, A-coded*	*5-pin M12 female connector, A-coded*	*4-pin M8 female connector*	*3-pin M8 female connector*	*8-pin M12 female connector, X-coded*	4-pin M12 female connector, D-coded
Pin	**Signal**	**Signal**	**Signal**	**Signal**	**Signal**	**Signal**	**Signal**
1	GND	Shield	Shield	+5 V	Sensor 1	TRD0_P	TX+
2	DC 24 V ± 20%	DC 24 V ± 20%	DC 24 V ± 20%	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-422/485), Host	CAN L	CAN L	–	–	TRD3_P	
6	TD– (RS-422/485), 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-422/485), Host	–	–	–	–	–	
12	RD– (RS-422/485), 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	–	–	–	–	–	