Lector[®]65x Flex

Image-based code reader with manually adjustable focus





Correct use

The Lector®65x Flex image-based code reader featuring a selectable application-specific optic kit (lens unit, integrable illumination unit with spacers plus optics protective hood) is an intelligent SICK IDpro sensor.



Lector®65x Flex: camera housing and optic kit (optional accessories)

The Lector®65x Flex is used for automatic, stationary 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 Lector®65x Flex sends the read data to a higher-level computer via its host interface for further processing.

Correct use also includes compliance with all information in these operating instructions and the supplementary Lector®65x Technical Information (no. 8016185). The Lector®65x product family includes two distinct version series: **Dynamic Focus** and **Flex**. Depending on the particular model, the version series offer different options in terms of the following:

- Sensor resolution and image frame rate of imager
- Type and focal distance of lens unit
- Light color of integrated/integrable illumination unit
- Type and combination of electrical connections
- Device enclosure rating and type of material used for the reading window in the optics protective hood

About this document

The purpose of these operating instructions is to allow you to put the **Lector**[®]**65x** Flex into operation quickly and easily and to achieve initial read results. These instructions describe a stand-alone application for **a** Lector[®]**65x** Flex based on the default settings. The device used in this scenario could, for example, take the form of a Lector[®]**654** Flex (model name V2D654R-MCxxA6: sensor resolution 4 megapixels) plus optional optic kit 05. The kit comprises: C-mount lens unit with a focal distance of 50 mm, integrable VI83I illumination (ring light) with white LED light, 2 spacers, and an IP 65 optics protective hood with a glass reading window. The optional CDB650-204 connection module can be used to achieve industrial-standard signal distribution with the

Lector®65x Flex. The operating instructions are valid for the following variants:

Connection variant 1:

- Lector®652 Flex, model name V2D652R-MCxxA6
- Lector®654 Flex, model name V2D654R-MCxxA6

Connection variant 2, for Systems:

- Lector[®]652 Flex, model name V2D652R-MCxxF6
- Lector[®]654 Flex, model name V2D654R-MCxxF6

For the exact features, see "Device overview", page 5.

For the sake of simplicity, the Lector®65x Flex with a mounted optic kit will be referred to below as the "Lector®65x".

Supplementary and applicable documents

More detailed information about mounting and electrical installation as a stand-alone device in accordance with these operating instructions is available in the $\Box Lector^{\oplus}65x$ Technical Information (no. 8016185). This technical information describes and presents:

- Optional mounting accessories (brackets)
- The suppression of possible ground potential equalization currents in applications with distributed systems
- Pin assignments and lead color assignments of cables
 Electrical wiring diagrams for the CDB650-204/CDM420-
- 0006 connection modules (in relation to the Lector®65x)
- Overview list and license texts for open-source software

Important information on VI83I illumination unit and its variant-dependent LEDs in risk groups RG 1 or RG 2 is contained in the III Notes on device of VI83I illumination unit (no. 8017270). Hard copy enclosed with the illumination unit. Information about configuring the Lector $^{\oplus}65x$ can be found in the online help function of the SOPAS ET configuration software.

The documents are available on the web in PDF format. Simply visit the SICK product page for the Lector®65x: www.mysick.com/en/lector65x

Safety information

- This chapter is about the safety of commissioning personnel, as well as operators of the system in which the Lector®65x is integrated.
- Read these instructions carefully before commissioning the Lector#65x in order to familiarize yourself with the device and its functions. The operating instructions are considered a part of the device and must be kept in an accessible location in the immediate vicinity of the Lector#65x at all times!
- The Lector®65x conforms to laser class 1M. The VI83I integrable illumination unit contained in the optics kits conforms to LED risk group RG 1 or RG 2, depending on the variant (→ see "Technical specifications (excerpt)", page 5). For details of hazards and protective measures → see "Optical radiation!", page 3 and Notes on device of VI83I illumination unit.
- During operation, the surface temperature of the Lector®65x housing (particularly on the rear of the device where the cooling fins are located) can reach 70°C.
- The following requirements must be met if the IP 65 enclosure rating is to be maintained during operation (otherwise, the device will no longer meet the conditions for any specified IP enclosure rating):
- · The optics protective hood must be screwed tight.
- The black cover for the micro SD card slot (rear of device) must be screwed tight to the device.
- 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 on delivery).

Only operate the Lector®65x 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 device against moisture and dust.

- Opening the Lector®65x camera 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 Lector®65x.
- 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 the confidentiality of the data and rights which are 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.

Commissioning and configuration

Scope of delivery

- The version of the Lector®65x 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 or covered by a protective sticker. Lens unit, illumination unit, optics protective hood, and connecting cables not included.
- Hexagon key, wrench size 2 for opening/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. 8016180) and English (no. 8016181). Other language versions (if applicable) are available in PDF format from the online product page: www.mysick.com/en/lector65x
- Optional accessories, such as the optic kit, device bracket, and connecting cables, are only supplied if ordered separately.

Step 1: Mounting and alignment

Tools and aids required

 Two or four M5 screws for mounting the Lector®65x 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 Lector®65x are included with the brackets.

Mounting requirements

- The permissible ambient conditions for the operation of the Lector[®]65x must be observed (e. g., ambient temperature, ground potential → see "Technical specifications (excerpt)", page 5 and "Risk of injury/risk of damage due to electrical current!", 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 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 Lector®65x. Net weight 635 g (without optic kit and cables). Dimension drawing → see "Device design", page 3
- Shock- and vibration-free mounting
- Clear view of the codes to be detected on the objects

Mounting the optic kit on the Lector®65x



Overview of how to mount the optic kit on the camera housing

Items supplied, optic kit:

- · Application-specific lens unit
- Application-specific VI83I illumination unit (ring light), luminated 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 cylinder head with hexagon socket, wrench size 2
- IP 65 optics protective hood with screw thread and reading window

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

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 Lector®65x.

- 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 Lector®65x or the glass lenses at either end of the lens unit.
- 1. Place the camera housing on a nonslip base.
- Remove the protective cap from the round light inlet ⑦.
 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
- This will also lock the optional filter in place at the same time (if applicable).

2. Mounting the illumination unit (ring light)

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.



After mounting the optics protective hood, attach the warning label to the hood near the light emission. See also the Avotes on device of VI83I illumination unit (no. 8017270)



Mounting the integrable illumination unit on the camera housing

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 variant for lenses with a focal distance of 12 mm/16 mm does 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 3 for the illumination unit on the camera housing.
- 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. Do not mount the IP 65 optics protective hood until:
 - The sharpness and aperture of the lens unit have been manually adjusted
 - The setting in the display window of the SOPAS configuration software has been checked
 (+) see "Adjusting the brightness and sharpness on the
 - lens unit", page 3)

Mounting the Lector®65x

- 1. Connect the designated cable(s) to the Lector $^{\circ}65x$.
- Optional: Attach the SICK bracket that has been ordered separately (e. g., mounting bracket no. 2069169) to the Lector®65x using the two sliding blocks. For further details

see the "Mounting" chapter of the La Lector®65x Technical Information (no. 8016185).

 Otherwise, mount the Lector®65x 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 blocks in the lateral slots (→ see "Device design", page 3).

Insert the screws into the threaded mounting holes/sliding blocks by a maximum of 5 mm.

Aligning the Lector[®]65x reading window with the code

Remember to consider the shape and alignment of the field of view in front of the Lector®65x.



V2D652R-IVICXX

extent is distance-dependent Taking account of the reading distance, which is dependent on resolution

Image-sensor-dependent viewing ranges in front of the device; the

For the resulting reading range \rightarrow see "Field of view diagram", page 5.

Taking account of the reading angle



Selection of the skew angle, depending on the application

Tilt the Lector®65x away from the plane that is perpendicular to the surface of the code to avoid as many interfering reflections as possible. Typically, this skew angle will be between 10° and 20°.

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

For further information about aligning the field of view with the object, see the "Mounting" chapter of the Lector®65x Technical Information (no. 8016185).

CDB650-204 connection module

Mount the CDB650-204 connection module in the vicinity of the Lector®65x. If you are using the serial data interfaces (RS-232), we recommend a maximum distance of 5 m. Mount the CDB650-204 in such a way that the device remains accessible at all times. In relation to this, see the \square CDB650-204 Connection Module Operating Instructions (no. 8016155), which are enclosed in printed form with the device.

Step 2: Electrical installation

- Only skilled electricians with appropriate training and qualifications are permitted to perform electrical installation.
- Standard safety requirements must be met when working in electrical systems.
- Electrical connections between the Lector®65x and other devices may only be made or disconnected when there is no power to the system. Otherwise, the devices may be damaged.
- Where connecting cables with one end open are concerned, 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 of the supply cable from the customer's power system should be designed and protected in accordance with the applicable standards. If the supply voltage for the Lector®65x is not supplied via the CDB650-204 connection module, the Lector®65x must be protected by a separate slow-blow fuse with a max. rating of 2.0 A. This fuse must be located at the start of the supply circuit.
- All circuits connected to the Lector®65x must be designed as SELV circuits (SELV = Safety Extra Low Voltage).

▲ DANGER

Risk of injury/risk of damage due to electrical current!

The Lector®65x 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 Lector®65x can result in equipotential bonding currents between the Lector®65x 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 heat rise, thereby causing cables to catch fire.

- 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.
- See the "Electrical Installation" chapter in the Lector®65x Technical Information (no. 8016185) that is available on the online product page: www.mysick.com/en/lector65x
- 1. Connect the communication interface of the Lector®65x to the PC (Ethernet or USB, depending on model).
- 2. Supply the Lector[®]65x with a voltage of DC 24 V \pm 20 %.



Block wiring diagram for commissioning the V2D65xR-MCxxxx

Step 3: Configuration

The SOPAS ET configuration software is used by default to adapt the Lector®65x parameters to the application and to perform diagnostics in the event of an error. The Lector®65x supports this process by displaying the images it has recorded in the SOPAS ET software (requirement concerning SOPAS ET: V. 2.38 or higher).

Installing and starting the configuration software

- 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: www.mysick.com/en/SOPAS_ET by following the instructions provided there. In this case, select the "Complete" option as suggested by the install 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)
- Establish a connection between the software and the Lector®65x via Ethernet or USB (depending on model). The connection wizard starts automatically so that you can do this.
- 4. The following IP address is configured by default on the Lector®65x:



5. Select the appropriate Lector®65x from the list of available devices:

SOPAS establishes communication with the Lector®65x and loads the associated device description file for the Lector®65x. The program window, which is divided into three sections, opens.

6. In the ONLINE IMAGE window, click the EDIT button. The Lector®65x now starts recording images consecutively and uses the current settings to decode them. The effects of any lens adjustment or parameter changes in SOPAS are directly visible. In this mode, the switching inputs and outputs are deactivated along with data output via the host interface.

SOPAS Single Device program window



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

- Click the CAMERA & ILLUMINATION configuration bar. You can now access key parameters for fine adjustment of the brightness and sharpness.
- 8. Align the lens of the Lector®65x with the code.



Adjusting the brightness and sharpness on the lens unit

- 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 reading distance is the center of the front window on the screwed-on optics protective hood (→ see adjacent figure on right). If the hood has been removed, the front 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 indicator changes to green.
- 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 process

- Make settings for additional functions during planned operation such as codes, reading trigger, read result formats, data interface, etc.
- Go to the image display window (ONLINE IMAGE), click the OPERATION button, and test the settings in read mode (real operation).

Completing the configuration process

Permanently save the entire configuration: Parameter set in Lector[®]65x: Click the button Configuration file on the PC: Click the button.

Important

To put the Lector[®]65x into operation 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.

Description of the device

Device design

Lector®65x (camera housing)



- $\oplus\ {\rm Onnection}\ {\rm P1},$ 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
- $\ensuremath{\textcircled{\texttt{S}}}$ Connection X1, function and design dependent on model
- ⑥ Reference point for reading distance (center of front window)

- between Lector®65x and object
- ⑦ Cover for the micro SD memory card slot
- \circledast Threaded mounting holes M5, 5 mm deep (4 x) for mounting the Lector*65x
- 9 Sliding blocks M5, 5.5 mm deep (2 x), rectractable, for an alternative method of mounting the Lector $^{8}65x$
- Threaded mounting holes M2.5, 5.5 mm deep (4 x) for mounting the illumination unit spacers
- ${\scriptstyle \textcircled{1}}$ Cover for illumination unit connection
- $\ensuremath{\mathfrak{D}}$ Light inlet with protective cap and threaded connection for lens unit
- Outlet opening for light beam from aiming laser
 - Bar graph display (10 x LEDs)
 - Image: Second Second
 - $fmodel{eq:levels}$ LEDs for status display (2 levels), 10 x

Integrable illumination unit (accessory)



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

Optical radiation!

Laser radiation class 1M:

The accessible beam from the aiming laser does not represent a risk due to the normal restrictions imposed by human behavior.

LED risk group 1:

The accessible radiation 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 radiation 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 radiation:

It is not possible to entirely rule out temporary, disorientating optical effects on the human eye (e.g., dazzle, flash blindness, afterimages, impairment of color vision), in particular in conditions of dim lighting. No safety precautions are required. Caution – Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

 Do not look into the light source when it is switched on. LED risk group 2: CAUTION – Possibly hazardous visible radiation. During operation do not intentionally look into

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the illumination unit for long periods. May be harmful to the eyes.

- Do not look at the laser directly with optical instruments (magnifiers).
- Comply with the latest version of the applicable standards 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.

Additional information \rightarrow see "Technical specifications (excerpt)", page 5.

Status indicators, functions



LED status indicators, function buttons, and bar graph display

Return button
 Arrow button

Status indicators on the first display level

Display	LED	Color	Status		
Deady		Green	Device ready to read		
Reauy		Red	Hardware or software error		
Desult		Green	Read operation successful		
Result		Red	Read operation unsuccessful		
Light	•	Green	Read mode: Illumination on, interna read gate open		
		Green	Function can be defined by user		
Funct	•	Yellow	Function can be defined by user		
		Blue	Function can be defined by user		
		Red	Function can be defined by user		

● = illuminated; : ● = flashing

Status displays on the second display level

Display	LED	Color	Status		
Tst		Blue	Test (reading diagnostics) selected		
(Test)	.	Blue	Test started		
		Blue	Teach-in selected (default: match code)		
Tch	.	Blue	Teach-in started		
(Teach- in)		Green	Teach-in successful		
	•	Red	Teach-in unsuccessful (match code default setting: unable to teach in any code)		
4.6		Blue	Auto-Setup selected		
(Auto-	.	Blue	Auto-Setup started		
Setup)		Green	Auto-Setup successfully finished		

Display	LED	Color	Status	
A-S (Auto- Setup)	•	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

Test (reading diagnostics)

Percentage Evaluation: The Lector®65x records a series of images and uses the current reading performance settings to decode them. The read rate of the last 10 attempts is displayed in % in the bar graph display.

Teach-in

When you teach in a match code, the Lector®65x 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 Lector®65x adjusts itself automatically to suit the lighting conditions and the quality of **the code presented**. It saves the calculated values permanently in accordance with the default setting.

Micro SD memory card (optional accessory)

Function

With the optional plug-in memory card, the Lector®65x backs up the last permanently modified parameter set externally as well (cloning). Furthermore, the Lector®65x can record optional images, e. g., when codes cannot be read ("No Read") (for details of the parameter backup concept and other memory card functions, see the online help function of the Lector®65x).

A memory card is not included in the scope of delivery.

To ensure that the memory card functions reliably, only use types approved by SICK (see La Lector®65x Product Information, no. 8016253). The Lector®65x supports memory cards up to max. 16 GB. The memory card has no write protection that can be activated.

Inserting the memory card

To avoid damaging the memory card, make sure there is no power to the Lector®65x when you insert or remove it.

On the Lector®65x, the card slot can be accessed on the rear of the device. It is located behind the black cover above the type label (\rightarrow see \overline{O} in *"Device design", page* 3).

Maintaining the IP 65 enclosure rating: → see "Safety information", page 1.

1. To release the cover, use the socket key provided (wrench size 2) to undo both (captive) hexagon socket screws.

Overview of electrical connections

Connec- tion	Connection variant 1 (V2D65xR-MCxxAx)	Connection variant 2 (for Systems) (V2D65xR-MCxxFx)			
	Inter	faces			
X1	Power/SerialData/CAN/IO	CAN IN			
X2	USB	Triggering of external illumination unit			
P1	GB Ethernet*)	GB Ethernet*)			
P2	-	CAN OUT			
P3	GB Ethernet	GB Ethernet			
*) Planned, cu	Planned, currently has no function.				

Overview of pin assignment and design of connections

	Power/SerialData/CAN/IO	CAN IN	CAN OUT	USB	Triggering of external illumination	GB Ethernet
	$\begin{array}{c} 3 \\ 13 \\ 5 \\ 14 \\ 6 \\ 17 \\ 17 \\ 15 \\ 8 \end{array} \begin{array}{c} 2 \\ 11 \\ 16 \\ 10 \\ 10 \\ 10 \\ 17 \\ 15 \\ 8 \end{array}$		$\frac{1}{5} \bigcirc 0 0 3$	$\frac{4}{3} \underbrace{)}_{0} \underbrace{)}_{1} \underbrace{)}_{1}$		4 3 2 5 6 7 8
	17-pin M12 plug, A-coded	5-pin M12 plug, A-coded	5-pin M12 socket, A-coded	4-pin M8 socket	3-pin M8 socket	8-pin M12 socket, X-coded
Pin	Signal	Signal	Signal	Signal	Signal	Signal
1	GND	Shield	Shield	+5 V	Sensor 1	TRD0_P
2	DC 24 V ± 20 %	DC 24 V ± 20 %	DC 24 V ± 20 %	Data-		TRD0_N
3	CAN L	GND	GND	Data+	Result 4	TRD1_P
4	CAN H	CAN H	CAN H	GND	SensGND	TRD1_N
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					

- 2. Push the cover away from the device until the card slot can be accessed.
- 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.

NOTE

Risk of data loss or irreparable damage to the memory card!

The Lector®65x does **not** signal when the card is being accessed (for read or write purposes) (unlike an electronic camera with a memory card).

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- If parameter values are changed on the Lector®65x using the SOPAS configuration software and the "permanent" option or if functions are started that need to access the memory card (e.g., image recording), do **not** remove the memory card/do **not** switch off the supply voltage.
- To remove the memory card safely during operation, select the REMOVE CARD function under ANALYSIS TOOLS/MICROSD CARD in the configuration software SOPAS and wait for SOPAS to provide confirmation.

Technical specifications (excerpt)

Model Name	Lector®65x Flex		
Focus	Manual adjustment of the sharpness and aperture on the optional lens unit		
Illumination for field of view	Optional, e.g., with the integrable VI83I illumination unit: 11 x LEDs, visible light. White ($\lambda = 6,000 \pm 500$ K) or blue ($\lambda = 455 \pm 20$ nm) (V2D65xR-MCxxxx)		
Feedback LED (spot in field of view)	Optional, e.g., with the integrable VI83I illumination unit: 1 x LED, visible light. Green ($\lambda = 525 \pm 15$ nm)		
LED risk group of the VI83I integrable illumination unit			
Aiming laser (field of view)	Visible light, red (λ = 630 nm 680 nm), can be deactivated		
Laser class	Class 1M acc. to IEC 60825-1: 2007-03. Complies with 21 CFR 1040.10 except for deviations pursuant to Laser Notice No. 50 dated June 24, 2007. P < 1.40 mW		
Code resolution	\geq 0.1 mm, depending on lens unit		
Reading distance	See "Field of view diagram", page 5.		
Lens unit	Application-specific, see Lector®65x Prod- uct Information (no. 8016253)		
Image sensor	Monochrome (gray scale value), sensor resolution (V2D65 x R-MCxxxx) depends on model, see Table 2		
Image frame rate	70 Hz at 2 Mpx, 40 Hz at 4 Mpx (V2D65 x R-MCxxxx)		
Ambient light safety	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		
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)		

Model Name	Lector®65x Flex			
Serial RS-232/422/485	Host (300 Bd 115.2 kBd), for data output			
Serial RS-232	Aux (57.6 kBd), for configuration/diag- nostics			
USB ¹⁾	Aux (USB 2.0), for configuration/diagnos- tics and image transmission			
Ethernet	Aux, Host, image transmission (FTP). 10/100/1,000 Mbit/s, TCP/IP, Ethernet/ IP. For 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			
Digital switching inputs ¹⁾	2 x physical, 2 x additional external via optional CMC600 module in connection module CD8650-204 or CDM420-0006. V = max. 32 V, I = max. 5 mA, opto-decou- pled, reverse polarity protected, adjustable debounce time			
Digital switching outputs ¹⁾	4 x physical, 2 x additional external via optional CMC600 module in connection module CD8650-204 or CDM420-0006. V _{ot} = V _s - 1.5 V, I _{ot} \leq 100 mA. Short-circuit protected, temperature protected. Not electrically isolated from supply voltage			
Electrical connections	Model-dependent, see "Overview of electri- cal connections", page 4			
Optical indicators	10 x RGB LEDs (status indicators) 1 x LED (feedback LED, green) 10 x RGB LEDs (bar graph display, blue)			
Acoustic indicators	1 x beeper for signaling events, can be deactivated			
External backup of parametric 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 according to EN 60950-1: 2011-01			
Power consumption	Typically 20 W (with switching outputs without load)			
Housing/weight	Aluminum die casting/635 g, without optic kit			
Reading window material	Model-dependent, glass or plastic (PMMA), 2 mm thick in each case, with scratch- proof coating.			
Reading window ma- terial (continued)	(V2D65xR-MCxxx x , glass: x = 4, 6, 7; plas- tic: x = 1, 5, 8, 9), see also <i>Table 2</i>			
Safety	Acc. to EN 60950-1: 2011-01			
Electrical protection class	III according to EN 60950-1: 2011-01			
Enclosure rating	IP 65 according to EN 60529: 2000-09 (V2D65xR-MCxxxx) Maintaining the IP 65 enclosure rating: → see "Safety information", page 1			
EMC	Radiated emission: EN 61000-6-3: 2007-01/A1: 2011-03 Electromagnetic immunity: EN 61000-6-2: 2005-08			
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			

Model Name	Lector®65x Flex		
Permissible relative 0 % 90 %, non-condensing air humidity			
 Not applicable to system variant Lector*65x Flex for Systems, model name V2D652R-MCxxF6 and V2D654R-MCxxF6 Notes regarding adequate dissipation of lost heat → see "Mounting require- ments", page 1. 			
Table 1			

For further technical specifications, see the Online data sheet on the online product page (www.mysick.com/en/lector65x).

Device overview

Version	Image sensor	Image sensor resolution	Electrical connections ¹⁾	Enclosure rating	Device type (camera housing)	Part no.
Lector [®] 652 Flex	2 Mpx	2,048 px x 1,088 px	Connection variant 1	IP 65	V2D652R-MCxxA6	1063404
Lector [®] 654 Flex	4 Mpx	2,048 px x 2,048 px	Connection variant 1	IP 65	V2D654R-MCxxA6	1060892
Lector®652 Flex for Systems	2 Mpx	2,048 px x 1,088 px	Connection variant 2	IP 65	V2D652R-MCxxF6	On request
Lector®654 Flex for Systems	4 Mpx	2,048 px x 2,048 px	Connection variant 2	IP 65	V2D654R-MCxxF6	1068496

For details of each configuration, see "Overview of electrical connections", page 4

Table 2

Field of view diagram



Interpreting the diagram

You can use the diagram to determine the following for a given lens focal distance:

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

Example:

Given (in red):

Code resolution (1): 0.4 mm Focal distance of lens (2): 35 mm

Read (in green):

Maximum reading distance ③: 1,680 mm Field of view V2D65**2**R ④: approx. 550 mm x 550 mm Field of view V2D65**4**R ⑤: approx. 550 mm x 275 mm

Maintenance and care

The Lector®65x is maintenance-free. No maintenance is required in order to ensure compliance of the aiming laser with class 1M and LED risk group RG 1 or RG 2 for the integrable illumination unit.

In order to obtain maximum reading performance from the Lector®65x, 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 Lector®65x in harsh environments (dust, abrasion, moisture, etc.). The reading window must be kept clean and dry for reading.

If the reading window becomes contaminated, clean it carefully with a soft, moist (mild detergent) cloth.

Important!

If the reading window is scratched or damaged (cracked, broken), the optics protective hood must be replaced immediately using a spare part of identical design (reading window material).

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).

Transport and storage

Transport and store the camera housing of the Lector®65x and any optional optic kit in their original packaging, ensuring in the case of the former 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 camera housing 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).

Repair

Repair work on the camera housing of the Lector®65x may only be performed by qualified and authorized service personnel from SICK AG. Spare parts may be purchased to enable the replacement of any optic kit parts that have become defective (spacers are only available in pairs).

Disassembly and disposal

Risk of burns due to hot device surface!

During operation, the surface of the Lector $^{\otimes}65x$ housing (particularly the rear of the device) can reach temperatures of up to 70 °C.

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

Any Lector®65x 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 country-specific waste disposal regulations that are applicable at the time. As it is categorized as electronic waste, the Lector®65x must never be disposed of with household 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 Lector $^{\otimes}65x$ and its optional accessories can be found in electronic form on the following

online product pages:

Image-based code reader Lector®65x (www.mysick.com/en/lector65x)

- Detailed technical specifications (online data sheet)
- EC declaration of conformity
- Dimensional drawing and 3D CAD dimension models in various electronic formats
- Field of view diagrams
- Compatible accessories (including cables, brackets, trigger sensors, external illumination units)
- Lector®65x Flex Operating Instructions in German (no. 8016180) and English (no. 8016181) and other languages if applicable
- Lector®65x Technical Information in German (no. 8016184) and English (no. 8016185)
- Ordering information in the Lector®65x Product Information in German (no. 8016252) and English (no. 8016253)
- Publications dealing with accessories

Integrating the Lector*65x FIELDBUS into PROFIBUS DP (www.mysick.com/en/cdf600-2)

- CDF600-21xx PROFIBUS DP Fieldbus Module Operating Instructions in German (no. 8015334) and English (no. 8015335)
- CDF600-21xx PROFIBUS DP Fieldbus Module Technical Information 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 German (no. 8015921) and English (no. 8015922) and possibly other languages and other languages if applicable

Documents on request

Overview of command strings for Lector[®]65x

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

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For details of the associated license texts that relate to the license overview provided below, please refer to the Lector®65x Technical Information, License Texts for Open-source Software (no. 8016467). This can be downloaded from the Lector®65x product page on the web: www.mysick.com/en/lector65x

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