

Lector®632

Image-based code readers



Product information

The Lector63x is an industrial image-based code reader family for all common 1D (bar codes / stacked codes) and 2D (matrix) codes. The result is sent to the control system via digital output or its host interfaces: Serial, CAN or Ethernet.

The Lector63x Flex variants feature exchangeable S- or C-mount optics, internal lighting and filter options to meet a wide range of application requirements.

About this document

This quickstart contains instructions that support the set up and operation of the Lector63x Flex. Make sure that the installation is performed by a qualified technician.

This quickstart as well as the Lector63x operating instructions, containing additional information, are available in English and German online. To download: www.SICK.com > type a document number in the PART NUMBER field: quickstart EN/DE, 8018061/8018060, operating instructions EN/DE, 8018071/8018070.

Mount

Assemble the optical kit on the Lector63x. For details see section C at the end of this quickstart.

NOTICE

Use only Lector63x optics to ensure optimal image quality and to avoid damage to the device.

Mount the device at a suitable working distance from the object, for example using a mounting bracket (angled bracket part no. 2076735, cooling bracket 2078970, or bracket kit 2076735). For information about suitable working distances, see section E.

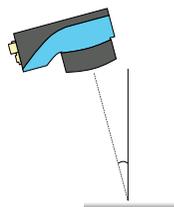


Fig. 1: Mounting

Mount the Lector63x with a 10 to 20 degree tilt to avoid reflections.

Connect

To connect the Lector63x:

1. Connect the Gigabit Ethernet to a network or directly to a PC.
2. Connect the power I/O to a 24 V power source.

⚠ WARNING

Ensure that the ground potential is the same at all grounding points. Incorrect grounding or connection can damage the device and cause fire.

Ensure that any loose cable ends are isolated. Do not connect external I/O signals to the Lector63x while it is powered.

Configure with PC

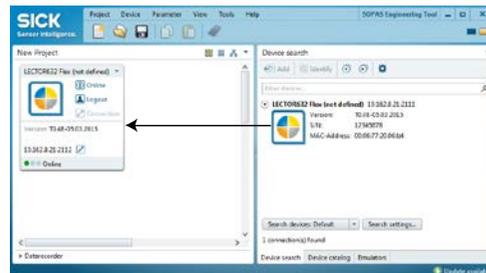
The SOPAS Engineering Tool (ET) software for PC is used to connect and configure the Lector63x and other SICK devices.

To install SOPAS ET:

1. Download SOPAS ET (version 3.0.1 or newer) from www.mysick.com/en/SOPAS_ET.
2. Run the downloaded installation file.
3. Follow the instructions on the screen.

SOPAS ET main window

The SOPAS ET main window is split into two panes, the project view to the left and a list of connected devices to the right. To add the Lector63x to the project, drag the device to the left project pane.



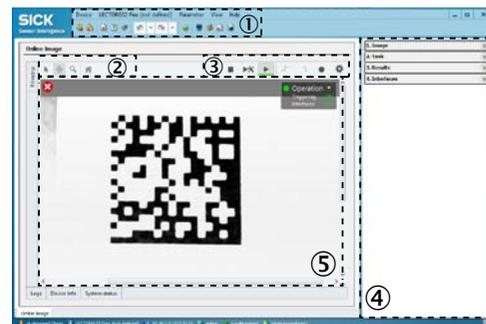
Double-click the product icon to open the device window and start the configuration.

If there are IP address connection issues, click the text next to the warning symbol in the project pane to make adjustments.

If the device driver is missing, click the text next to the warning symbol in the project pane and follow the instructions. The device will be in offline mode after installing the driver. Put the device in online mode by clicking the OFFLINE button next to the product icon.

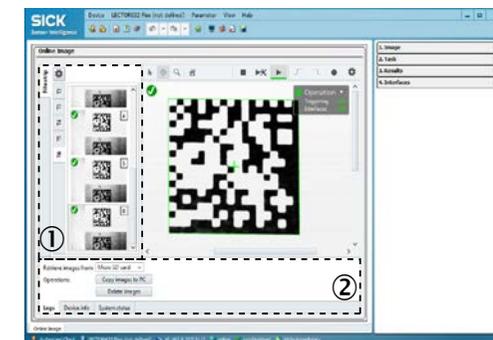
SOPAS ET device window

The Lector63x is configured in the SOPAS ET device window. The code in the image below can be used to test your device.



- ①. SOPAS functions
- ②. Image handling controls
- ③. Device controls
- ④. Parameter pane with workflow
- ⑤. Image area

Additional expandable panels are available to the left of and below the image area.



- ①. Filmstrip
- ②. Information area

Device controls

The device controls are used to change between image acquisition modes and to activate related functions.

Button	Mode	Description
	Stop	Stops image acquisition. External interfaces including inputs are disabled. The device does not receive triggers.
	Live	Activates live image acquisition. External interfaces are disabled.
	Operation	Activates image acquisition as configured in the triggering settings. External interfaces are enabled.

Button	Function	Description
	Manual trigger	Trigger a single image (single image mode).
	Start trigger	Start image series (image series mode).
	Stop trigger	Stop image series (image series mode).
	Record	Records images to a folder on the PC.
	Settings	Recording settings.

Image handling controls

The image handling controls are used to change how images are viewed.

Button	Function	Description
	Select	Click and drag to change region size and position.
	Move	Click and drag to move the image.
	Zoom	Click and drag upwards to zoom in and downwards to zoom out.
	Home	Click to fit image area to view.

Filmstrip

The expandable filmstrip area shows the image history as thumbnails. When the image acquisition is stopped it is possible to click a thumbnail to see it enlarged.

Information area

The expandable information area contains the DEVICE INFO, LOGS and SYSTEM STATUS tabs.

The DEVICE INFO tab displays device-related information such as IP address and serial number.

The LOGS tab contains controls to retrieve logged images.

The SYSTEM STATUS tab shows system warnings and errors.

Workflow

Follow the workflow in the parameter panel to configure the Lector63x. While the steps are arranged in the typical configuration order, it is possible to navigate freely between the steps.

1. Image

The IMAGE workflow step controls how and when images are acquired.

The LENS & FOCUS section controls lens type selection and displays focus feedback.

The BRIGHTNESS section controls the visual quality of acquired images. Use the AUTO GAIN button to automatically adjust the gain.

The ILLUMINATION section controls the internal and external lighting behavior. The internal lighting is enabled by default.

NOTICE

For Lector632x Flex, the focusing of the image is done mechanically on the device (S-mount) or on the lens (C-mount). To protect the device (S-mount) from focus manipulation attach the supplied round label to the hole in the device lid.

The TRIGGERING section controls the acquisition mode and triggering method:

Acquisition mode	Description
Single image	<ul style="list-style-type: none"> Acquires one image and outputs one result per trigger signal. Used when there is only one acquisition and analysis per object. Used when the code is precisely positioned on the object in high speed applications.
Image series	<ul style="list-style-type: none"> Acquires a series of images and typically outputs one combined result per trigger signal. Used when the object is larger than the field of view and the exact code position is unknown. Used to increase read rate by acquiring each code multiple times.

Image series is enabled by default.

2. Task

The TASK workflow step contains the code reading parameters.

The CODE READER SETTINGS section determines which code types to read. Advanced settings are available for performance optimization.

The CODE READER RESULTS section contains unformatted results for the current image, such as the read result and code print quality.

The results are presented in a table where each row represents one code.

3. Results

The RESULTS workflow step contains settings for result timing, post-processing and formatting.

The OUTPUT CONTROL section determines when the result shall be output, either:

- Directly when processing is ready
- At a fixed response time

The COUNTERS section contains counters which for example can be used to set conditional outputs.

The CONDITIONS section allows creation of custom conditions for device control and result logic. The GoodRead condition is pre-defined as an example:

GoodRead

New Copy Delete See all

+ Result + System + Func

CodeReader.Count >= 1

The DIGITAL OUTPUTS section specifies which results are published on the available outputs.

In the OUTPUT FORMAT section, the decoding result can be formatted to a string in a visual editor. The example below shows how the GoodRead condition is used to output the content of all read codes.

Output format 1

+ Prog + Char + Result + System + Func

```

if GoodRead
  then
    For each CodeReader.codes
      Content
    else
      NoRead
  <ETX>
  <STX>
  
```

The BEEPER, FUNCTION LED and FEEDBACK SPOTLIGHT sections contain settings to define custom outputs for monitoring results without a screen.

4. Interfaces

The INTERFACES workflow step contains settings for connections to external interfaces.

The I/O DEFINITIONS section defines the physical behavior of the digital inputs and outputs.

The ETHERNET section sets up Ethernet communications with peripheral equipment.

The SERIAL section sets up serial communications with peripheral equipment.

The LOGGING section controls logging of data from the device to internal and external destinations: Device RAM, MicroSD card and external FTP server.

The ENCODER section sets up one of the digital inputs to receive encoder signals. For example, increment-controlled acquisition and result output make the system independent of conveyor speed.

The MASTER/S�AVE section sets up camera-to-camera

communication in a SICK CAN network.

The FUNCTION BUTTONS ON DEVICE section defines the behavior of the device buttons.

The DEVICE TIME section specifies how to set the device time manually or to synchronize with an external time server.

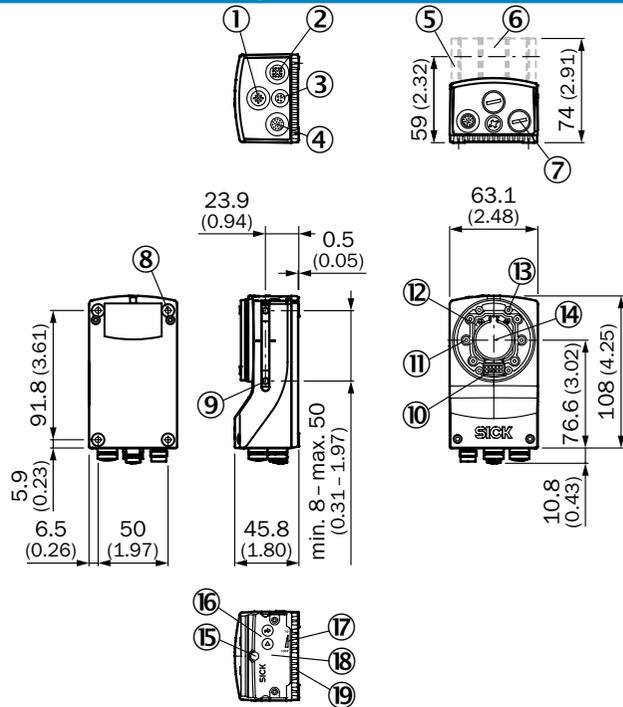
License text

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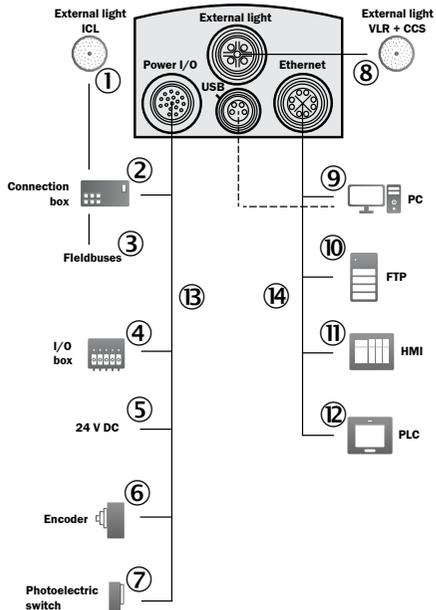
View the complete license texts here: www.sick.com/licencetexts. A printed copy of the license texts is also available on request.

A. Dimensional drawings



- ① External light connector
- ② Gigabit Ethernet connector
- ③ USB connector
- ④ Power, serial, CAN and I/O connector
- ⑤ 23 mm protection hood for lens and lighting
- ⑥ 38 mm protection hood for lens and lighting
- ⑦ Plug to ensure IP67 for unused connectors
- ⑧ Blind hole thread M5, 5.5 mm deep (4 x)
- ⑨ Sliding nut M5, 5.5 mm deep (4 x)
- ⑩ Integrated lighting connector
- ⑪ Aiming laser (2 x)
- ⑫ S- or C-mount optical module
- ⑬ Blind hole thread 2.5 mm (4 x) for mounting integrated lighting
- ⑭ Optical axis and center of image sensor
- ⑮ Manual focus screw, hidden under cover/sticker (S-mount Flex)
- ⑯ Function button (2 x)
- ⑰ Bar graph LED display (5 x)
- ⑱ Removable cover for microSD card and manual focus screw
- ⑲ Status LED display (5 x 2 levels)

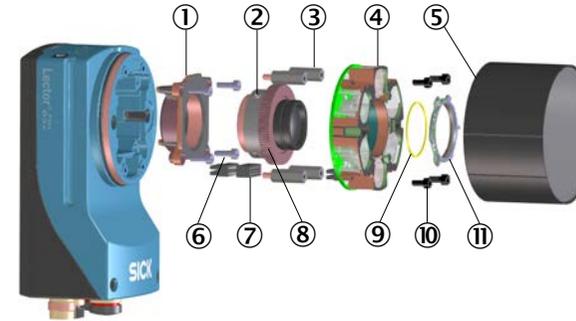
B. Connection diagram



- ① External light (ICL)
- ② Connection box
- ③ Fieldbuses
- ④ I/O box
- ⑤ 24 V DC, power source
- ⑥ Encoder
- ⑦ Photoelectric switch
- ⑧ External light (VLR + CCS)
- ⑨ PC
- ⑩ External FTP server
- ⑪ HMI, operator interface
- ⑫ PLC, control system
- ⑬ Power cable, for example no. 2055419 (2 m)
- ⑭ Ethernet cable, for example no. 6034414 (2 m)

C. Optical configuration

Example with compact C-mount optics:



- ① Optical module (C-mount)
- ② Focus locking screws
- ③ Spacers
- ④ Integrated lighting
- ⑤ Protection hood
- ⑥ Metallic screws
- ⑦ Integrated lighting connector extension
- ⑧ Focus adjustment ring
- ⑨ Filter ring (replace with filter)
- ⑩ Black screws
- ⑪ Filter holder

Note: parts vary between optical configurations. To prevent focus changes, fix the C-mount lens with at least one of the supplied screws before starting operation.

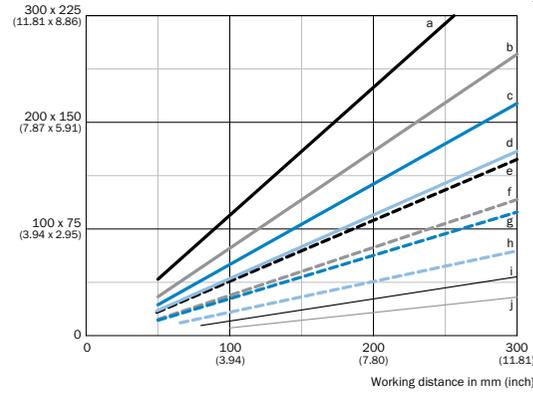
D. Pin assignment

Pin	Power/SerialData/ CAN/I/O	USB (no image transfer)	External light	Gb Ethernet
1	Ground	+5V	DC 24V switchable out	TRD0_P
2	DC 24V ±20%	- Data	-	TRD0_N
3	CAN L	+ Data	Ground	TRD1_P
4	CAN H	Ground	-	TRD1_N
5	TD+ (RS 422/485)			TRD3_P
6	TD- (RS422/485) TxD (RS 232)			TRD3_N
7	TxD (RS 232)			TRD2_P
8	RxD (RS 232)			TRD2_N
9	Sens GND			
10	Input 1			
11	RD+ (RS 422/485)			
12	RD- (RS 422/485) RxD (RS 232)			
13	Input/output 3			
14	Input/output 4			
15	Input 2			
16	Input/output 5			
17	Input/output 6			

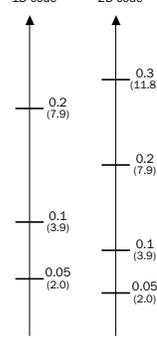
E. Field of view diagram

Short range up to 0.3 m working distance

Field of view width x height in mm² (sq inch), typical values



Min. resolution in mm (mil)
1D code 2D code

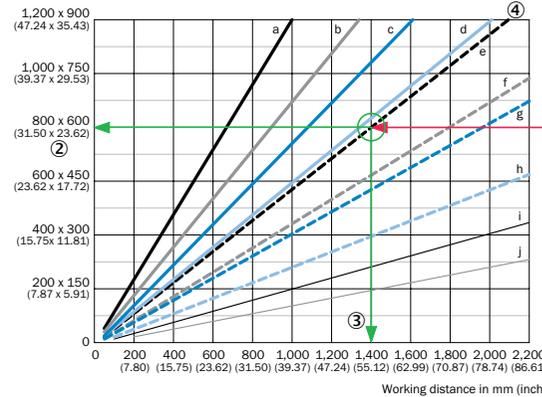


Lens focal length

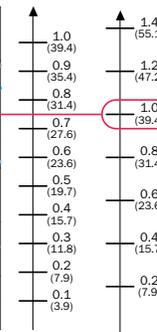
- a: f = 6.0 mm
- b: f = 8.0 mm
- c: f = 9.6 mm
- d: f = 12.0 mm
- - e: f = 12.5 mm
- - f: f = 16.0 mm
- - g: f = 17.5 mm
- - h: f = 25.0 mm
- - i: f = 35.0 mm
- - j: f = 50.0 mm

Long range up to 2.2 m working distance

Field of view width x height in mm² (sq inch), typical values



Min. resolution in mm (mil)
1D code 2D code



Interpreting the diagrams

Use the diagrams to determine:

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

Example

Given (in red):
2D code resolution ①: 1.0 mm

Read (in green):
Field of view ②: 800x600 mm²
Working distance ③: 1400 mm
Lens focal length ④: 12.5 mm
(example, other lenses possible)

F. LED definitions

First level, runtime operation

	Green ●	Red ●	Yellow ●	Blue ●
Ready	Operation	Stop	Live	Busy
Result	Decision OK	Decision NOK	-	-
Light	Lighting on	-	-	-
Function	User-defined	User-defined	User-defined	User defined

Second level, manual configuration (not active)

	Green ●	Red ●	Yellow ●	Blue ●
Test	-	-	-	-
Teach	-	-	-	-
Setup	-	-	-	-
Focus	-	-	-	-

G. Technical data

Attribute	Value
Features	
Task	Reading
Technology	2D, snapshot, image analysis
Sensor	CMOS matrix sensor, gray scale
Spectral range	Approx. 400 nm ... 900 nm
LED class	White light: Risk group 1 (low risk, IEC62471: 2006)
Laser class	1 (IEC 60825-1 (2014)) complies with 21 CFR 1040.10 except for the tolerance according to "Laser Notice No.50" from June 24.2007
Focus	Manually adjustable
Lens	Exchangeable S- or C-mount, depending on optical kit
Reading distance	30 mm ... 2000 mm
Performance	
Scanning frequency	Max 50 Hz
Sensor resolution	1600 x 1200 px
Bar code types	Interleaved 2 of 5, Codabar, Code 128, Code 32, Code 39, Code 93, GS1 DataBar, GS1-128/EAN 128, Pharma, UPC/GTIN/EAN
2D code types	Data Matrix ECC200, GS1 Data-Matrix, MaxiCode, QR code
Stacked code types	PDF417, Postal
Code qualification	On the basis of ISO/IEC 16022, ISO/IEC 15415, ISO/IEC 15416, ISO/IEC 18004
Interfaces	
Data store and retrieve	Image and file logging via MicroSD memory card, internal RAM and external FTP
Switching inputs	Max 6 internal 24V (4 configurable as in/out), additional 2 inputs via optional CMC600 in CDB650/CDM420
Configurable inputs	Encoder input, external trigger
Switching outputs	Max 4 internal 24V (configurable as in/out) additional 2 external outputs via CMC600 in CDB650/CDM420
Configurable outputs	Good read, external light trigger, conditional output
Output current	≤ 100 mA per output

Attribute	Value
Maximum encoder frequency	1 kHz
Control of external illumination	Via digital output (24V trigger) or via external light connector
Serial - Function - Rate	RS-232, RS-422 - Host, AUX - 300 Baud ... 115.2 kBaud, AUX: 57.6 kBaud (RS-232)
USB	USB 2.0
Ethernet - Function - Data transmission rate - Protocol	- Host, AUX, image transmission - 10/100/1000 Mbit/s - TCP/IP, FTP
CAN bus - Function - Rate - Protocol	- Master/Slave - 250 kbit/s ... 500 kbit/s - CSN (SICK CAN Sensor Network)
Optical indicators	11 LEDs (5 x status display, 5 x bar graph, 1 green/red feedback spot)
Acoustic indicators	Configurable beeper
Control elements	2 function buttons
Memory card	MicroSD memory card, optional
Mechanics/electronics	
Electrical connection	1 x M12, 17-pin plug (serial, CAN, I/Os, power supply), 1 x M8, 4-pin socket (USB), 1 x M12, 8-pin socket (Ethernet), 1 x M12, 4-pin socket (external light control)
Power consumption	Typ. 10 W, ± 20 %
Enclosure rating	IP 67 (with hood and plugged unused connectors)
Housing	Aluminium
Window material	PMMA or glass
Weight	430 g excluding optics
Operating voltage	24 V DC ± 20 %
Ambient data	
Shock resistance	EN60068-2-27:2009-5
Vibration resistance	EN60068-2-6:2008:02
Ambient operating temperature	0 °C ... +50 °C
Ambient storage temperature	-20 °C ... +70 °C