

ICR840-2
Image Code Reader
– New Generation –



2D Line



Software Versions

Software/Tool	Function	Version
ICR840-2	Firmware	V 3.10
CLV-Setup	Configuration software (Windows-based)	V 4.6
CLV-Setup Help	Online help (HTML)	V 4.6
ImageFTP	Image transfer and presentation software	V 2.1.0.1

NOTICE

RF interferences in case of use in residential areas!

- The ICR840-2 Image Code Reader is exclusively intended for use in industrial areas.

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Latest manual version

For the latest version of this manual (PDF), see www.sick.com.

Table of Contents

1	Notes on this document	7
1.1	Purpose.....	7
1.2	Target group	7
1.3	Depth of information	7
1.4	Used symbols	8
2	Safety Information	9
2.1	Authorized users	9
2.2	Intended use	9
2.3	General safety precautions and protection measures.....	10
2.4	Quick stop and quick restart.....	12
2.5	Environmental information.....	12
3	Product description	13
3.1	Design of device.....	13
3.2	System requirements	16
3.3	Product features and functions (overview)	16
3.4	Method of operation	18
3.5	Indicators and control elements.....	20
4	Installation	23
4.1	Overview of installation sequence.....	23
4.2	Installation preparations	23
4.3	Installation location	25
4.4	Installing and adjusting the ICR840-2.....	29
4.5	Installing external components.....	29
4.6	Removing the device	30
5	Electrical installation	31
5.1	Overview of the installation sequence	31
5.2	Electrical installation preparations.....	31
5.3	Electrical connections and cables	33
5.4	Pin assignments.....	36
5.5	Performing electrical installation	37
5.6	Pin assignment and wire colour assignment of pre-fabricated cables with open ends.....	45
6	Startup and configuration	47
6.1	Overview of the startup procedure	47
6.2	CLV-Setup configuration software	47
6.3	Establish communication with the ICR840-2	48
6.4	The image transfer program ImageFTP.....	58
6.5	Using the function key.....	68
6.6	First startup	69
6.7	Establish communication with the ICR840-2 manually	70
6.8	Configuring the ICR840-2.....	71
6.9	Operating modes and outputting the reading result	74
6.10	ICR840-2 messages	89
6.11	Default settings.....	91
6.12	Adjusting the ICR840-2	93
6.13	Configuration guide	94
6.14	Switching the ICR840-2 off	100
7	Maintenance	101
7.1	Maintenance during operation	101
7.2	Cleaning the ICR840-2	101
7.3	Checking the incremental encoder.....	102
7.4	Replacing an ICR840-2	103
7.5	Disposal	104
8	Troubleshooting	105
8.1	Overview of errors and malfunctions which could occur	105

8.2	Monitoring errors and malfunctions.....	105
8.3	Error messages.....	106
8.4	ST error status in the reading result of an 1D code (bar code).....	107
8.5	Troubleshooting.....	109
8.6	SICK Service.....	119
9	Technical data	121
9.1	Data sheet for the ICR840-2 Image Code Reader	121
9.2	ICR840-2 dimensional drawing	123
9.3	Specification diagrams	124
10	Appendix	127
10.1	Appendix overview.....	127
10.2	Settings for reading Data Matrix ECC200	128
10.3	System messages.....	137
10.4	Installation and operating instructions for the CLV-Setup configuration software	138
10.5	Configuring the ICR840-2 with command strings.....	148
10.6	Auxiliary tables.....	150
10.7	Special applications and procedures.....	151
10.8	Ordering information for ICR840-2 and accessories	166
10.9	Dimensional drawings accessories.....	171
10.10	Supplementary documentation.....	173
10.11	Glossary.....	174
10.12	EC-Declaration of Conformity.....	180
10.13	List of tables and figures	181
10.14	Index.....	185
10.15	Code samples (selection).....	189

Abbreviations

CAN	Controller Area Network (field bus protocol based on the CAN bus)
CDB	Connection Device Basic
CDM	Connection Device Modular
DPM	Direct Part Marking
DOF	Depth of Field
DPS	Dynamic Parameter Switching
DSP	Digitaler signal processor
EEPROM	Electrically Erasable Programmable Read Only Memory.
FIFO	First in, first out
HD	High-Density
HTML	Hyper Text Markup Language (languages of internet websites)
ICR	Image Code Reader
LED	Light Emitting Diode.
LIFO	Last in, first out
MTBF	Mean Time Between Failure
PLC	Programmable Logic Controller
RAM	Random Access Memory
ROI	Regions of Interest
ROM	Read Only Memory
RTF	Rich Text Format (standardised document format with format descriptions)
SMART	SICK Modular Advanced Recognition Technology

Important For a list of tables and figures see [Chapter 10.13 List of tables and figures, Page 181](#)

1 Notes on this document

1.1 Purpose

This document provides instructions for **technical staff** on the installation and operation of the ICR840-2 Image Code Reader (fixed focus) in following versions:

- High Density / Standard / Mid / Long Range reading range
- Front / side reading window

A summary of all device versions is shown in [Chapter 3.1.4 Device versions, Page 15](#).

This document provides information on

- Installation and electrical installation
- Startup
- Configuration
- Maintenance
- Troubleshooting
- Replacing the device
- Special applications and procedures

Important The ICR840-2 Image Code Reader with all its variants is simply referred to as "ICR840-2" in the document, except where a distinction is necessary.

1.2 Target group

This document is intended for persons who are responsible for the following activities:

Tasks	Target group
Installation, electrical installation, maintenance and replacement	Qualified staff, e.g. electricians and service technicians
Startup and configuration	Qualified staff, e.g. technicians and engineers

Tab. 1-1: Target group

1.3 Depth of information

This document contains all of the information necessary for the installation, electrical installation and startup of the ICR840-2 with the **factory default settings**.

The ICR840-2 is configured for the **application-specific reading conditions** using the CLV-Setup configuration software on a Windows™ PC. The CLV-Setup configuration software contains the online help system CLV-Setup Help to facilitate configuration. The procedure for installing and operating the configuration software is described in the Appendix.

Important Additional information on the structure of the ICR840-2 Image Code Reader and 1D/2D code technology is available from the Auto Ident division of SICK AG.
Internet address: www.2d-code.com.

1.4 Used symbols

Some of the information in this document is marked specially so that you can access it quickly:



WARNING

Warning notice!

A warning notice indicates real or potential danger. It is intended to prevent accidents and to protect the ICR840-2 Image Code Reader from damage.

- Always read warning notices carefully and observe them at all times.

Reference Italic script denotes a reference to further information.

Important This important note informs you of specific features.

Explanation Explanations provide background information on technical correlations.

Recommendation Recommendations help you carry out certain procedures more effectively.

Tip Tips explain settings CLV-Setup configuration software.

Default setting Marks a section containing the values of the factory default settings.

SCANNING FREQUENCY This font indicates a term in the user interface of the CLV-Setup configuration software.



Icons refer to buttons in the user interface of the CLV-Setup configuration software.

"Host receive fault" This font indicates messages output via the auxiliary interface of the ICR840-2.



This symbol identifies sections that describe steps carried out with the user interface of the CLV-Setup configuration software.



This symbol refers to additional technical documentation.

- There is a procedure which needs to be carried out. This symbol indicates operational instructions which only contain one operational step or operational steps in warning notices which do not have to be followed in any particular order.
Operational instructions comprising several steps are denoted using consecutive numbers.
- ⇒ This symbol indicates either the selection of a function in the CLV-Setup configuration software or indicates a reference in the glossary.

2 Safety Information

This chapter deals with your safety and operator safety in the operational area.

- Read this chapter carefully **before** using the ICR840-2.

2.1 Authorized users

For correct and safe functioning, the ICR840-2 must be installed, operated and maintained by sufficiently qualified staff.

Repairs to the ICR840-2 should only be carried out by qualified and authorised SICK AG service staff.

- Supplied the end user with the operating instructions.
- Provide the end user with expert tuition and advise him to read the operating instructions.

The following qualifications are required for the various tasks involved:

Tasks	Qualifications
Installation, maintenance	<ul style="list-style-type: none"> - General technical training - Knowledge of the standard guidelines relating to safety in the workplace
Electrical installation, replacement	<ul style="list-style-type: none"> - Practical electrical training - Knowledge of the common electrical safety guidelines - Knowledge regarding the operation of the devices in the relevant application (e.g. conveyor belt)
Startup, configuration	<ul style="list-style-type: none"> - Basis knowledge of the Windows™ operating system - Basis knowledge of designing and setting up (addressing) Ethernet connections for connecting the ICR840-2 to the Ethernet - Basis knowledge of working with an HTML browser (e.g. Internet Explorer™) for using the online help - Basic knowledge of data transfer - Basic knowledge of 1D/2D code technology
Operation of the devices in each operational area	<ul style="list-style-type: none"> - Knowledge regarding the operation of the devices in the relevant application (e.g. conveyor belt) - Knowledge of the hardware and software environment of the relevant application (e.g. conveyor belt)

Tab. 2-1: Required qualifications for starting up the ICR840-2

2.2 Intended use

The ICR840-2 is an intelligent sensor for the automatic reading and decoding of 1D codes (bar codes) and 2D codes on objects in a reading station. The sensor is optimised to applications in which the codes are read either on not moved objects or on objects transported only with low velocity.

The ICR840-2 transfers the reading data via its host interface (serial RS 232/422/485 or Ethernet) to a host computer for further processing.

The ICR840-2 is configured/diagnosed using the CLV-Setup configuration software that runs on a standard client PC (Windows™) provided by the customer.

Important Any warranty claims against SICK AG shall be deemed invalid in the case changes to the device, such as opening the housing, this includes modifications during installation and electrical installation or changes to the SICK software.

The ICR840-2 is only to be operated in the permitted ambient air temperature range.

2.3 General safety precautions and protection measures

- Read the general safety precautions carefully and observe them at all times. This also applies to the warnings and operating instructions in the individual chapters of this document.

2.3.1 RF interferences

NOTICE

RF interferences in case of use in residential areas!

- The ICR840-2 Image Code Reader is exclusively intended for use in industrial areas.

2.3.2 Electrical installation



DANGER

Risk of injury by electrical current!

In the CDM420 Connection Module, the CMP400 Power Supply Module is connected to a mains voltage of 100 to 250 V AC/50 to 60 Hz.

- When working with electrical equipment, always follow the relevant safety regulations.

Important Electrical installation should only be carried out by qualified staff.

Connect or disconnect current linkages only under de-energised conditions.

Wire cross sections and their correct protection have to be selected and implemented according to valid engineering standards.

2.3.3 LED radiation



CAUTION

LED radiation!

The illumination of the ICR840-2 operates with LEDs of LED class 1.

Under normal and sensible conditions, the accessible radiation of the LEDs is not hazardous. Blinding, impairment of ability to see color, or other irritations, however cannot be excluded.

The entire area of the reading window ([Fig. 2-1](#)) acts as a LED outlet aperture.

Caution – use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

- Never look directly into the illumination.
- Do not open the housing.
(Opening the housing does not deactivate the LEDs by the reading pulse.)
- Always observe the latest valid version of laser protection regulations.

Radiation power

The illumination LEDs operate at a wavelength of $\lambda = 617 \text{ nm} \pm 15 \text{ nm}$ (visible red light) with a pulse duration of max. 5 ms. The energy in the human eye is $< 1.7 \text{ J/m}^2$.

ICR840-2

The product is classified in LED class 1 in accordance with EN 60825-1 and IEC 60825-1 (for publication date, see the warning sign on the device).

Important Maintenance is not required to ensure compliance with LED class 1.

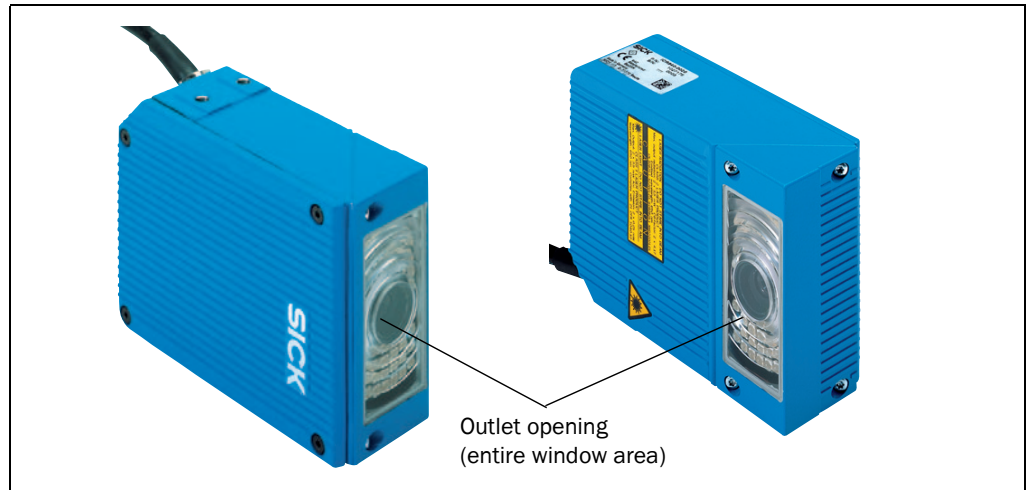


Fig. 2-1: Outlet opening of the LED radiation at the ICR840-2

Warning labels

At the ICR840-2, the warning label (Fig. 2-2) in three languages and the warning symbol are located on the wide side of the housing.

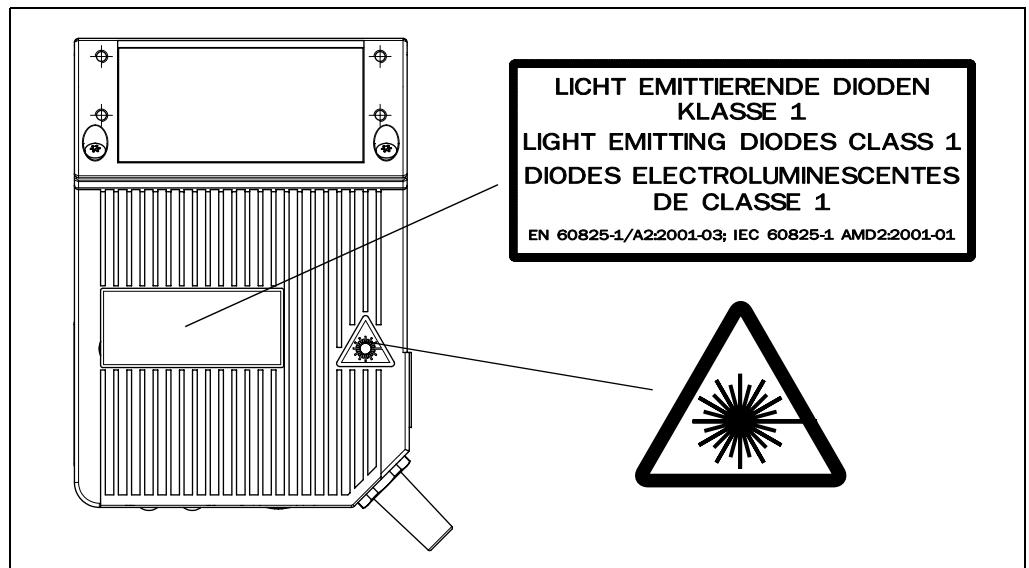


Fig. 2-2: Black-yellow signed warning labels found on the ICR840-2

If the ICR840-2 is installed in a machine/panel with the result that the warning labels are no longer visible, additional warnings (not included in the scope of delivery) must be provided on the machine beside the emergence aperture of the LED radiation.

Controlling the illumination LEDs

- Activation and deactivation of the LEDs when reading is controlled by the reading pulse (trigger source).
- A timer (illumination timeout) automatically deactivates the LEDs 10 minutes (default setting) after a continuous reading pulse is initiated in Reading mode with switching input pulse modes "Sensor Input" and "Serial Interface". However, it does not end the

reading interval. In this case, the ICR840-2 outputs the following message to the auxiliary interface:

"Illumination safety timeout"

The reading interval must be terminated by resetting the trigger signal. The LEDs are activated again by the next reading pulse.

- The illumination timeout can be set in the range of 1 min to 25 h or deactivated.
- **The illumination LEDs are periodically activated in the operating mode "Percentage Evaluation" and are always activated in the pulse mode "Free Running" in Reading mode.**

2.4 Quick stop and quick restart

2.4.1 Switching the ICR840-2 off

- Switch off the power supply or remove the ICR840-2 cable plug from the connection module.

This can result in loss of the following (at the most):

- The application-specific parameter set, if it was only stored **temporarily** in the ICR840-2
- The last reading result
- Daily operating data
(operating hours counter, reading interval count, good read count, no read count, maximum duration reading interval, minimum duration reading interval, number of matches with match code 1, number of matches with match code 2, number of No Matches.)

2.4.2 Switching the ICR840-2 on again

- Switch on the supply voltage or reattach the ICR840-2 cable plug to the connection module.

The ICR840-2 resumes operation with the **last permanently stored** parameter set and resets the daily operating data.

2.5 Environmental information

The ICR840-2 is designed to cause minimum impact on the environment. It does not contain any silicone-based materials on the housing surface and, therefore, does not represent any problems for paint sprayers in paint shops, for example.

2.5.1 Power requirements

The power requirements are low: The ICR840-2 has a maximum power consumption of typically 13 W. The value is given for devices with disconnected switching outputs.

2.5.2 Disposal after final removal from service

At present SICK AG does not take back devices which have become unusable or irreparable.

- Dispose of unusable or irreparable devices in accordance with the respective state regulations on waste disposal in a manner compatible with the environment.

The ICR840-2 can be separated into recyclable secondary raw materials and special-category waste (electronic scrap).

See [Chapter 7.5 Disposal, Page 104](#).

3 Product description

This chapter describes the design, the features and the functions of the ICR840-2.

- For installation, electrical installation and startup assistance as well as for the application-specific configuration of the ICR840-2 using the CLV-Setup configuration software, please read this chapter **prior** to carrying out any of the tasks.

3.1 Design of device

The ICR840-2 consists of a image recording system (lense and CMOS matrix sensor) and an electronic unit (image processing system with integrated decoder). The image recording system and the electronic unit are located in an industry-compatible housing. The light exits and enters via a reading window in the housing, which also contains an arrangement of LEDs for illuminating the reading area.

For an adaptation to on-site space conditions two housings are available: a housing with front reading window and a housing with side reading window. Via the integrated angle attachment, the reflected light enters through the side reading window at an angle of 90°, referred to the centre-line of the housing.

Depending on the type, various lenses enable different resolutions and reading ranges.

The ICR840-2 is electrically connected by a shielded cable with a D-Sub HD plug and by an RJ45 socket on the housing. The ICR840-2 meets the enclosure rating IP 65 using an optional adapter frame with the corresponding Ethernet cable or a corresponding cover.

Fig. 3-1, Page 14 shows the view of the ICR840-2.

3.1.1 View of device

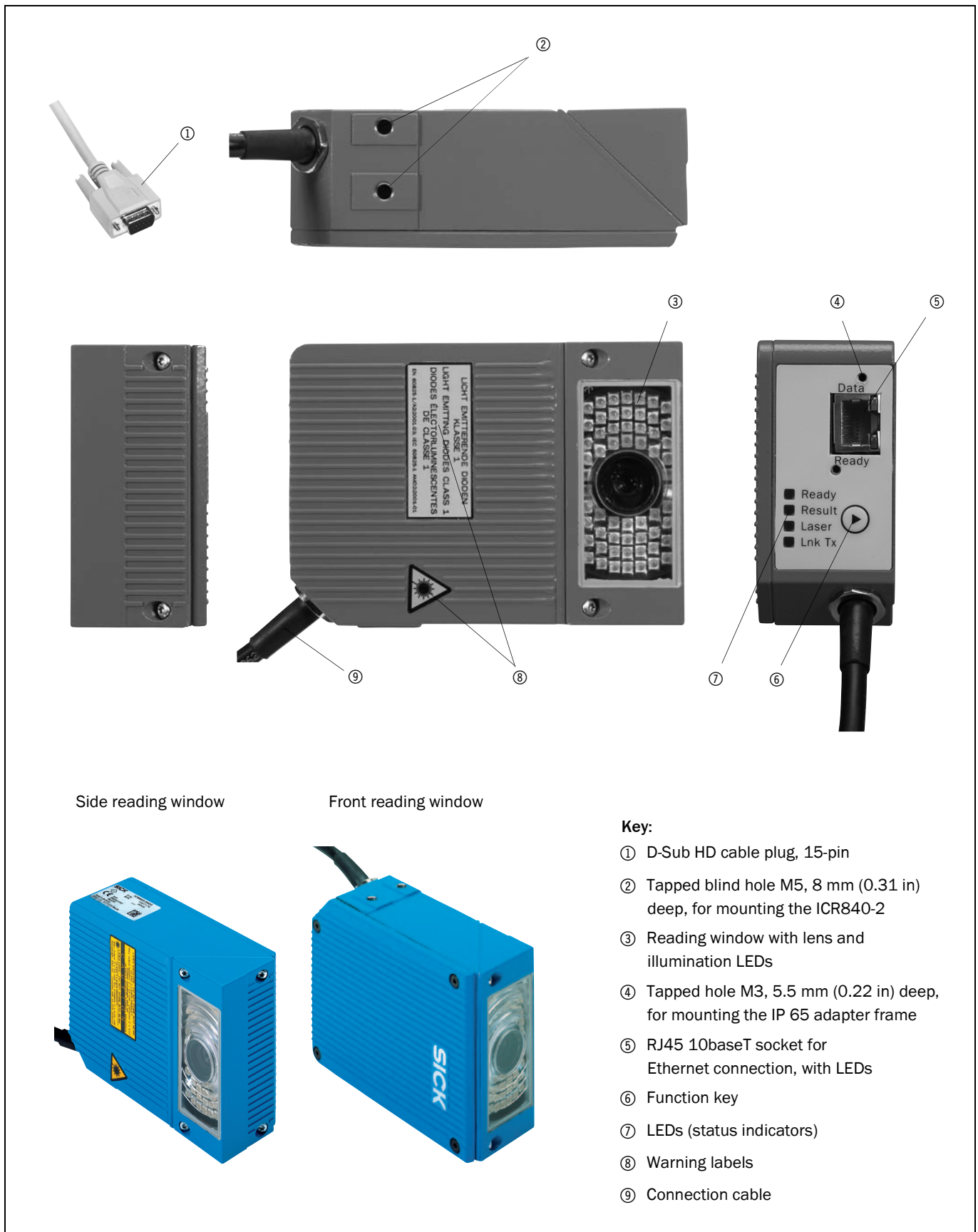


Fig. 3-1: Design of the ICR840-2

ICR840-2

3.1.2 Scope of delivery

Delivery of the ICR840-2 includes the following components:

No.	Component	Comment
1	ICR840-2 Image Code Reader	Type depends on version, see Tab. 3-2
1	Notes on device with electrical connection diagram and quick start as primary information	Included in the device packing of the ICR840-2
1	CD-ROM "Manuals & Software Bar Code Scanners"	Included in the device packing of the ICR840-2
	ICR840-2 Operating Instructions in printed form, in German and/or English	Optional, depending on the number of issues explicitly ordered upon purchase

Tab. 3-1: ICR840-2 delivery

An overview of in-stock installation accessories, connection modules, sensors for reading pulses, incremental encoder, cables and plug-in connectors is available in [Chapter 10.8 Ordering information for ICR840-2 and accessories, Page 166](#).

3.1.3 Contents of the CD-ROM (Nr. 2029112)

- **CLV-Setup:** Configuration software for standard PC (Windows™) with integrated online help system CLV-Setup Help (HTML files)
- **CLV-Connect:** Presentation software for standard PC (Windows™) for displaying connection diagrams (HTML files)
- **ICR840-2 operating instructions:** PDF version in German and English as well as further publications of other SICK devices (connection modules, bar code scanners)
- **Adobe Reader:** Freely available PC software for displaying PDF files

Important All current versions of publications and programs on the CD-ROM can also be downloaded at www.sick.com.

3.1.4 Device versions

The ICR840-2 is available in the following versions:

Type (red light)	Order no.	Version	Reading window
ICR840-2A0020	1042896	High Density	On front
ICR840-2A1020	1042897		On side
ICR840-2B0020	1042277	Standard Range	On front
ICR840-2B1020	1042338		On side
ICR840-2C0020	1042279	Mid Range	On front
ICR840-2C1020	1042885		On side
ICR840-2D0020	1043547	Long Range	On front
ICR840-2D1020	1043546		On side

Tab. 3-2: Versions of the ICR840-2

Important Other versions on request.

3.2 System requirements

General system requirements are derived from the technical data of the ICR840-2 (see [Chapter 9 Technical data, Page 121](#)).

The requirements and conditions for [Installation](#), [Electrical installation](#) and [Startup and configuration](#) are summarised in the respective chapters.

3.3 Product features and functions (overview)

Feature	Characteristic
High-performance reader	<ul style="list-style-type: none"> • CMOS matrix sensor of newest technology (1.3 megapixel) • Fixed focus • Front reading window or side reading window • Resolution, reading range (DOF) and field of view depending on type (High Density/Standard Range / Mid Range / Long Range) • 25 Hz Image recording rate/decoding frequency at highest resolution • Function to adapt to the code marking quality/object velocity • Variable active evaluation range of the image buffer, thereby higher image recording rate
Safety and user-friendly features	<ul style="list-style-type: none"> • Robust, compact metal housing, max. IP 65, CE certification • LED class 1, illumination LEDs switches off if reading interval is active for too long • Automatic self-test on startup. Can also be triggered at any time • Diagnosis tools for installing and monitoring the system • Variable output of reading diagnosis data in the read result • Operating data query, and error messages on request • Test string function for signaling readiness for operation • Future proof thanks to firmware update via data interface (flash PROM) • Low power consumption • Extended power voltage range
Easy configuration	<ul style="list-style-type: none"> • Configuration (online/offline) via CLV-Setup configuration software with integrated Assistant (Connection Assistant) and help system. Displaying the image memory content via the ImageFTP program. • Configuration alternatively with simple command strings, also for use with special devices • Function key for starting functions without using CLV-Setup • Four status LEDs • Beeper to confirm device functions or operating steps (can be switches off)
Operating modes	<ul style="list-style-type: none"> • Reading mode • Percentage evaluation - for assessing the quality of the reads (2D codes only) • Special functions for system installation
Reading pulse	<ul style="list-style-type: none"> • External reading pulse, via switching input(s) or serial data interface • Free running with timeout
2D code/1D code evaluation	<ul style="list-style-type: none"> • Data Matrix ECC 200/all standard bar code types • Max. 50 codes per image/reading pulse (max. 4,000 characters) • Separation of identical codes of the same code type • Code comparison (max. 2 matchcodes), can also be used as filter as sort criterion for the reading result
Data processing	<ul style="list-style-type: none"> • Manipulation of the data output string via filter or format mask • Sort sequences: code position, FIFO, LIFO, code length list, ROI sequence
Data communication	<ul style="list-style-type: none"> • Host interface: variable output format for reading result, communication can be routed via the CAN or Ethernet interface • Auxiliary interface (auxiliary data interface): fixed output format, with special diagnosis functions, communication can be routed via the Ethernet interface

Tab. 3-3: Overview of the product features and functions

ICR840-2

Feature	Characteristic
Electrical interfaces	<ul style="list-style-type: none"> Serial host interface (RS 232 or RS 422/485), variable data transfer rate and protocol Serial auxiliary interface (RS 232), with fixed data transfer rate and fixed protocol Ethernet interface with TCP/IP and FTP CAN interface for integration in the SICK CAN scanner network or a CANopen network 2 digital switching inputs for external reading pulse and special function (e.g. encoder increment) 2 digital switching outputs for signaling defined events in reading mode as well as for triggering or direct powering an external field illumination
Connection technology (design)	<ul style="list-style-type: none"> Data and switching interfaces as well as power supply: <ul style="list-style-type: none"> Cable with 15-pin D-Sub HD plug Ethernet: 8-pin RJ45 10 baseT socket on device CDB620 or CDM420 Connection Module for connection to host (stand-alone) and for integration in SICK CAN scanner network CMF400 Connection Module Fieldbus in the CDM420 Connection Module for connection to DeviceNet or PROFIBUS-DP

Tab. 3-3: Overview of the product features and functions (contd.)

3.3.1 Field of applications

The ICR840-2 can read 2D codes, which either have been added to the object using labels or have been directly marked onto the object surface (DPM) with one of the following methods:

- Inkjet printing
- Nd-YAG laser
- CO₂ laser
- Laser marking on metal
- Dot peening on metal

Fig. 3-2 shows some samples for various marking methods.

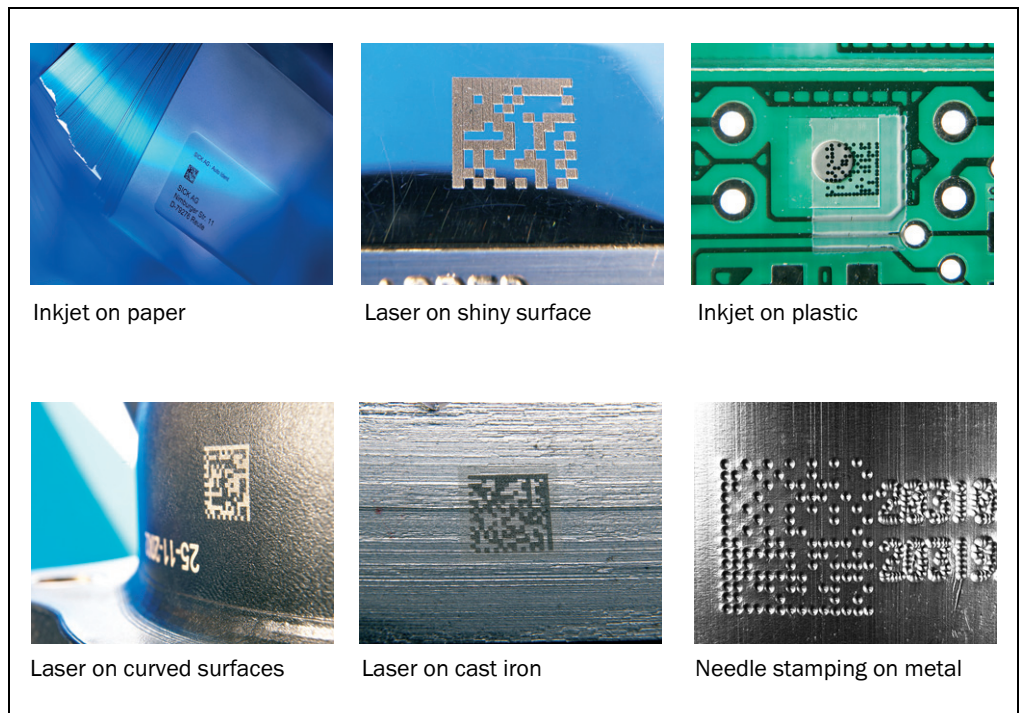


Fig. 3-2: ICR840-2: Direct marking methods for 2D codes

3.4 Method of operation

The ICR840-2 consists of a image recording system (lense and CMOS matrix sensor) and an electronic unit (image processing system with integrated decoder). It reads and decodes 1D codes (bar codes) and 2D codes.

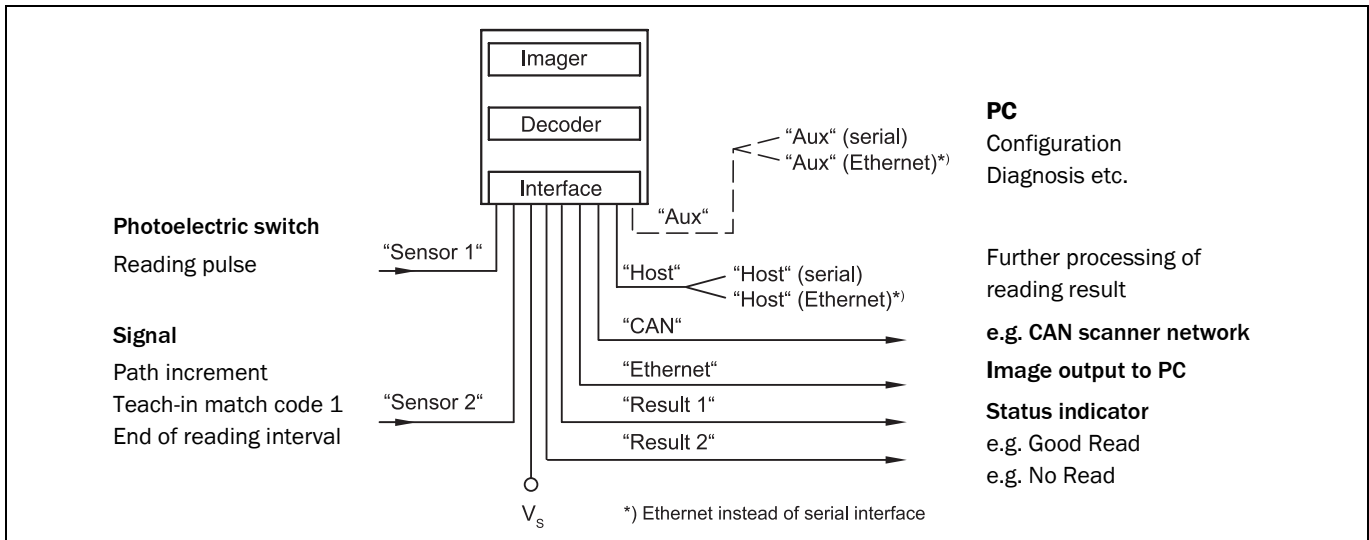


Fig. 3-3: Block diagram: functions of the ICR840-2

3.4.1 Image recording

For image recording the ICR840-2 takes a rectangular image of the area to be read. To do so, an illumination lights the area to be read. The LEDs of the illumination generate a red illumination field (pulsed) with a flash frequency and duration calculated by the ICR840-2. When starting a reading cycle, the ICR840-2 switches on the illumination. With the matrix sensor the ICR840-2 absorbs repeatedly the light reflected from the field of view (Fig. 3-4) through the lens as grey values. The recorded images are stored in an electronic image buffer memory. To prevent distorted images while the image are being recorded, the objects must remain stationary or must only be moved with low velocity. The velocity permitted depends on the cell size, the contrast of the code layout and the flash duration.

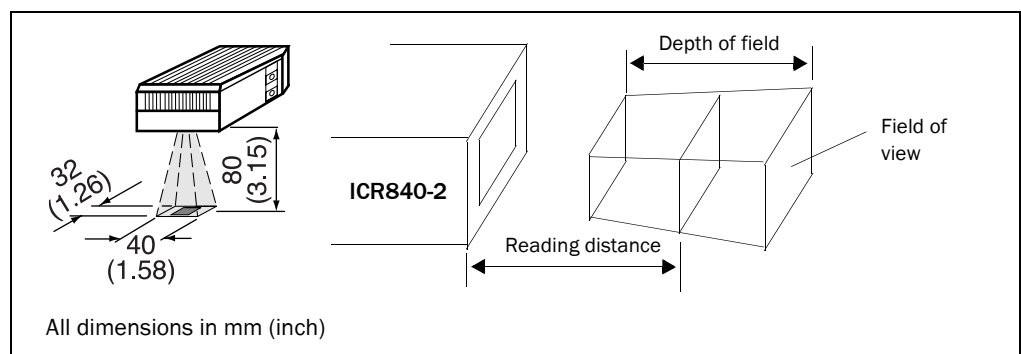


Fig. 3-4: Field of view of the ICR840-2 in the focus position (Standard Range)

The field of view, which is mapped in sharp focus by the ICR840-2 on its matrix sensor, depends on the reading distance and, depending on the resolution, must be within the reading range (DOF). Chapter 9.3 Specification diagrams, Page 124 shows the available field of view. The image recording rate is 25 Hz at full matrix sensor utilisation. If the appropriate configuration settings are made to reduce the matrix sensor area (image geometry) used for the evaluation, this increases the potential image recording rate. The recording rate with

the VGA resolution (640 x 480 pixels) is 60 Hz, for example. The ICR840-2 automatically adjusts the flash frequency and duration. With a maximum of two working areas, a maximum of just two separate strips in the image field can be evaluated. To read the codes successfully when the active field of view is reduced, the objects must be routed exactly and the codes must be in fixed location.

On request, the ICR840-2 outputs the image buffer memory content as binary or grey scale bitmap via the Ethernet interface. The images can be displayed by the Image FTP program.

3.4.2 Decoding

As codes are detected in the image data, the ICR840-2's decoding algorithms determine the code(s) contents. At the end of the reading cycle the ICR840-2 outputs the code data information via its host interface to a host/PC for further processing.

The ICR840-2 is equipped with four decoders:

- The decoder for omni-directional reading of 2D codes
- The tried-and-tested standard decoder of the CLV series for 1D codes (bar codes)
- The SMART decoder (**SICK Modular Advanced Recognition Technology**) for decoding 1D codes on following conditions:
 - small aspect ratio (ratio of the code height to the code length)
 - dirty or damaged printed code
 - bar codes that are tilted excessively (azimuth angle)
- The 360°-decoder for omni-directional reading of 1D codes

The ICR840-2 derives useful diagnosis data from the reading process and transfers it to the host. It also records operating data that can be requested at any time. The reading quality of 2D codes can be checked in the "Percentage Evaluation" operating mode.

3.4.3 Reading triggering and indicating of result status

To start the reading process when an object is located in the field of view, the ICR840-2 requires a suitable trigger. This opens a time window ("reading interval") in the ICR840-2 for the reading procedure. In the default setting, this trigger is supplied by an external reading pulse sensor. Alternative trigger sources include Free Running mode or a command sent via the host interface.

The current operating status is indicated by four LEDs. A beeper indicates the status of the reading result. In the default setting, the "Good Read" function is selected for this.

If the trigger is supplied externally by a sensor, the "Sensor 1" switching input signals the start of the reading procedure to the ICR840-2. The "Sensor 2" switching input is used to signal alternatively the end of reading procedure or to enter a path increment. It can also be used e.g. to teach in a match code.

The "Result 1" and "Result 2" switching outputs can be assigned various functions and trigger external devices, such as a PLC. Using the "Result 1" output, an external illumination can additionally be triggered or directly powered (max. 100 mA) by the ICR840-2.

The ICR840-2 is configured via the serial auxiliary interface/host interface with the CLV-Setup configuration software or with command strings. Alternatively, the Ethernet interface is available for both types of operation.

The ICR840-2 outputs system and error messages as error codes, which can be requested from the error memory using command strings.

3.5 Indicators and control elements

3.5.1 Control elements

The ICR840-2 is configured application-specifically using the CLV-Setup configuration software. The software runs on a PC which must be connected to one of the two data interfaces (auxiliary interface: serial RS 232 or Ethernet, host interface: serial RS 232/RS 422/485 or Ethernet) of the ICR840-2.

[Chapter 10.4 Installation and operating instructions for the CLV-Setup configuration software, Page 138](#) describes the procedure for installing the PC software "CLV-Setup" and explains how to use it. Configuration is explained in [Chapter 6 Startup and configuration, Page 47](#).

As an alternative to the CLV-Setup configuration software, command strings are available upon which the user interface of the CLV-Setup configuration software is based (see also [Chapter 10.5 Configuring the ICR840-2 with command strings, Page 148](#)).

Start-up as well as diagnosis in case of an error can be carried out via the CLV-Setup configuration software. Some function can also be started using the function key. The ICR840-2 operates fully automated in normal operation.

3.5.2 Function key on the housing of ICR840-2

With the function key you can start a pre-configured function without using the CLV-Setup configuration software. At the moment, only the reading interval can be started. On the device, the foil key is located nearby the LEDs ([Fig. 3-1, Page 14](#)).

In the default setting the function key is active. The key can be deactivated with the CLV-Setup configuration software.

[Chapter 6.5 Using the function key, Page 68](#) describes how to use the key.

3.5.3 Function of the LEDs

General LEDs

Four LEDs indicate the operating status, activity of the illumination LEDs, the reading result status and data transfer on the serial host interface.

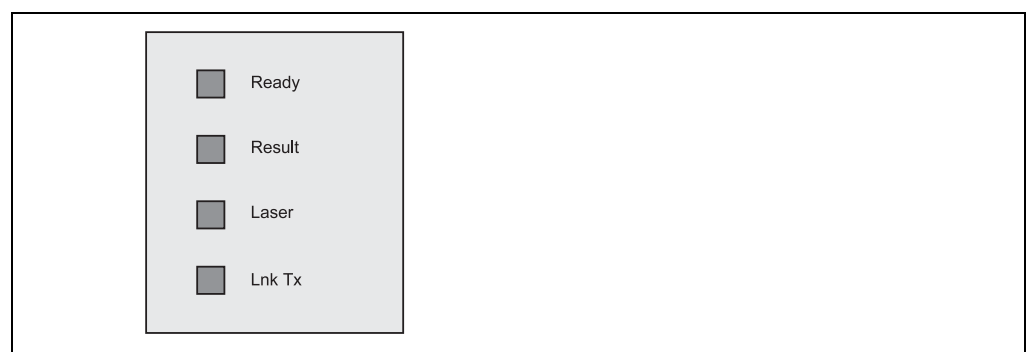


Fig. 3-5: LEDs

The LEDs are located on the rear of the device toward the bottom ([Fig. 3-1, Page 14](#)). [Table 3-4](#) shows the meaning of the LEDs in the different operating modes/functions.

LED	Colour	Funktion
Ready	Orange	<ul style="list-style-type: none"> Lights up shortly after power-up if the self-test was successful
	Green	<ul style="list-style-type: none"> Lights up constantly in Reading mode Extinguishes with new operating mode/function
Result	Green	<ul style="list-style-type: none"> Lights up shortly after power-up if the self-test was successful
		<ul style="list-style-type: none"> Lights up after a good read (default setting: Good Read). The LED is connected to the "Result 2" switching output. It indicates the selected result status for the set pulse duration of the output.
Laser	Green	<ul style="list-style-type: none"> Lights up shortly after power-up if the self-test was successful
		<ul style="list-style-type: none"> Lights up when the illumination LEDs are active. (The illumination LEDs are activated/deactivated by reading pulse). Lights up constantly in the pulse mode Free Running, as the illumination LEDs are always active.
Lnk Tx	Green	Flickers while the ICR840-2 transfers data to the host on the serial host interface.

Tab. 3-4: Meaning of the general LEDs

LEDs of the Ethernet interface

Two LEDs, integrated in the RJ45 socket 10baseT (Fig. 3-1, Page 14), indicate the status of the Ethernet connection. Table 3-5 lists the meaning of the LEDs.

LED	Colour	Function
Ready	Green	Indicates the physical Ethernet connection
Data	Yellow	Lights up when the ICR840-2 receives or sends addressed data via Ethernet

Tab. 3-5: Meaning of the LEDs of the Ethernet interface

3.5.4 Function of the beeper

The beeper uses different tone sequences and lengths ([Table 3-6](#)) to signal whether functions have been executed successfully and whether any malfunctions have occurred. For information on troubleshooting, see [Chapter 8.5 Troubleshooting, Page 109](#).

In the default setting, the beeper is activated and indicates the result status "Good Read" for the Reading mode. It is assumed in these Operating Instructions, that the beeper is operated with the default setting in Reading mode.

Tone sequence	Function
Beep Beep Beep	Power-up: <ul style="list-style-type: none"> • Signals that the self-test after power-up was successful • Confirms that the device has assumed Reading mode
Beep Beep Beep Beep	Reading mode: <ul style="list-style-type: none"> • Confirms a successful read (good read; default setting) and the reading result output • Signals that the illumination LEDs have been deactivated after the illumination timeout of 10 min (default setting) was exceeded in Reading mode. The reading interval is still active.
Beep High beep	Application of function key: <ul style="list-style-type: none"> • Confirms the start of the reading interval • Confirms a successful read or the end of the reading interval

Tab. 3-6: Beeper function



Tip

The behavior of the beeper in **Reading mode** can be changed with the CLV-Setup configuration software.

4 Installation

4.1 Overview of installation sequence

This chapter describes the installation sequences for the ICR840-2 and the external components.

The typical installation sequences are listed below:

- Selecting the installation location for the ICR840-2
- Aligning the ICR840-2 to the code and installing the device
- Installing the connection module CDB620 or CDM420
- Connecting the ICR840-2 to connection module CDB620 or CDM420
- Adjusting the ICR840-2 (reading distance)
- Installing the reading pulse sensor for reading pulse triggering

Important Do not open the housing of the ICR840-2. If the device is opened, the SICK AG warranty shall not apply.

4.2 Installation preparations

The following general requirements should be observed for installation:

- Typical space requirement: application-specific and type-dependent (reading range, orientation of reading window)
- Unobstructed view of the objects for the ICR840-2
- Stable installation holder with sufficient load capacity and dimensions suited to the ICR840-2 (see [Chapter 9.2 ICR840-2 dimensional drawing, Page 123](#))
- Shock absorbent and vibration free attachment

The following tools and resources are required for installation:

- Two screws M5 for installing the SICK mounting bracket no. 2025491/no. 2039465 or the quick release clamp no. 2042484 to the base.
The screw length depends on the wall thickness of the base.
- Tool
- Goniometer

4.2.1 Components to be installed

The following components have to be placed ready for installation:

- ICR840-2 Image Code Reader

4.2.2 Accessories

The following accessories are not included in the delivery of the ICR840-2. They have to be ordered separately and placed ready for installation:

- Mounting device, see next chapter
- Connection module CDB620 or CDM420
- Reading pulse sensor for external reading pulse triggering, e.g. photoelectric reflex switch(s)/photoelectric proximity switch

4.2.3 Mounting device

The ICR840-2 is fixed using two blind hole taps (M5) that are located on the narrow side of the device (see [Chapter 9.2 ICR840-2 dimensional drawing, Page 123](#)).

The ICR840-2 can be mounted using the following SICK holders:

- Mounting bracket no. 2025491
- Mounting bracket no. 2039465
- Quick release clamp no. 2042484

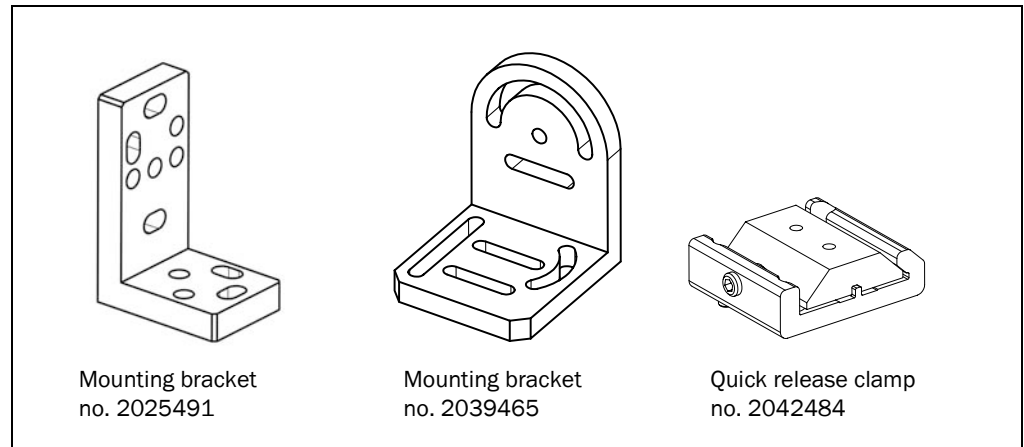


Fig. 4-1: Installation accessories

The construction of the mounting brackets supports various mounting options and the alignment of the ICR840-2 in two axis. [Fig. 4-2](#) shows a mounting option.

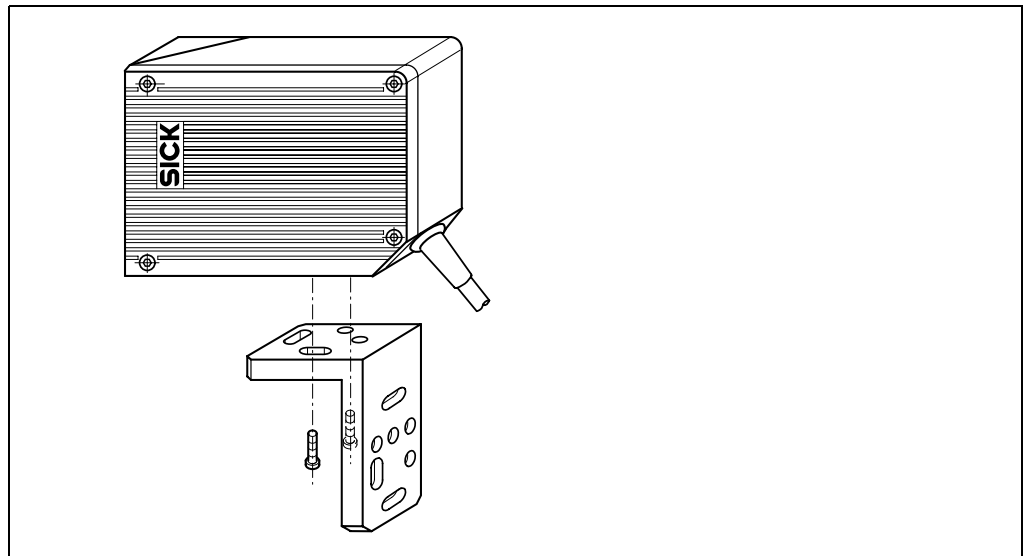


Fig. 4-2: Example: Fixing the ICR840-2 with the mounting bracket no. 2025491

For the fine adjustment of the ICR840-2, the slots in the mounting bracket no. 2025491 allow a turning freedom of $\pm 15^\circ$ and in the mounting bracket no. 2039465 a turning freedom of $\pm 180^\circ$.

The dimensions of the mounting brackets and the quick release clamp are shown in [Chapter 10.9 Dimensional drawings accessories, Page 171](#).

Alternatively, the user can provide a holder.

The holder must meet the following requirements:

- Stable mounting device.
 - Adjustable alignment of the ICR840-2 in the x and y axis
 - The mounting device must be able to bear the weight of the ICR840-2 including its connection cable (ca. 900 g (approx. 31.75 oz)) without vibrating.
- Two screws M5 to fix the ICR840-2.
 - The screw length depends on the wall thickness of the mounting device.
 - The maximum thread reach in the ICR840-2 is **8 mm** (0.32 in) from the housing surface.

4.3 Installation location

The following aspects are relevant for the selection of the installation location:

- Allocation of the field of view for the code
- Reading distance to the code/field of view dimensions
- Angle alignment of the ICR840-2
- Avoiding surface reflections
- Counting direction of the code position (position of the code in the longitudinal direction of the field of view)

Furthermore, the distance between the ICR840-2 and the host computer and the distance to the connection module has to be taken into account (see [Chapter 5.2 Electrical installation preparations, Page 31](#) and [Chapter 4.5.1 Installing connection module CDB620 or CDM420, Page 29](#)).

4.3.1 Allocation of the field of view to the code

The main allocation of the field of view to the code on the object ([Fig. 4-3](#)) depends on the version of the ICR840-2 (front or side reading window).

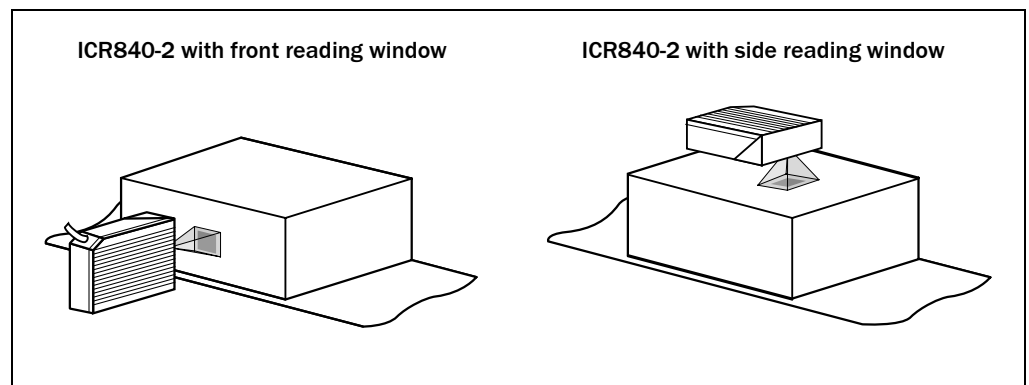


Fig. 4-3: ICR840-2: Allocation of the field of view to the code

4.3.2 Reading distance to the code/field of view dimensions

The distance between the reading window of the ICR840-2 and the code is determined by the fixed focus position of the ICR840-2 and the resolution-specific depth of field for the desired cell size/module width. The distance may not exceed the total technical limits (see [Chapter 9.3 Specification diagrams, Page 124](#)).

[Fig. 4-4](#) shows the exact definition of the reading distance from the reading window.

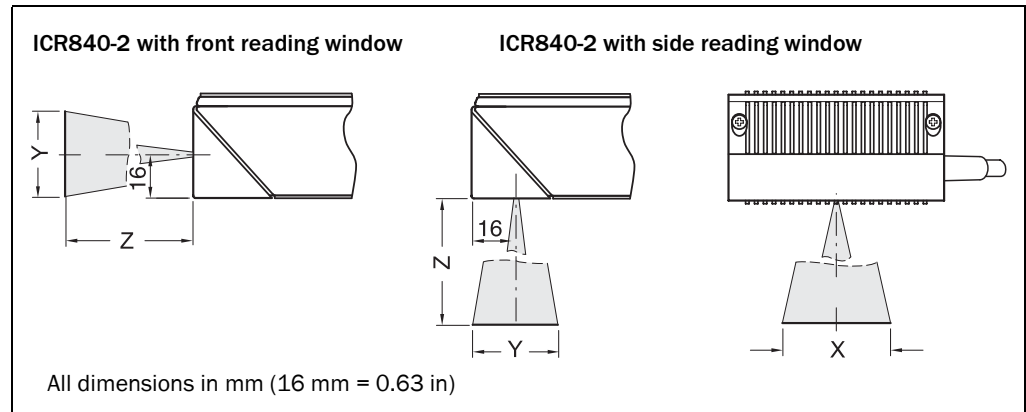


Fig. 4-4: Definition of the reading distance and the field of view

Type	Version	Focus position Z	Length X	Width Y
ICR840-2A0020	High Density	50 mm (1.97 in)	23.75 mm (0.94 in)	19 mm (0.75 in)
ICR840-2A1020				
ICR840-2B0020	Standard Range	80 mm (3.25 in)	40 mm (1.58 in)	32 mm (1.26 in)
ICR840-2B1020				
ICR840-2C0020	Mid Range	115 mm (4.53 in)	58.5 mm (2.30 in)	46.5 mm (1.83 in)
ICR840-2C1020				
ICR840-2D0020	Longe Range	145 mm (5.71 in)	72.5 mm (2.86 in)	58 mm (2.29 in)
ICR840-2D1020				

Tab. 4-1: Reading distance and field of view dimensions (type-depended)

4.3.3 Angle alignment of the ICR840-2

The ICR840-2 is optimally aligned if the code is in the centre of the field of view. Possible code positions that can occur between the field of view and the code in all three levels in the room have to be taken into account (Fig. 4-5 and Table 4-3).

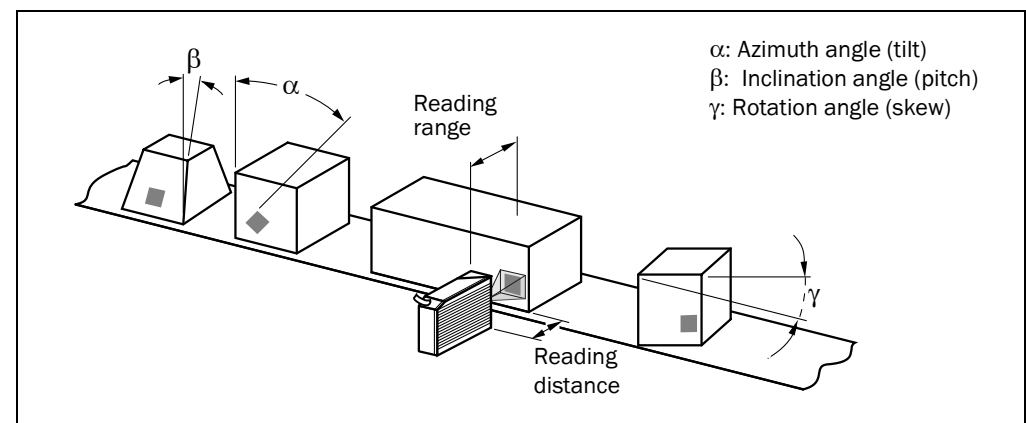


Fig. 4-5: Reading angle that can occurs between the field of view and the code

The following applies for bar codes and 2D codes (Data Matrix ECC200) when reading with omni-directional decoder:

Angle	Limit value
Azimuth α (tilt)	360°
Incline β (pitch)	Max. $\pm 45^\circ$ (depending on the cell size and symbol size)
Rotation γ (skew)	Max. $\pm 45^\circ$ (depending on the cell size and symbol size)

Tab. 4-2: Permissible reading angle between the field of view and the bar code/2D code when reading with omni-directional decoder

The following applies for bar codes when reading with standard/SMART decoder (ICR840-2B (Standard Range)):

Angle	Limit value
Azimuth α (Tilt)	Max. $\pm 45^\circ$ (lengthwise of the field of view and in focus position 100 mm (3.94 in) for module width 0.2 to 0.5 mm (7.9 to 19.7 mil))
Incline β (Pitch)	Max. $\pm 45^\circ$ (depending on the module width)
Rotation γ (Skew)	Max. $\pm 45^\circ$ (depending on the module width)

Tab. 4-3: Permissible reading angles between the field of view and bar code when reading with standard/SMART decoder for Standard Range

Important The length of readable bar code is reduced with respect to the decodable length as a result of the distance-dependent dimensions of the field of view (see examples in [Table 9-2, Page 122](#)).

4.3.4 Selecting the rotation angle (skew) to avoid surface reflections

If the light of the red illumination field vertically meets the surface of the code, this can result in disruptive reflections when the bounced back light is received. To prevent this effect, the ICR840-2 must be installed in such a way that the illumination light emitted is tilted down relative to the plumb line.

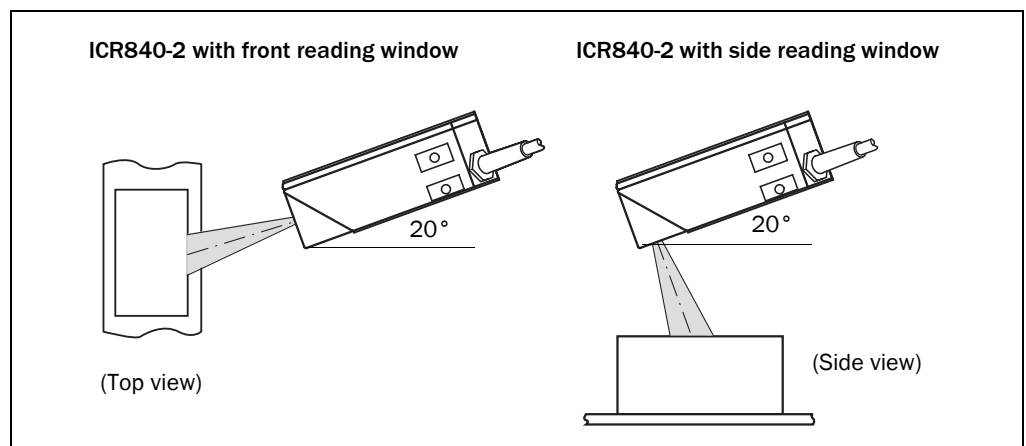


Fig. 4-6: Avoiding surface reflection: Angle between emitting light and code (tilted away from the plumb line)

4.3.5 Counting direction of code position (position of the code in the longitudinal direction of the field of view)

Explanation The ICR840-2 can record and decode several codes with each image. In doing so, it determines the local reading diagnosis data for each code in the image buffer memory.

Fig. 4-7 shows the count direction of the code position CP along the reading window (this corresponds to the longitudinal direction of the field of view).

The determination of the code position enables identical codes (code type, code length and data contents) to be separated and the code data to be assigned to their position on the object.

For **2D codes**, the ICR840-2 determines the spatial position of the finder patterns in the image buffer memory. It outputs its corner points in the shape of two-dimensional coordinates in the reading result of the auxiliary interface as the "PT" reading diagnosis data (see [Chapter 1. Output of reading result on the auxiliary interface: 2D code \(Data Matrix ECC200\)](#), Page 76).

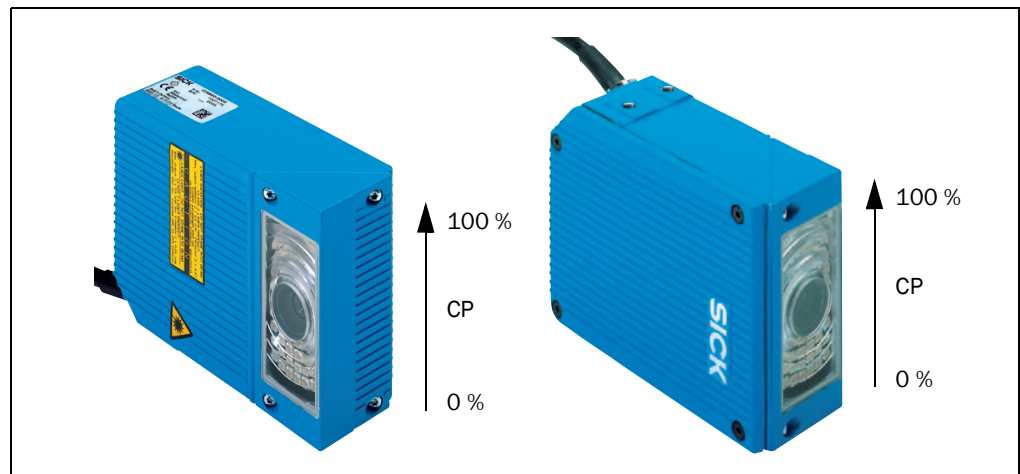


Fig. 4-7: Count direction of the code position CP for bar codes along the reading window

For **bar codes**, the ICR840-2 determines the position of the first dark line of the start character in the image buffer memory. It outputs the value in the reading result of the auxiliary interface as reading diagnosis data "CP" (see [Chapter 2. Output of reading result on the auxiliary interface: Bar code](#), Page 78).

When the ICR840-2 (Standard Range) is in the focus position (reading distance 80 mm ((3.15 in))), one pixel in the image memory is approx. 33 μ , whereby 1% of the CP is approx. 0.4 mm lengthwise of the field of view.

Important In the default setting, the ICR840-2 does not output the values "PT" or "CP" in the reading result of the host interface. If this is required to evaluate the result in the host, the values can be included in the "reading data" block of the output string using the CLV-Setup configuration software.

4.4 Installing and adjusting the ICR840-2

4.4.1 Installing the ICR840-2

NOTICE

Damage to the device!

The maximum thread reach of the two blind hole taps M5 is 8 mm (0.32 in). Longer screws will damage the device.

- Use screws with the correct length.

1. Prepare the holder and the base for the installation of the ICR840-2, see [Chapter 4.2.2 Accessories, Page 23](#).
2. Screw the M5 screws through the holder into the blind hole taps of the ICR840-2.
3. Tighten the screws slightly, so that the ICR840-2 can to be varied in the x and y axes for adjusting.
4. Place the object containing the 2D code within the field of view of the ICR840-2 in the position at which it is to be read.
5. Align the ICR840-2 in combination with the holder to the code using a goniometer in such a way that:
 - The wide side of the ICR840-2 with the warning labels is adjusted under an angle of approx. 20° to the code surface, when using a side reading window.
 - The front reading window is adjusted under an angle of approx 20° to the code surface, when using a front reading window.
 - Reading distance (focus position) from reading window:

ICR840-2A (High Density):	50 mm (1.97 in)
ICR840-2B (Standard Range):	80 mm (3.15 in)
ICR840-2C (Mid Range):	115 mm (4.53 in)
ICR840-2D (Long Range):	145 mm (5.71 in)

See also [Chapter 4.3.2 Reading distance to the code/field of view dimensions, Page 25](#)
 - All of the possible reading angles must be taken into consideration, see [Chapter 4.3.3 Angle alignment of the ICR840-2, Page 26](#).
 - If relevant to the evaluation, pay attention to the count direction of the code position if applicable (see [Chapter 4.3.5 Counting direction of code position \(position of the code in the longitudinal direction of the field of view\), Page 27](#)).
6. Mark the holder of the ICR840-2 on the base, drill the required holes and install the holder with the ICR840-2 on the base.
7. Adjust the ICR840-2 exactly, see [Chapter 6.12 Adjusting the ICR840-2, Page 93](#).

4.5 Installing external components

4.5.1 Installing connection module CDB620 or CDM420

Depending on the application, you can install either connection module CDB620 or CDM420. The installation process is the same for both modules .

Important The connection module must not be located further than 10 m (32.8 ft) from the ICR840-2, since the CLV-Setup configuration software on the PC accesses the serial auxiliary interface of the ICR840-2 via this module (RS 232, 9,600 bd, internal 9-pin D-Sub plug).

1. Install the connection module close to the ICR840-2.
2. Install the connection module in such a way that the opened device can be accessed at any time.



For detailed information about installation and electrical installation, see the "*CDB620 Connection Module*" Operating Instructions (no. 8012119) or "*CDM420 Connection Module*" Operating Instructions (no. 8010004).

4.5.2 Installing the external reading pulse sensor

If the ICR840-2 is triggered by an external reading pulse sensor (e.g. photoelectric reflex switch), the sensor has to be installed close to the ICR840-2.

[Fig. 4-8](#) shows two examples of where a photoelectric reflex switch can be installed. This depends on the distance a from the code to the front of the object. Depending on the application, you may need to attach the sensor in such a way that codes on objects of different sizes can be read completely during the reading interval.

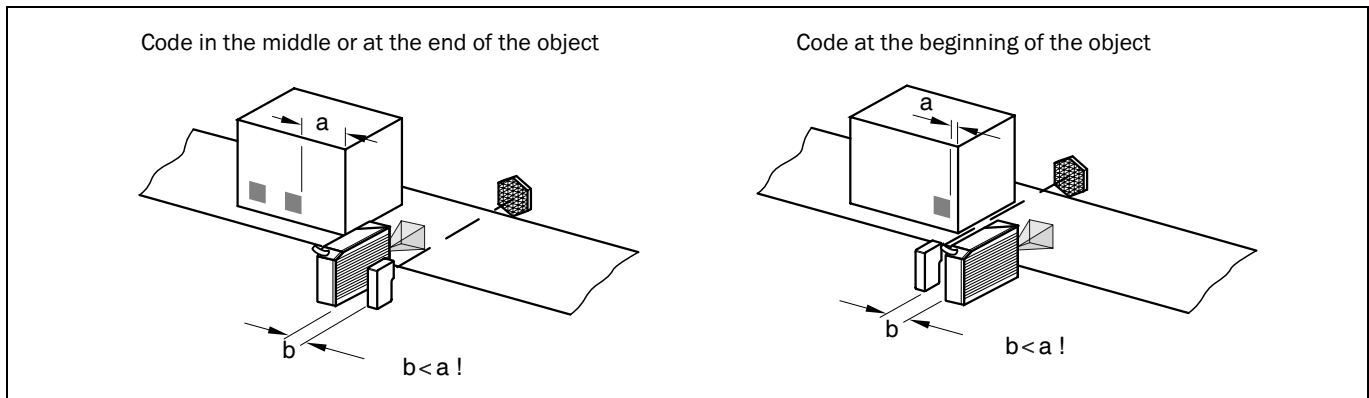


Fig. 4-8: Installation example for the external reading pulse sensor

4.5.3 Installing the incremental encoder

If identical codes (code type, code content) have to be separated or if an track-controlled delay of the external reading trigger is required, a suitable incremental encoder has to be installed, e.g. no. 2022714. The increment pulses must originate from the area of the conveyor belt which the ICR840-2 is reading.

1. Install the incremental encoder near to the ICR840-2, best against the direction of the conveyor system in front of ICR840-2.
2. Ensure that the incremental encoder has direct and fixed contact with the drive system and that the friction wheel rotates without slipping.

4.6 Removing the device

Removal of the ICR840-2 is described in [Chapter 7.4.1 Removing the ICR840-2, Page 103](#).

For the environmental friendly disposal after decommissioning see [Chapter 7.5 Disposal, Page 104](#).

5 Electrical installation

5.1 Overview of the installation sequence

Important Electrical installation should only be carried out by qualified staff.

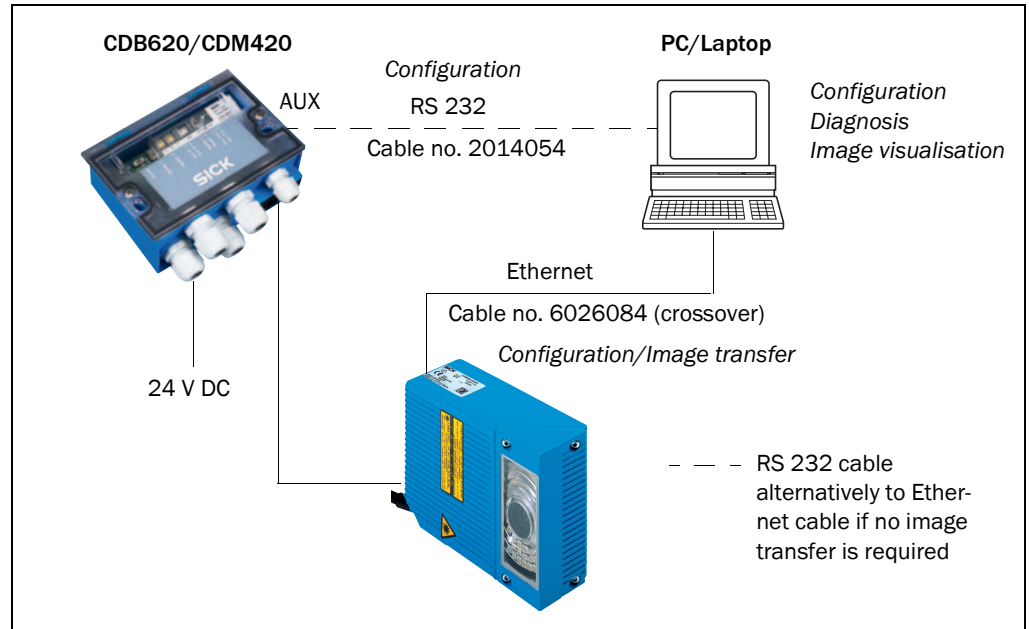


Fig. 5-1: Block diagram for startup and configuration

The following list provides an overview of a typical installation sequence:

- Connecting the ICR840-2 to connection module CDB620 or CDM420
- Wiring the data and function interfaces of the ICR840-2 in the connection module
- Connecting the Ethernet interface on the ICR840-2 to the PC for image output and configuration (recommended).
 - Alternatively without image output: Connect the PC to the serial auxiliary interface in the connection module
- Optional: Connecting the external illumination to the connection module
- Connecting the power supply to the connection module

Once electrical installation has been completed, the ICR840-2 is started up and configured (see [Chapter 6 Startup and configuration, Page 47](#)).

5.2 Electrical installation preparations

The following general requirements should be observed for electrical installation:

- Supply voltage 15 to 30 V DC (functional extra-low voltage in accordance with IEC 364-4-41 (VDE 0100 Part 410)), power output at least **15 W**, provided e.g. via power pack by the customer.

Connecting the ICR840-2:

- Via connection module CDB620 or CDM420
 - or –
- If wiring without a SICK connection module use the cable no. 6010137 with 15-pin D-Sub HD plug and open end to connect the ICR840-2.

- If further modules are used in combination with the connection modules CDB620/CDM420 the following supply voltages are required for the ICR840-2:

Connection module	Additional module	Function	Supply voltage/ additional power consumption
CDB620-001	–	–	15 to 30 V DC
CDB620-101 CDB620-201	CMC600	Connection Module Cloning	15 to 30 V DC/ 0.5 W
CDM420-0001	–	–	15 to 30 V DC V
	CMC600	Connection Module Cloning	15 to 30 V DC/ 0.5 W
	CMP400	Connection Module Power	AC 100 ... 250 V, 50 to 60 Hz
	CMD400	Connection Module Display	18 to 30 V DC/ 1 W
	CMF400	Connection Module Fieldbus	18 to 30 V DC/ 2 W

Tab. 5-1: Required supply voltage if using further modules in combination with the connection module CDB620/CDM420

- With external reading pulsing:
 - Suitable reading pulse sensor (start/stop), e.g. photoelectric reflex switch, for registering an object in the field of view
 - Additional suitable reading pulse sensor (stop), e.g. photoelectric reflex switch, for registering the end of pulse with extended reading pulse
- Suitable incremental encoder: For separating identical codes (code type, code content) or for delaying the external reading pulsing track-controlled
- If necessary, with external illumination: A suitable light source, e.g. a ring illumination
- Host computer with serial RS 422-/485, RS 232 data interface or Ethernet: For further processing the reading data
- For connecting the ICR840-2 to PROFIBUS-DP or DeviceNet: the corresponding bus module CMF400 for installing in the connection module CDM420

An overview of in-stock sensors for reading pulse generation, incremental encoder, external illuminations as well as cables and plug-in connectors is available in [Chapter 10.8 Ordering information for ICR840-2 and accessories, Page 166](#).

Important The possible distance between the ICR840-2 and the host computer depends on the physical version of the selected host interface and the set data transfer rates.

The following tools and resources are required for electrical installation:

- Tool
- Digital measuring device (current/voltage measurement)

5.3 Electrical connections and cables

The electrical connection of the ICR840-2 consists of cable with a 15-pin D-Sub HD plug and an 8-pin RJ45 socket 10baseT on the device. It supplies the following interfaces:

- Four data interfaces (serial host interface, serial auxiliary interface, Ethernet interface and CAN interface)
- Two digital switching inputs (external reading pulse and multifunctional input)
- Two digital switching outputs (for indicating the result status or triggering an external illumination)
- Power supply

5.3.1 Pre-fabricated cables (overview)


Temperature range 0 to +40 °C (+32 to +104 °F).

Connection of ICR840-2 to	Cable no.	Length	Purpose
CDB620 CDM420	6010075	2 m (6.56 ft)	Extension cable for data and function interfaces, with 15-pin D Sub HD socket and plug
Non-SICK power pack	6010137	2 m (6.56 ft)	Connection cable for data and functions interfaces, with 15-pin D Sub HD socket and open end
PC (RS 232)	2014054	3 m (9.84 ft)	RS 232 data cable (null modem cable) with two 9-pin D Sub sockets (TxD and RxD are crossed)
Ethernet (PC in network)	6026083	3 m (9.84 ft)	Ethernet data cable (patch cable), grey, with two 8-pin RJ45 plugs, IP 20
	2039986	1 m (3.28 ft)	Adapter frame including sealing and Ethernet data cable (patch cable) with 8-pin RJ-45 plugs IP 65/IP 20
Ethernet (peer-to-peer)	6026084	3 m (9.84 ft)	Ethernet cross-over cable, red, with two 8-pin RJ45 plug, IP 20


Tab. 5-2: Pre-fabricated cables for connecting the ICR840-2

For technical data on the cables see [Chapter 10.8.6 Accessories: Cables and plug-in connections, Page 169](#).

5.3.2 SICK Connection Modules (Overview)

Connection module	Order no.	View	Purpose
CDB620-001 CDB620-101 CDB620-201	1042256 1042257 1042258		<ul style="list-style-type: none"> - Connecting one ICR840-2 - 1 x 15-pin D-Sub HD socket, - 4 x plastic cable gland M16 - CDB 420-001: 4 x cable gland M16, 2 x M12 plug connection (1 x plug, 1 x socket) - CDB620-201: 4 x cable gland M16, 1 x cable gland M12 - Enclosure rating max. IP 65 - Temperature range -35 to +40 °C (-31 to +104 °F)

Tab. 5-3: Connections modules for the ICR840-2

Connection module	Order no.	View	Purpose
CDM420-0001	1025362		<ul style="list-style-type: none"> - Connecting one ICR840-2 - 1 x 15-pin D-Sub HD socket, 6 x plastic cable gland M16 - Enclosure rating max. IP 65 - Temperature range -35 to +40 °C (-31 to +104 °F)

Tab. 5-3: Connections modules for the ICR840-2 (contd.)

For technical data on the modules see [Chapter 10.8.4 Accessories: Connection modules, Page 167](#).

5.3.3 Connections/cables for the CDB620 or CDM420 Connection Module

The CDB620 or CDM420 Connection Module is suitable for connecting the ICR840-2 to peripherals (distribution function) and the power supply. The module can be used to establish a connection from the ICR840-2 to the host (point-to-point) and integrate the device into the CAN scanner network. The CDB620 is available in free variants. All modules can be operated with an operating temperature to -35 to +40 °C (-31 to +104 °F).

[Fig. 5-2](#) shows the connection principle of the CDB620 or CDM420 for one ICR840-2.

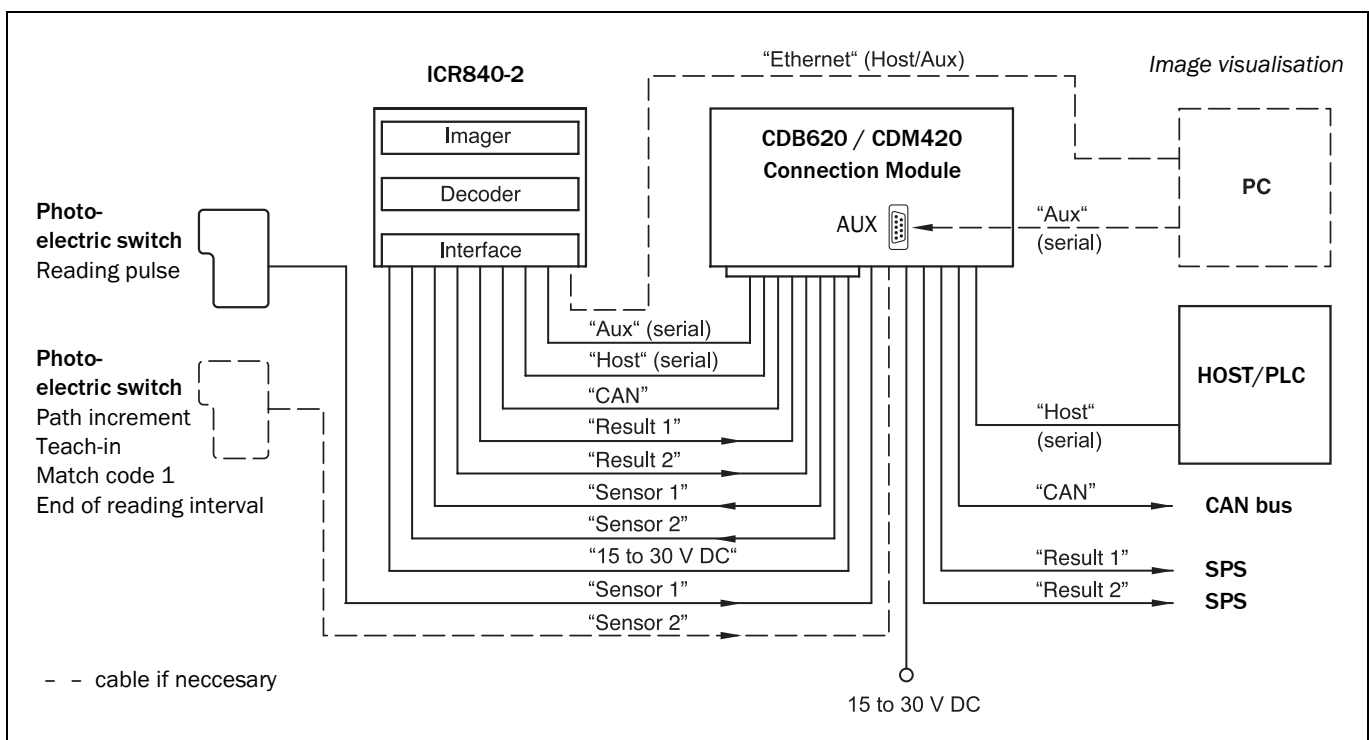


Fig. 5-2: Block diagram: Connection of the ICR840-2 to the CDB620 or CDM420 Connection Module



Connect and configure the CDB620 or CDM420 Connection Module as described in the "CDB620 Connection Module" Operating Instructions (order no. 8012119) respectively in the "CDM420 Connection Module" Operating Instructions (order no. 8010004).

Important

Diagramms showing you how to connect the CDB620 and CDM420 Connection Modules are also available in the "CLV Connect" PC program. This software is available on the "Manuals & Software Bar Code Scanners" CD-ROM, which is included in the scope of delivery of the ICR840-2.

The software can also be downloaded from the SICK home page (www.sick.com) at "Service&Support/Downloadpool". It can be called up using a standard HTML browser (e.g. Internet Explorer™).

5.3.4 Optional modules for installing in the CDB620/CDM420 connection modules

Connection module	Additional module	Order no.	Function
CDB620-001 CDB620-101 CDB620-201	CMC600	1042259	Connection Module Cloning for saving the parameters of the ICR840-2 externally and activating operating modes automatically after power-on
CDM420-0001	CMC600	1042259	See above
	CMP400	2029468	Power Supply Module for supplying the ICR840-2 directly from an AC power line
	CMD400	2029466	Connection Display Module in optional cover for representation of reading results and reading diagnosis data
	CMF400-1001	1026241	Bus Module (field bus gateways) for connecting the ICR840-2 to PROFIBUS-DP
	CMF400-2101	1026242	Bus Module (field bus gateways) for connecting the ICR840-2 to DeviceNet

Tab. 5-4: Functions of the additional modules for the ICR840-2 installed in the connection modules

For technical data on the additional modules see [Chapter 10.8.5 Accessories: Extensions for connection modules, Page 168](#).

For detailed descriptions about functions and installation see the corresponding Fitting/Operating Instructions (see [Chapter 10.10 Supplementary documentation, Page 173](#)).

5.4 Pin assignments

5.4.1 Cable plug

Pin	Signal	Function
1	15 to 30 V DC	Power supply
2	RxD (Aux)	Auxiliary interface (receiver)
3	TxD (Aux)	Auxiliary interface (transmitter)
4	Sensor 2	Switching input, variable function
5	GND	Ground
6	RD+ (RS 422/485)	Host interface (receiver)
7	RD- (RS 422/485); RxD (RS 232)	Host interface (receiver)
8	TD+ (RS 422/485)	Host interface (transmitter)
9	TD- (RS 422/485); TxD (RS 232)	Host interface (transmitter)
10	CAN H	CAN bus (IN/OUT)
11	CAN L	CAN bus (IN/OUT)
12	Result 1	Switching output, variable function
13	Result 2	Switching output, variable function
14	Sensor 1	Switching input for external reading pulse
15	SensGND	Common ground for all inputs
-	-	Shield

Tab. 5-5: Pin assignment of the 15-pin D-Sub HD plug

5.4.2 RJ45 socket 10baseT (Ethernet)

Pin	Signal	Function
1	TX+	Transmitter+
2	TX-	Transmitter-
3	RX+	Receiver+
6	RX-	Receiver-
4, 5, 7, 8	n.c.	Not connected

Tab. 5-6: Pin assignment of the 8-pin RJ45 socket 10baseT

5.5 Performing electrical installation

NOTICE

RF interferences in case of use in residential areas!

➤ The ICR840-2 Image Code Reader is exclusively intended for use in industrial areas.

1. Connect or disconnect current linkages only under de-energised conditions.
2. Wire cross-sections and their correct protection have to be selected and implemented according to valid engineering standards.
3. Check carefully the wiring before switching on the supply voltage for the connection module/the ICR840-2 after finishing the electrical installation.

5.5.1 Connecting the power supply for the ICR840-2

The ICR840-2 requires a supply voltage of 15 to 30 V DC (functional extra-low voltage in accordance with IEC 364-4-41 (VDE 0100 Part 410)). The ICR840-2 has a power consumption of max. 13 W (when switching outputs are not connected).

The functional extra-low voltage can be generated by using a safety isolating transformer pursuant to IEC 742.

Important The output circuit must be electrically insulated from the input circuit. This is usually created by means of a safety transformer in accordance with IEC 742.

The ICR840-2 is supplied with 15 to 30 V DC via the CDB620 or CDM420 Connection Module. If an optional CMF400 fieldbus gateway or a CMD400 Connection Module Display is additionally used in the CDM420, the ICR840-2 is supplied with **18** to 30 V DC.

If the CMP400 Power Supply Module is used in the CDM420, a mains voltage of 100 to 250 V AC/50 to 60 Hz is required for the CMP400.

Important To ensure that the incoming supply cables are protected against short-circuits/overloads, the wire cross-sections must be dimensioned and protected in accordance with valid standards.

Use a wire cross-section of at least 0.15 mm² (26 AWG) when connecting the supply voltage.

Connecting the power supply:

When connecting the ICR840-2 via the connection module CDB620 or CDM420, the data and function interfaces of the ICR840-2 are connected together with the supply voltage to the connection module. The Ethernet interface is not routed via the connection module.

1. Ensure that the power supply to the connection module is switched off.
2. Connect the 15-pin cable plug on the ICR840-2 to the corresponding device socket on the CDB620 or CDM420 and screw it tightly.
The connection cable can be extended by 2 m (6.56 ft) using the extension cable no. 6010075. The sealing no. 4038847 remains the enclosure rating IP 65 on the plug-in connection.

Important If the ICR840-2 is not connected via the connection module CDB620 or CDM420, use the cable no. 6010137 with 15-pin D-Sub HD socket and open end to connect the ICR840-2. The wire colour assignment is shown in [Chapter 5.6 Pin assignment and wire colour assignment of pre-fabricated cables with open ends, Page 45](#).

5.5.2 Connecting the serial host interface

The ICR840-2 sends the reading result via the serial host interface. Alternatively, you can use the Host port of the Ethernet interface.

The serial host interface of the ICR840-2 can be operated as an RS 422/485 or an RS 232 interface. The maximum data transfer rate depends on the cable length and the interface type.

Interface type	Data transfer rate	Distance to host computer
RS 232	Uo to 19,200 bd	Max. 10 m (32.8 ft)
	38,400 to 57,600 bd	Max. 3 m (9.84 ft)
RS 422/485 ¹⁾	Max. 38,400 bd	Max. 1,200 m (3,936 ft)
	Max. 57,600 bd	Max. 500 m (1,640 ft)

1) with suitable line termination according to specifications

Tab. 5-7: Recommended maximum cable lengths between ICR840-2 and host computer

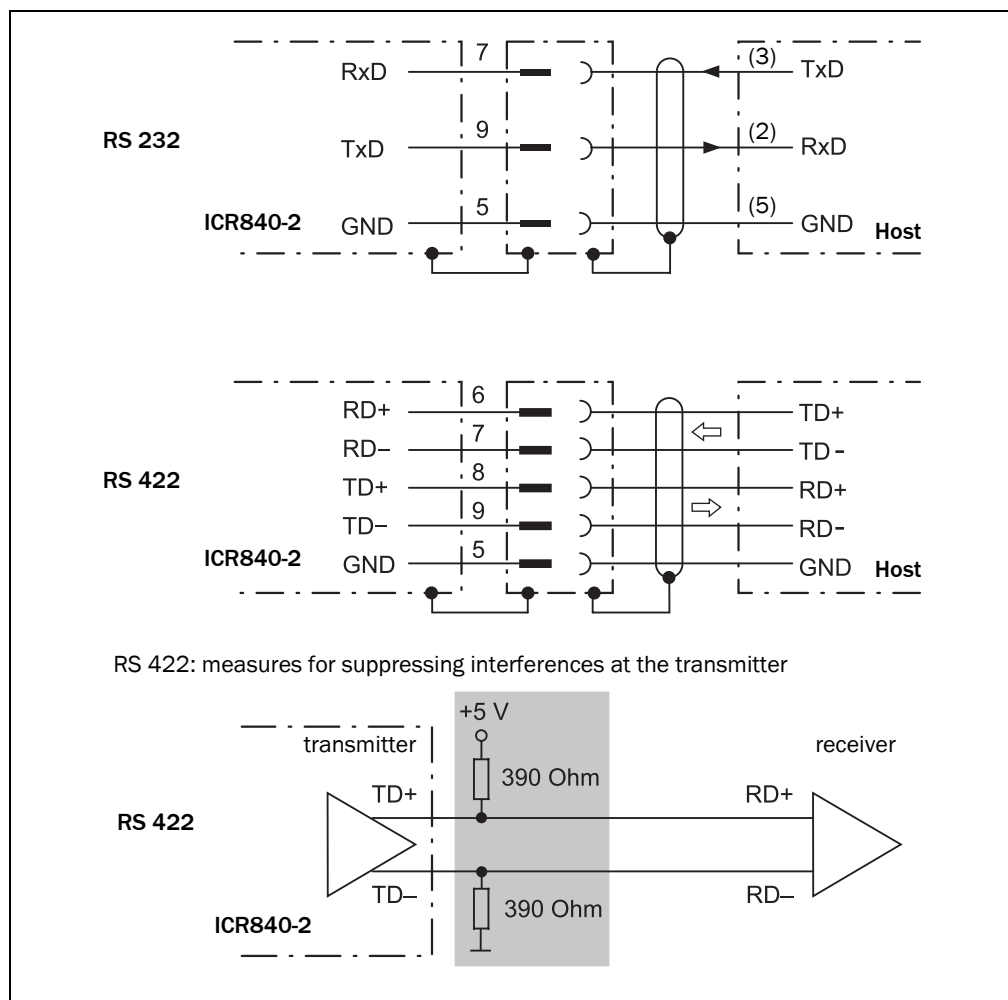


Fig. 5-3: Connecting the serial host interface

Important RS 422 data interface

After sending data, the transmitter of the ICR840-2's RS 422 data interface changes to high-resistance state (resting state). In bad conditions this can causes interferences.

- If any interferences occur on the RS 422 interface insert externally a pull-up resistor and a pull-down resistor into the sending lines of the ICR840-2 as shown above.

NOTICE

Damage to the interface module!

Incorrect wiring of the serial host interface can damage electronic components in the ICR840-2.

- Observe information about wiring the host interface.
- Check the wiring carefully before switching on the ICR840-2.

1. Connect the serial host interface on the ICR840-2 to the host computer using shielded cables (EMC requirements). Ensure that the maximum cable lengths are not exceeded ([Table 5-7](#)).
2. To prevent interference, do not lay the cable parallel with power supply and motor cables over long distances, e.g. in cable ducts.

Terminating the RS 422 interface

The interface can be terminated in the CDB620 or CDM420 Connection Module.

See "[CDB620 or CDM420 Connection Module](#)" Operating Instructions.

In the default setting, the ICR840-2 communicates with the host computer via the serial host interface using the values shown in [Chapter 6.11 Default settings, Page 91](#).

5.5.3 Connecting the serial auxiliary interface

The ICR840-2 is configured and diagnosed with the CLV-Setup configuration software. In order to do so, you must connect the device to the PC via the serial auxiliary interface. Alternatively, you can use the Aux port of the Ethernet interface.

The serial auxiliary interface of the ICR840-2 can be operated as an RS 232 interface. The cable length between the connection module and the ICR840-2 must not exceed 10 m (32.8 ft). Unlike the serial host interface, the serial auxiliary interface has a fixed data format and a fixed data transfer rate..

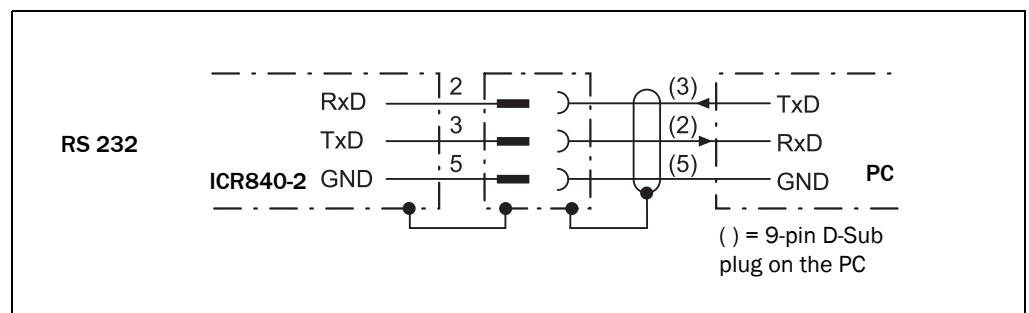


Fig. 5-4: Connecting the serial auxiliary interface

1. Switch off the PC and power supply to the connection module.
2. Connect the PC to the internal, 9-pin "Aux" plug of the connection module. To do so, use a 3-core RS 232 data cable (null modem cable, RxD and TxD crossed), e.g. no. 2014054.

– or –

Without the SICK Connection Module:

Connect the PC as shown in [Fig. 5-4](#).

In the default setting, the ICR840-2 communicates via the serial auxiliary interface using the values shown in [Chapter 6.11 Default settings, Page 91](#).

5.5.4 Connecting the CAN interface

For information on the connection and configuration of the ICR840-2 for use in a SICK-specific CAN scanner network or in a CANopen network, see the "Application of the CAN interface" Operating Instructions (no. 8009180, English version).

5.5.5 Connecting the Ethernet interface

The serial host and auxiliary interface communication can alternatively be routed via the Ethernet interface of the ICR840-2 (TCP/IP). Furthermore, the ICR840-2 provides quick and comfortable output of the image memory contents to the PC via FTP to check and diagnose the images.

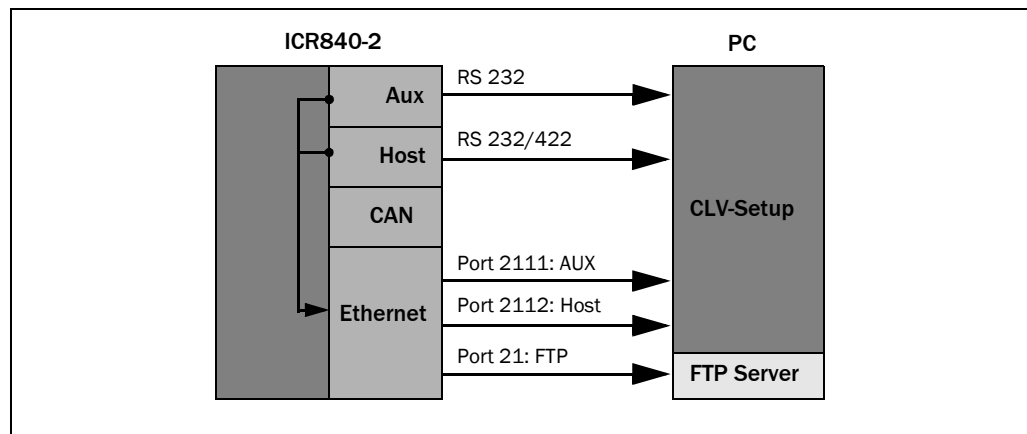


Fig. 5-5: Block diagram: Function of the Ethernet interface

Important If serial auxiliary interface communication is routed via the Ethernet interface by making the appropriate configuration, the serial auxiliary interface (RS 232) is disabled.

The serial host interface communication can either be routed via the Ethernet interface or via the CAN interface. In this case, the serial host interface (RS 422/485, RS 232) is disabled.

If the PC is connected to the ICR840-2 for configuration via the Ethernet interface, however, the serial auxiliary interface and serial host interface of the ICR840-2 remain active (without diversion).

In the default setting, the ICR840-2 communicates via the Ethernet interface using the values shown in [Chapter 6.11 Default settings, Page 91](#).

Connecting the Ethernet interface:

- Connect the ICR840-2 directly to the Ethernet interface of the PC (for configuration) using a crossover cable (e.g. no. 6026084) or to the host computer (for data output) as peer-to-peer connection.

– or –

Connect the ICR840-2 to the Ethernet network (via switch or hub) to which the PC or the host computer are connected. To do so, use a patch cable (e.g. no. 6026083). For secure contact, ensure that the plugs of the cable are snapped in correctly into the sockets (see [Table 5-2, Page 33](#)).

If the green "Ready" LED at the socket of the ICR840-2 lights up, the physical connection has finished successfully.

Recommendation To reduce electromagnetic emissions, attach a ferrite filter to the cable near the ICR840-2 in the snap-in folding housing.

5.5.6 Connecting the switching inputs

If a reading process is to be triggered on the ICR840-2 by an external sensor, the reading pulse sensor must be connected to the "Sensor 1" switching input. The trigger type is selected in the default setting of the ICR840-2.

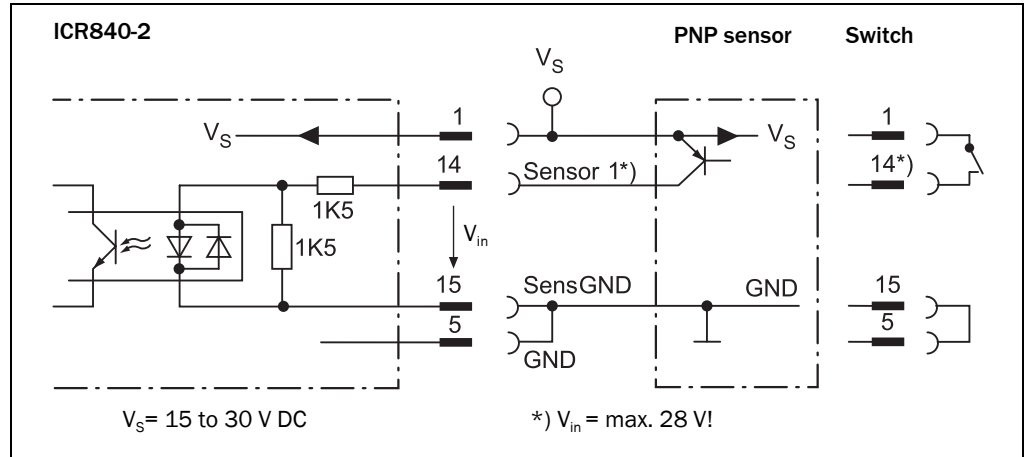


Fig. 5-6: Connecting the "Sensor 1" switching input

Important An external pulse is not required for "Percentage Evaluation" mode.

The "Sensor 2" switching input has the following function, among others:

- Incremental encoder input
- Reading pulse generator for reading pulse end
- Trigger source for teach-in of match code 1/activation of code comparison

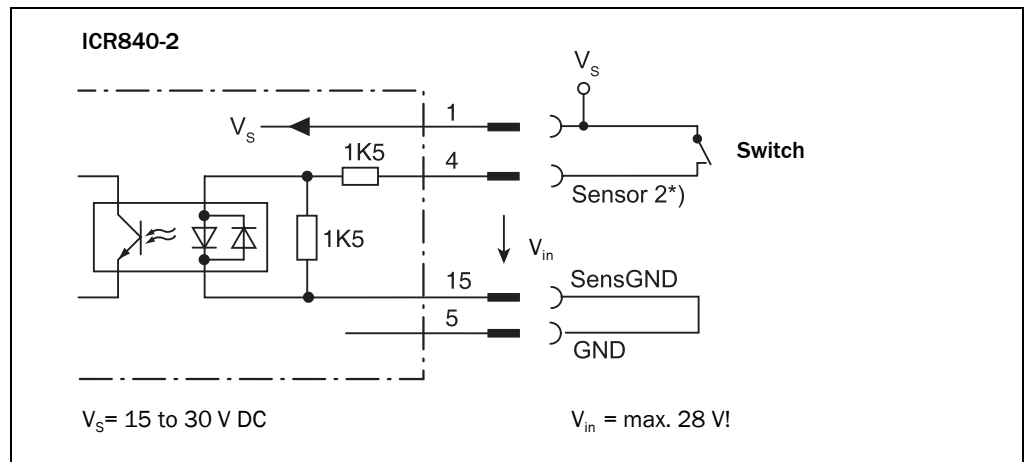


Fig. 5-7: Connecting the "Sensor 2" switching input

➤ Connect the switching inputs depending on application.

The characteristics for "Sensor 1" and "Sensor 2" are identical.

Switching mode	Current at the input starts the assigned function in the ICR840-2. (default setting: level: not inverted (active high), debouncing time: 10 ms, start delay: 0 ms, stop delay: 0 ms)
Characteristics	- Optodecoupled, non-interchangeable - Can be connected to PNP output on a sensor

Tab. 5-8: Characteristic data of the switching inputs

Function assignment (default setting)	Sensor 1: Reading pulse input (fixed) Sensor 2: No function
Electrical values	Low: $-1\text{ V} \leq V_{in} \leq +1\text{ V}$ $-0.3\text{ mA} \leq I_{in} \leq +0.3\text{ mA}$ High: $+8\text{ V} \leq V_{in} \leq +28\text{ V}$ $+1.4\text{ mA} \leq I_{in} \leq +18\text{ mA}$

Tab. 5-8: Characteristic data of the switching inputs (contd.)

The connections and procedure for teaching in match code 1 are described in [Chapter 10.7.1 Triggering the Teach-in match code 1 and activating the code comparison via the "Sensor 2" switching input, Page 151](#).

5.5.7 Connecting the switching outputs

The "Result 2" switching output is used to indicate the result status. To do so, it can be allocated various functions. If the assigned event occurs during the reading process, the switching output becomes live at the end of the reading pulse for the selected pulse duration. The switching output is designed for high side switch.

The "Result 1" switching output is used to trigger an external field illumination (powered external) or to switch on the illumination when directly powered (max. 100 mA) by the ICR840-2. (Fig. 5-8). To do so, the switching output is designed for low side switching. In addition, the output can be used to indicate the result status like the "Result 2" switching output, but it operates not as high side switch when a load (e.g. PLC) is connected (Fig. 5-9). To use the "Result 1" switching output in the function of a high side switch, we recommend to insert a optocoupler between output and the load (e.g. PLC), see Fig. 5-10.

Important The "Result" LED is linked to the "Result 2" output and lights up in "Reading" mode for the selected pulse duration and function of the result status display.

Connecting the "Result 1" switching output:

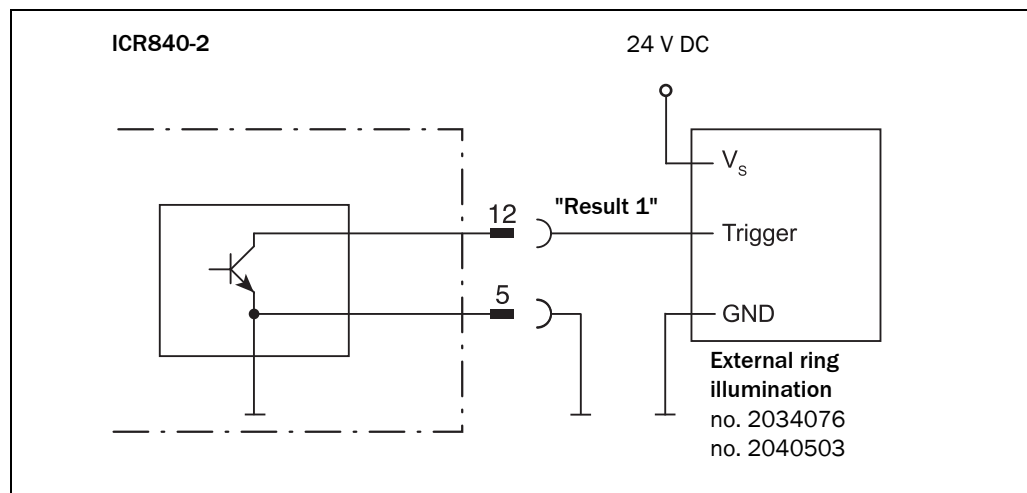


Fig. 5-8: Connecting the "Result 1" switching output for triggering the external illumination

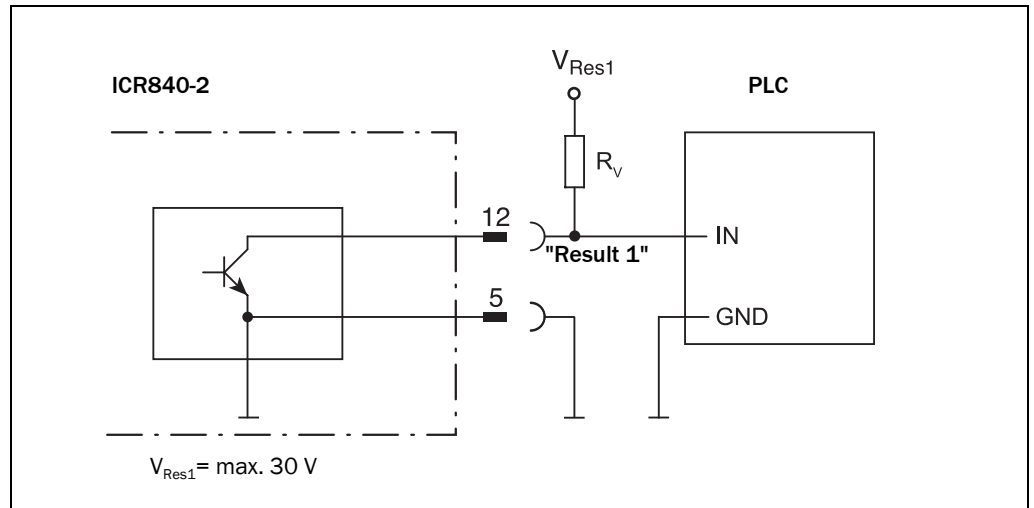


Fig. 5-9: Connecting the "Result 1" switching output for indicating the result status when the load (e.g. PLC) is directly connected, using a series resistor

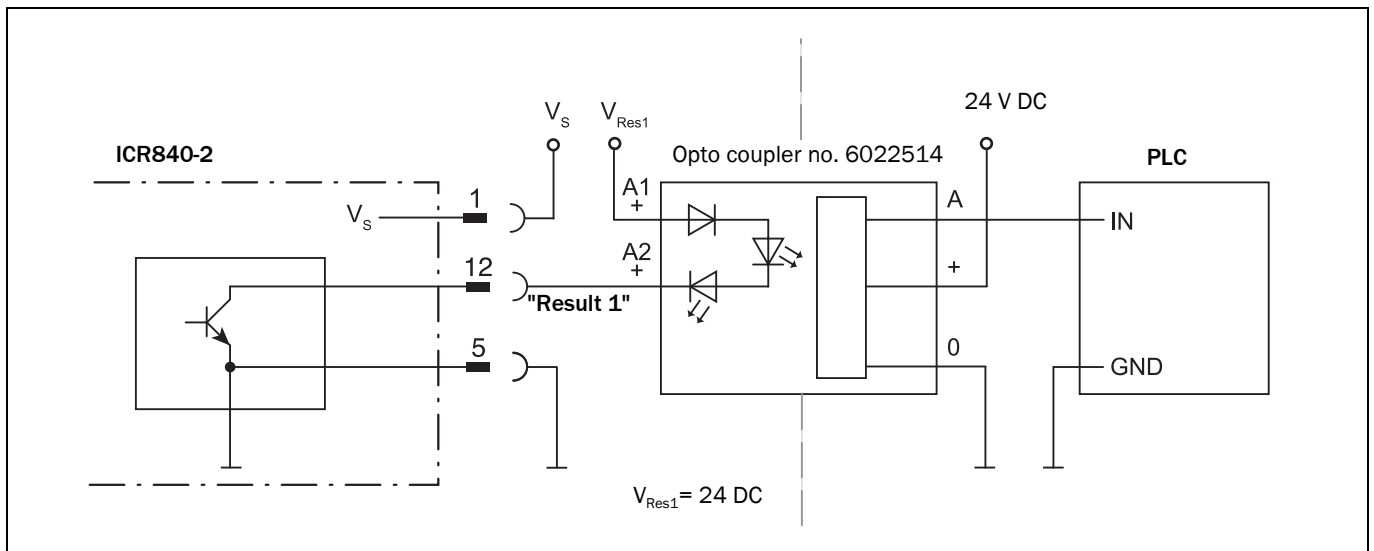


Fig. 5-10: Connecting the "Result 1" switching output for indicating the result status when the load (e.g. PLC) is connected via optocoupler to create a high side switching function

➤ Connect the output, depending on application, as shown for example.

Switching mode	NPN-switching with respect to the ground (low-side switch)
Characteristics	<ul style="list-style-type: none"> - Short-circuit-proof + temperature protected - not electrically isolated from V_S - Pulse duration based on setting: 10 to 990 ms, 00: static (to the end of the next reading pulse) Triggering of external illumination: pulse duration depending on flash duration
Function assignment (default setting)	"Device Ready (static)", Level: not inverted (switching output becomes alive (low) when the event occurs in the reading procedure /the external light is triggered)
Electrical values	$V_{LOW} < 0.2 \text{ V}$ at $I_{out} \leq 100 \text{ mA}$

Tab. 5-9: Characteristic data of the "Result 1" switching output

Connecting the "Result 2" switching output:

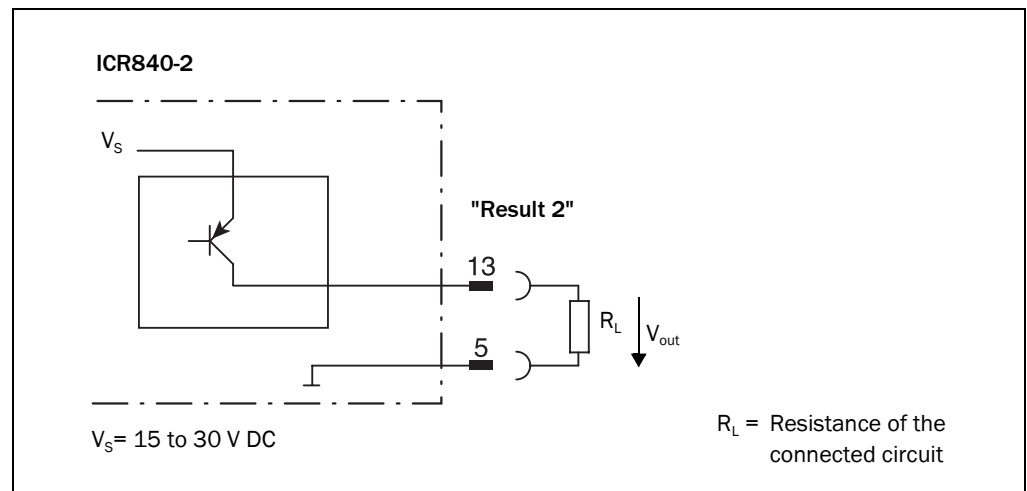


Fig. 5-11: Connecting the "Result 2" switching output

- Connect the output as shown for example.

Switching mode	PNP-switching with respect to the power supply V_s (high-side switch)
Characteristics	<ul style="list-style-type: none"> - Short-circuit-proof + temperature protected - not electrically isolated from V_s - Pulse duration based on setting: 10 to 990 ms, 00: static (to the end of the next reading pulse)
Function assignment (default setting)	"Good Read" (100 ms), Level: not inverted (switching output becomes alive (high) when the event occurs in the reading procedure)
Electrical values	$(V_s - 1.5 \text{ V}) \leq V_{\text{out}} < V_s$ at $I_{\text{out}} \leq 100 \text{ mA}$

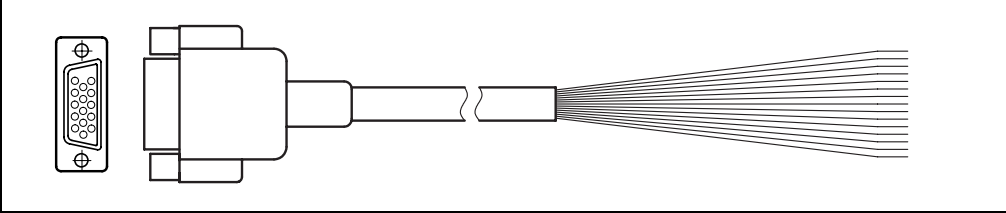
Tab. 5-10: Characteristic data of the "Result 2" switching output

Important If the "Device Ready" function is chosen, the ICR840-2 outputs a static pulse in Reading mode.

Recommendation ➤ To check the switching functions using a high-impedance digital voltmeter, wire the outputs with a load resistor to prevent incorrect voltage values/voltage statuses from being displayed.

5.6 Pin assignment and wire colour assignment of pre-fabricated cables with open ends

Cable no. 6010137



Pin	Signal	Wiring colour
1	15 to 30 V DC	Red
2	RxD (aux)	Purple
3	TxD (aux)	Yellow
4	Sensor 2	Red/black
5	GND	Black
6	RD+ (RS 422/485)	Light blue
7	RD- (RS 422/485); RxD (RS 232)	Blue
8	TD+ (RS 422/485)	Turquoise
9	TD- (RS 422/485); TxD (RS 232)	Green
10	CAN H	Gray
11	CAN L	Pink
12	Result 1	Brown
13	Result 2	Orange
14	Sensor 1	White
15	SensGND	White/black
-	Shield	White/green

Tab. 5-11: Wiring colour assignment of cable no. 6010137 (open end)

Important The wiring color assignment shown above only applies for the upper cable, not for the connection cable with the cable plug which runs to the ICR840-2 housing.

6 Startup and configuration

Startup, adjustment, configuration and diagnosis are carried out via the CLV-Setup configuration software. The procedures will be supported by the ImageFTP presentation program. In normal reading operation the ICR840-2 operates fully automated.

6.1 Overview of the startup procedure

- Starting up the ICR840-2 with the factory default settings.
- Installing the CLV-Setup configuration software and the ImageFTP program on the PC.
- Connecting the PC to the ICR840-2 .
- In order for optimising the functionality of the ICR840-2, adjusting the ICR840-2 and configuring the ICR840-2 for the application.
- Starting the ImageFTP program to check the reading process and configuring the image transfer in ICR840-2 and in ImageFTP.
- Checking correct functioning of ICR840-2 in automatic reading operation.

6.2 CLV-Setup configuration software

The CLV-Setup configuration software is used to optimise the ICR840-2 to the reading conditions on site. The configuration data can be saved and archived as a parameter set (configuration file) on the PC.

6.2.1 Functions of the CLV-Setup configuration software for the ICR840-2 (overview)

Important The online help in the CLV-Setup configuration software describes the general functions of the software and their operation: Menu bar, HELP, CONTENTS [F1] or [Chapter 10.4.5 Functions of CLV-Setup, Page 144](#).

- Selecting the menu language (Englisch, German)
- Setting up communication with the ICR840-2
- Terminal Emulator for online access to the ICR840-2
- Assistant for device functions
- Diagnosis of the ICR840-2

6.2.2 System requirements for the CLV-Setup configuration software

PC system requirements:

- Recommendation: at least Pentium III, 500 MHz, 128 MB RAM, CD drive, serial data interface RS 232 (COM port) and Ethernet interface card, mouse and colour monitor (resolution at least 800 x 600 pixels)
- Operating system Windows 95™/98™, Windows NT4.0™, Windows 2000™ or Windows XP™
- Free storage space on the hard drive: approx. 38 MB for CLV-Setup configuration software (V. 4.4) and ImageFTP program, approx. 27 MB for online help (V. 4.4, complete installation) and approx. 70 MB for Adobe™ Reader™.
- PC HTML browser, e.g. Internet Explorer™: For using the online help system CLV-Setup Help.

Connection cables:

- For configuring the ICR840-2 via the serial auxiliary interface (RS 232): a 3-core RS 232 data cable (null modem cable, Pin 2 (RxD) and Pin 3 (TxD) are crossed) with two 9-

pin D-Sub sockets e.g. no. 2014054. The PC will be connected in the connection module CDB620 or CDM420.

- For configuration/image output via the Ethernet interface of the ICR840-2:
 - A standard Ethernet data cable (patch cable), e.g. no. 6026083, for connecting the ICR840-2 to the Ethernet network
 - A Ethernet data cable (crossover), e.g. no. 6026084, for connecting the PC directly to the ICR840-2.

6.2.3 Installing the CLV-Setup configuration software/ImageFTP program

1. Start the PC and insert the installation CD-ROM "Manuals & Software Bar Code Scanners".
2. If installation does not start automatically, call up setup.exe on the CD-ROM.
3. Follow the operating instructions to conclude installation.

Important For detailed installation hints see [Chapter 10.4 Installation and operating instructions for the CLV-Setup configuration software, Page 138](#).

6.3 Establish communication with the ICR840-2

Prerequisite The TCP/IP protocol at the PC has to be active to enable communication via TCP/IP.

To use the optional image output function of the ICR840-2 (recommended), an Ethernet connection to the ICR840-2 must be established and the ImageFTP program is required. ImageFTP will be automatically installed in combination with CLV-Setup.

6.3.1 Connecting data interfaces

- Connect the PC and ICR840-2 using one of the data interfaces as shown in [Table 6-1](#).


PC with	Via data interface	Comment
ICR840-2	Ethernet interface (10/100 Mbps)	Directly connect the PC to the Ethernet interface of the ICR840-2 using a crossover cable - or - Connect the PC to the Ethernet network using a patch cable. The PC and the ICR840-2 must be in the same subnet.
ICR840-2	Serial auxiliary interface (RS 232)	Connect the PC (COM port) via an RS 232 data cable (null modem cable) to the 9-pin D-Sub plug in the connection module CDB620/CDM420.

Tab. 6-1: Connection between PC with CLV-Setup configuration software and ICR840-2

6.3.2 Starting the CLV-Setup configuration software and calling up the CLV Assistant



1. Switch on the power supply for the ICR840-2 (for the connection module CDB620/CDM420).
The ICR840-2 performs a self-test and is initialised.
2. Switch on the PC and start the CLV-Setup configuration software.
The CLV-Setup configuration software opens the program window with the user interface language and dimension units chosen during installation.
3. In order to change the language setting, select the desired language via the menu OPTIONS/LANGUAGE ON NEXT START.
4. Once the language setting has been changed, shut down the CLV-Setup configuration software and restart it.

5. In order to change the dimension units (metric or inch), select the desired unit via the Menu OPTIONS/UNITS. The new units become valid without any restart und will be directly displayed.
6. In the program window of CLV-Setup, click on  in the tool bar or select CLV ASSISTANT in the TOOL menu.
The CLV Assistant dialog box is opened. The program window of CLV-Setup in the background is minimised.

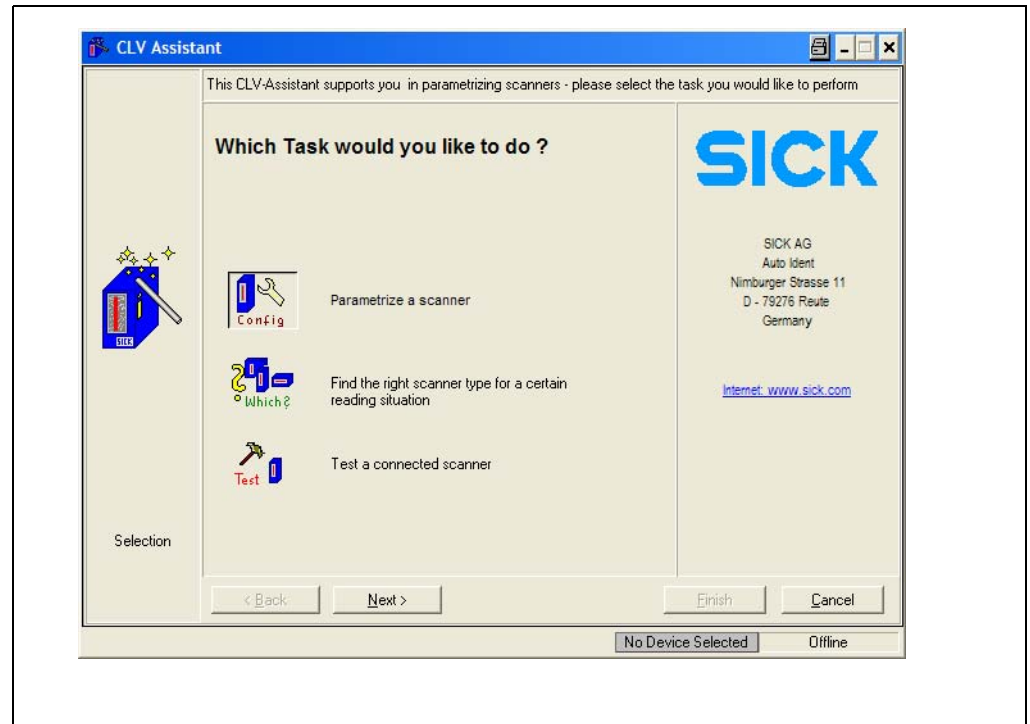


Fig. 6-1: CLV Assistant: Starting up window

The CLV Assistant is a separate program started from CLV-Setup. It provides a step-by-step, interactive guide to establish communication with the ICR840-2. Once communication has been established, the Assistant uploads the current parameter values from the ICR840-2 (initial commissioning: default settings) and copies the values automatically to CLV-Setup. The Assistant helps to establish communication between PC and ICR840-2 via the Ethernet interface (see [Chapter 6.3.3, Page 50](#)) or via one of the two RS 232 interfaces (serial auxiliary or host interface), see [Chapter 6.3.4, Page 54](#).

Important If the CLV Assistant is started from CLV-Setup, CLV-Setup is locked. When all the steps in the Assistant have been completed or if the Assistant has been terminated, the system automatically returns to CLV-Setup. If the Assistant is terminated, no parameter values will be changed in the ICR840-2 or in CLV-Setup.

The ImageFTP program can be started in CLV-Setup or in the Assistant and runs as a server under Windows, independent of the Assistant and CLV-Setup.

6.3.3 Configuring and starting the Ethernet communication with the Assistant

Important The green "Ready" LED must light on the RJ45 socket of the ICR840-2.

When using the Ethernet Assistant there are some restrictions:

- A firewall installed on the host computer can block the telegrams between the host computer and the ICR840-2.
- If the subnet mask of the IP configuration of the ICR840-2 is set to 255.255.255.255, the ICR840-2 will receive telegrams but cannot send any telegram.
- There is no forwarding of telegrams to an other subnet which is connected with the subnet of the ICR840-2 by a router.

1. In the Assistant dialog box confirm the pre-selected PARAMETRIZE A SCANNER option. To do so, click NEXT.

The dialog box of the **Connection Assistant** is then displayed.

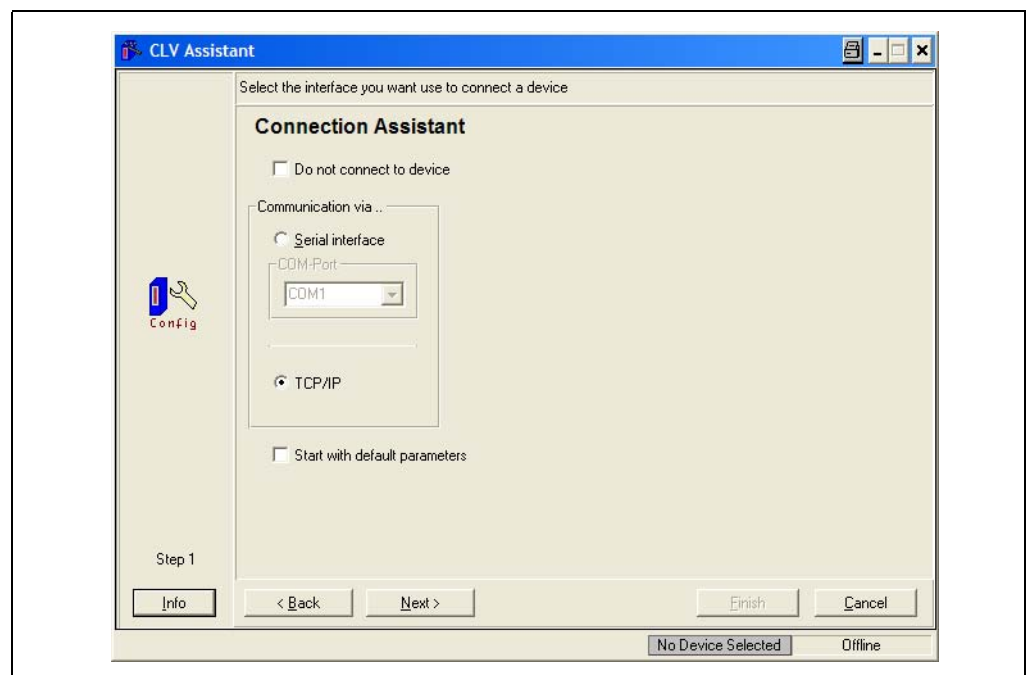


Fig. 6-2: CLV Assistant: Connection Assistant dialog box

2. If necessary, click the control box START WITH DEFAULT PARAMETERS.

Explanation

If the control box is enabled, the Assistant will restore the default settings temporarily in the RAM of ICR840-2. This means that the parameter values of a former successful Ethernet connection will be remained. All other settings will be lost in the new temporary parameter set.

3. Activated the option "TCP/IP" in the section COMMUNICATION VIA.
4. Click NEXT.

The dialog box of the **Ethernet Assistant** is then displayed:

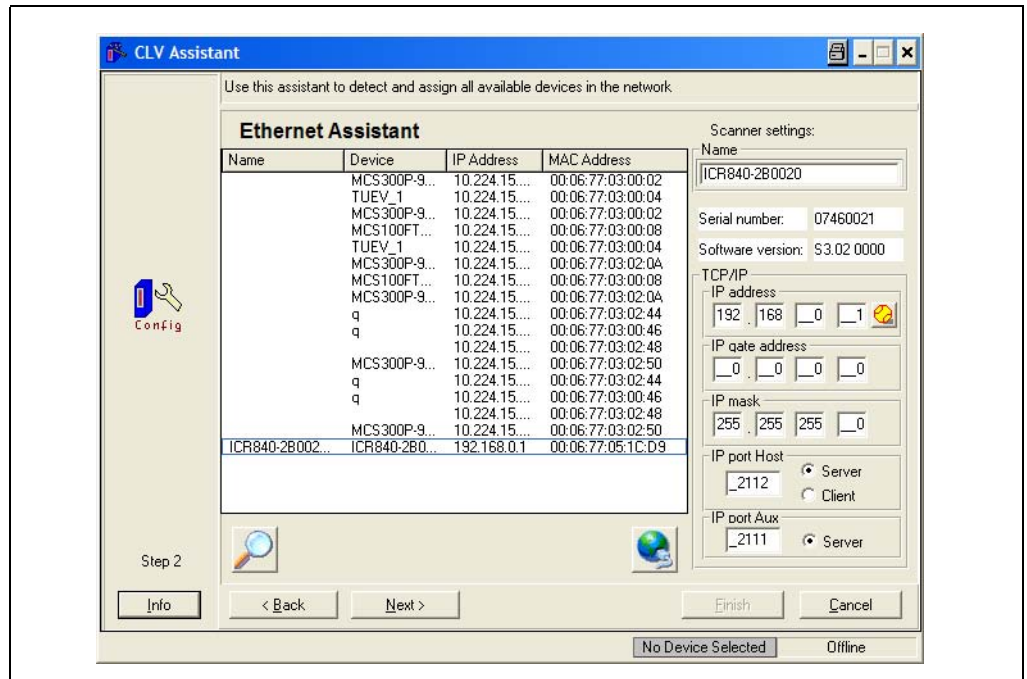



Fig. 6-3: CLV Assistant: Ethernet Assistant dialog box after an ICR840-2 has been detected in the network (here: IP address in the default setting of the ICR840-2)


- The Assistant uses the **UDP protocol** to scan the Ethernet for nodes and displays the result in the dialog box.
(To restart the Netscan, click on  at the bottom left.)
- Identify the required device (if necessary, compare the displayed MAC address with the MAC address on the type plate on the ICR840-2) and select the corresponding device in the dialog box.

Assigning a new address to the ICR840-2:

- Under "TCP/IP" on the right-hand side, overwrite the IP address and the IP mask of the default setting in accordance with the customer-side conditions in the Ethernet.
To jump from one input field to another, use the tabulator key.

Important

The IP address and the subnet mask of the ICR840-2 have to be adapted in such way, that the PC/host computer and the ICR840-2 are in the same subnet (IP mask). The corresponding IP address of the ICR840-2 must be unique and may not clash with the addresses of existings devices.

- Click on  (Assign) at the bottom right.
The Assistant downloads the new settings permanently to the ICR840-2.
The ICR840-2 is then reset (warm start).
- The Assistant now scans the Ethernet for nodes using the **TCP/IP protocol** and displays the result in the dialog box.
- Reselect the device and check, whether the required IP address/mask has been successfully assigned to the ICR840-2 (Fig. 6-4, Page 52).

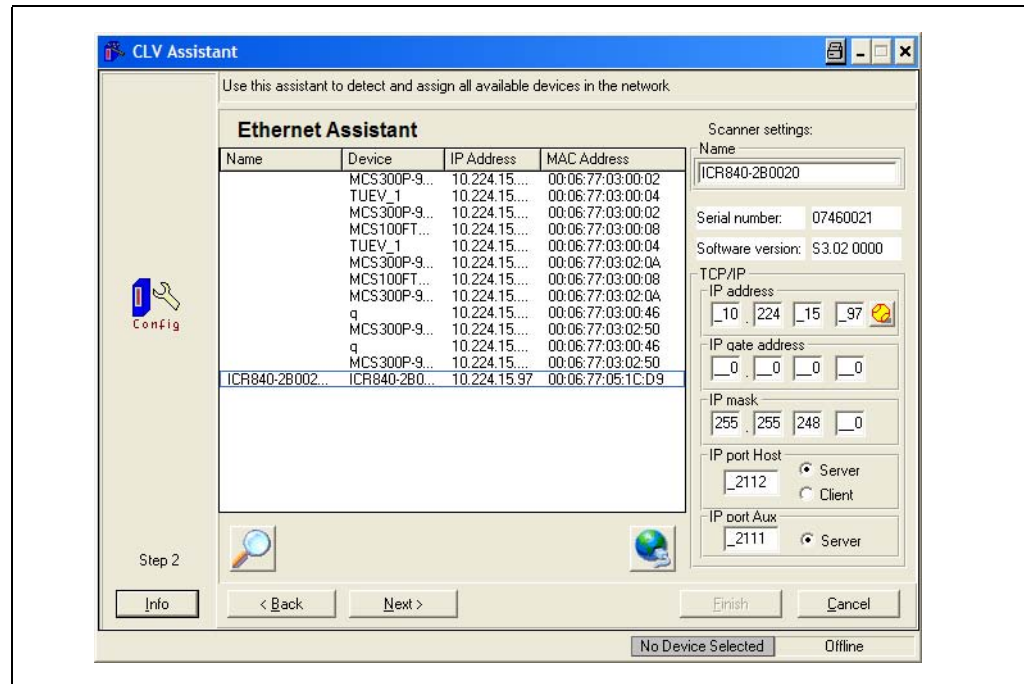


Fig. 6-4: CLV Assistant: Ethernet Assistant dialog box after a new IP address/mask has been assigned to the ICR840-2 (here: 010.224.015.097/255.255.248.000)

11. To establish TCP/IP communication with the ICR840-2, click NEXT.

The Setup Assistant then displays a dialog box showing whether or not communication is successful:

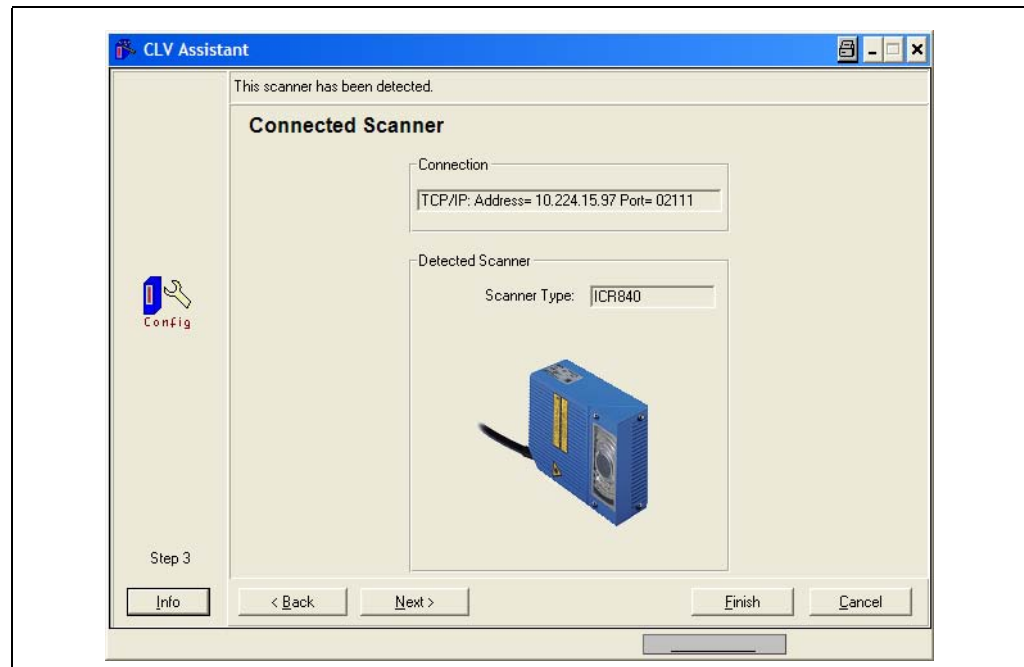


Fig. 6-5: CLV Assistant: Dialog box confirming that communication with the ICR840-2 via Ethernet (TCP/IP) is successful

12. Click NEXT.

13. In the next window confirm the shown settings with NEXT.

The CLV Assistant uploads the current configuration of the ICR840-2 into the CLV-Setup data base. Then the CLV Assistant dialog box is closed and the program window of CLV-Setup is opened again.

ICR840-2

In the status line CLV-Setup displays left bottom the IP address of the ICR840-2 and right bottom the green highlighted message "Connected!".
The ICR840-2 is ready for further configuration with the new settings of the Ethernet interface.

6.3.4 Configuring and starting RS 232 communication with the Assistant

1. In the dialog box of the Connection Assistant (*Fig. 6-2, Page 50*) click the control box START WITH DEFAULT PARAMETERS if necessary.

Explanation

If the control box is enabled, the Assistant will restore the default settings temporarily in the RAM of ICR840-2. This means that the parameter values of a former successful RS 232 connection will be remained. All other settings will be lost in the new temporary parameter set.

2. Activated the option "SERIAL INTERFACE" in the section COMMUNICATION VIA.
3. In the list, selected the active COM port of the PC.
4. Click NEXT.

The Connection Assistant attempts to establish communication with the ICR840-2. If the attempt is not successful, the Assistant starts the AUTODETECT function. The dialog box of Auto Detect is then opened.

Auto Detect scans the serial interface by varying the communication parameters and sends telegrams to the connected ICR840-2 until the settings are synchronised with the settings of the ICR840-2.

5. Confirm the Auto Detect dialog box with OK.

The Assistant establishes communication with ICR840-2 and uploads the current configuration of the ICR840-2 into the CLV-Setup data base.

The Assistant then displays a dialog box showing that communication is successful:

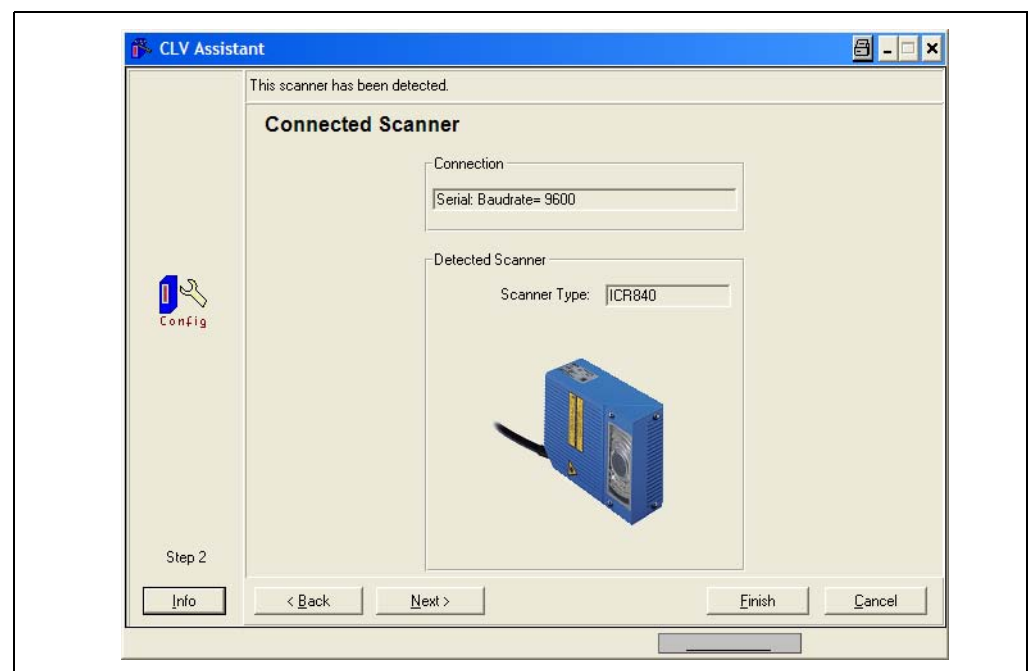


Fig. 6-6: CLV Assistant: Dialog box confirming that communication with the ICR840-2 via RS 232 is successful

6. Click NEXT.
7. In the next window confirm the shown settings with NEXT.

The CLV Assistant dialog box is closed.

The program window of CLV-Setup is opened again.

In the status line CLV-Setup displays left bottom the communication parameters of the ICR840-2 and right bottom the green highlighted message "Connected!".

The ICR840-2 is ready for further configuration.




6.3.5 Preparing image output of ICR840-2 and image representation in ImageFTP

Starting ImageFTP and configuring the image directory

Important In the default setting, the ICR840-2 only reads Data Matrix ECC 200 codes (free symbol length, square data field).

Purpose of starting ImageFTP is to check the recorded and transferred image. The Data Matrix code must clearly be visible with sufficient sharpness and be undistorted.

If necessary, the reading distance or the reading configuration has to be modified in CLV-Setup.

1. Start the ImageFTP program.
To do so, click on  in the toolbar of CLV-Setup.
2. For configuring the image directory on the PC, click on  in the toolbar of ImageFTP or select USER ACCOUNTS in the SERVER menu.
3. In the DIRECTORY PERMISSIONS section, select the proposed PHYSICAL PATH and click EDIT. The "Edit Directory" dialog box for entering the permissions for the "anonymous" account is then displayed.
(Password for the default entry "anonymous": anonymous.)
4. In the PHYSICAL PATH section, click on  and select the desired directory in which you want to save the transferred images.
5. Confirm the dialog box and further dialog boxes with OK.
ImageFTP returns to the program window.
6. If necessary, select IMAGE VIEW in the VIEW menu in the program window of ImageFTP. The next image to be displayed will be scaled automatically to the size of the program window.
7. Move the ImageFTP program window to a free place on the screen, so that it is parallel to the CLV-Setup program window.

Configuring image acquisition and FTP communication (Ethernet) in the ICR840-2

1. In CLV-Setup change to the IMAGE ACQUISITION tab.

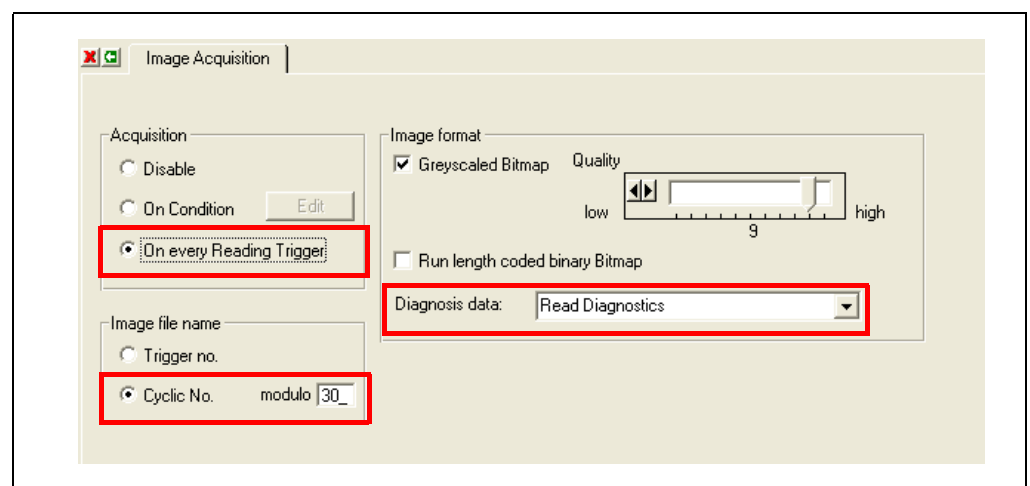


Fig. 6-7: CLV-Setup: "Image Acquisition" tab

2. Activate and configure the image acquisition.
3. Download the modified parameters to the ICR840-2 using the right mouse button (DOWNLOAD PARAMETER OF THIS VIEW). The download is performed temporarily.
4. Change to the ETHERNET tab.
5. On the ETHERNET tab, enable the ICR840-2 for FTP client and configure the FTP server

address (PC). Do not modify default settings of USER NAME, PASSWORD and UPLOAD PATH.

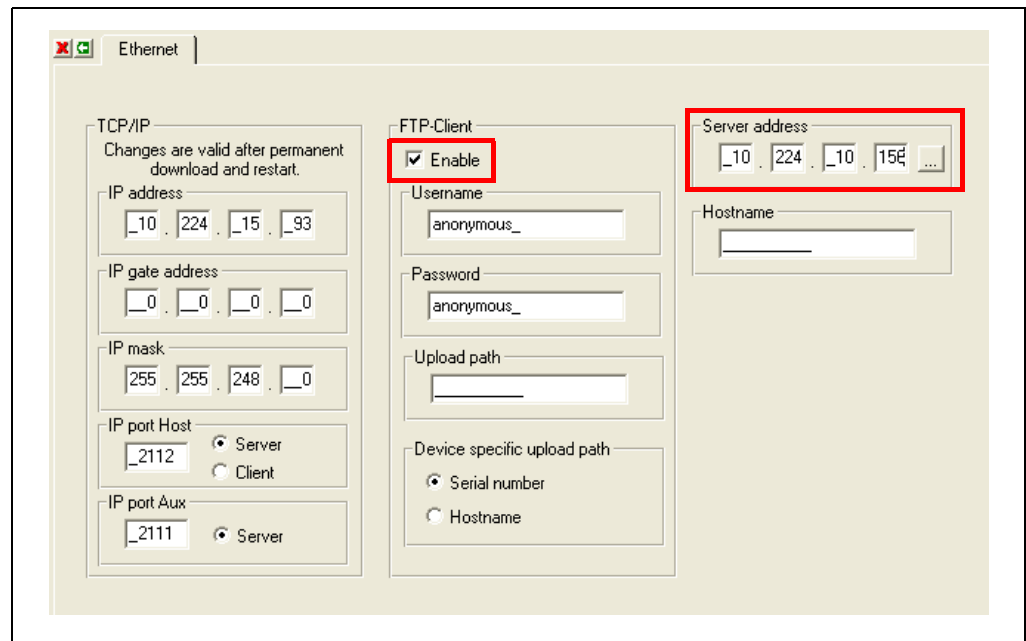


Fig. 6-8: CLV-Setup: "Ethernet" tab

- Download the modified parameters to the ICR840-2 using the right mouse button (DOWNLOAD PARAMETER OF THIS VIEW). The download is performed temporarily.

6.3.6 Starting 2D code reading with ICR840-2

- Start the reading pulse: block the light path of the photoelectric switch or close the switch. The ICR840-2 switches the red, pulsed illumination field on for lighting the reading area. The lit area is greater than the active field of view. The field of view is in the centre of the area. For allocation of field of view to the reading window see [Fig. 3-4, Page 18.](#))

The ICR840-2 records repeatedly an image from the field of view. With a small offset, the ICR840-2 starts decoding simultaneously.

- Represent a 2D code in the field of view (no conveyor movement). Regard the reading distance from reading window / the field of view dimensions.

ICR840-2A (High Density): 50 mm / 23.75 mm x 19 mm
(1.97 in / 0.94 in x 0.75 in)

ICR840-2B (Standard Range): 80 mm / 40 mm x 32 mm
(3.15 in / 1.58 in x 1.26 in)

ICR840-2C (Mid Range): 115 mm / 58.5 mm x 46.5 mm
(4.53 in / 2.30 in x 1.83 in)

ICR840-2D (Long Range): 145 mm / 72.5 mm x 58 mm
(5.71 in / 2.86 in x 2.29 in)

- Stop the reading pulse: unblock the light path of the photoelectric switch or open the switch. The ICR840-2 switches off the red illumination field. The ICR840-2 outputs the reading result (default setting: end of reading interval).
- In ImageFTP, check the recorded and transferred image. The Data Matrix code must clearly be visible with sufficient sharpness and be undistorted (see sample in [Fig. 6-9](#)). ImageFTP also displays the derived reading diagnosis data in the image (if enabled for visualisation as set in default setting).

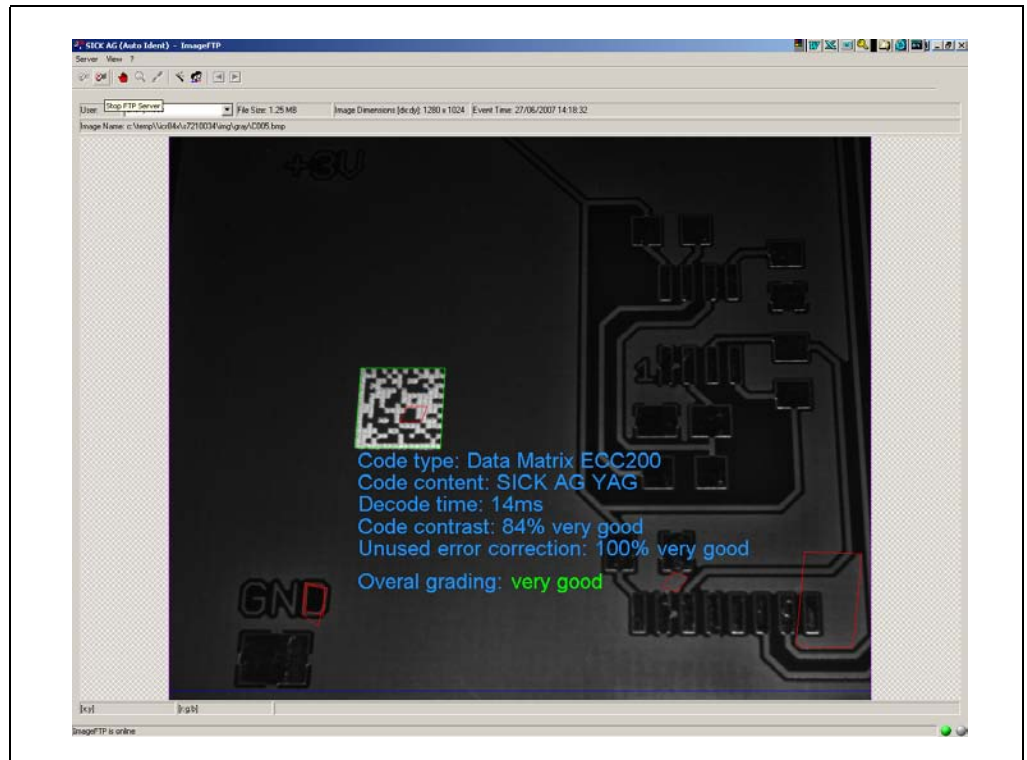


Fig. 6-9: ImageFTP: Image output

For meaning of the reading diagnosis data see [Chapter 6.4.7 Intended use of reading diagnosis data, Page 63](#).

5. If necessary, modify the reading distance or vary the parameters on the READING CONFIGURATION or the CODE PROPERTIES PARAMETERS tab in der CLV-Setup configuration software. After each modification, download temporarily the new parameter values to the ICR840-2.
6. Trigger reading again and so on.
7. If any parameter values have been modified in the ICR840-2, save the parameters in the ICR840-2 with the PERMANENT option.

6.4 The image transfer program ImageFTP

6.4.1 Functioning of the ImageFTP

When functioning as an FTP server, the ImageFTP is used for the automatic transfer, representation and storage of images at the PC for diagnosis/documentation purposes. After a corresponding release, the ICR840-2, as the client, sends its processed image storage content to the PC either continuously with each triggering of image capturing/decoding (cyclical) or only for No Read.

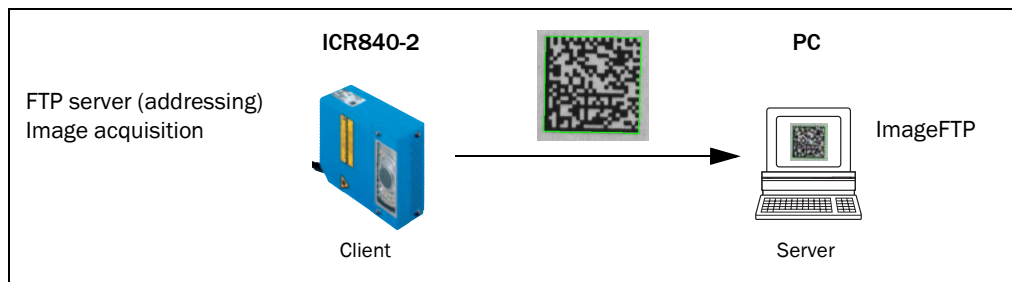


Fig. 6-10: Image output of the ICR840-2 and image transfer to the PC

Since the ImageFTP is a multi-user compatible server, several ICR840-2 devices can send their images to the same PC in various target directories when stating their user name. With the aid of the user name it is then possible to toggle between the individual ICR840-2 devices in the ImageFTP for the presentation of the images.

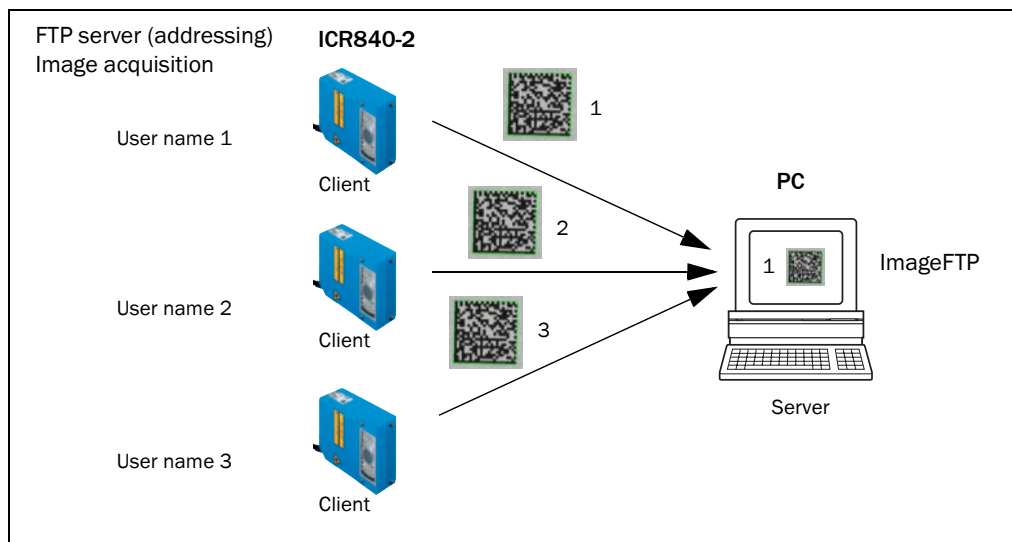


Fig. 6-11: Multi-user operation: Image output of several ICR840-2 devices to the ImageFTP on one PC

ImageFTP is able to visualise images in BMP format (grey value bitmap) and in JPG format (graphic file). **The ICR840-2 outputs images in BMP format or in run length codes binary format (for bar codes).**

The ICR840-2 can transfer various reading diagnosis data for the code with the image using an assigned XML file; this data is determined during reading. The reading diagnosis data is arranged according to diagnosis levels. The ImageFTP graphically displays the data in the image as coloured lines.

The ImageFTP continuously saves the received files of the ICR840-2 under the file name "imagex.bmp" (x = variable for trigger increment or counting according to the modulo) in the selected target directory.

6.4.2 ImageFTP system requirements

PC system requirements: Ethernet card and operating system Windows 98™, Windows NTSP6™, Windows 2000™, Windows Me™ and Windows XP™. The file "gdiplus.dll" has to be available in the operating system.

6.4.3 Installing the ImageFTP

When performing a complete installation, the installation program of the CLV-Setup configuration software automatically installs ImageFTP at the PC in the same directory.

6.4.4 Enabling image output in the ICR840-2

Important

Image output is inactive in the default setting of the ICR840-2.

If the image output is no longer necessary after successful configuration of the ICR840-2, we recommend to disable image acquisition. This avoid blocking the ICR840-2 for reading by the image transfer process.

In order to configure and enable the image output of the ICR840-2, carry out the following settings in the CLV-Setup configuration software:



Configuring the IP address of the server (PC) in the ICR840-2:

1. Select the entry FTP-SERVER on the left-hand side of the device tree.
2. Enter the IP address of the PC under SERVER ADDRESS.
3. If the IP address of the PC is unknown, select the command EXECUTE in the Windows start menu.
4. Enter the command cmd in the dialog box.
5. Enter the command IPconfig after the prompt character in the DOS dialog window. In addition to other information, Windows also displays the IP address of the PC.
6. In the CLV-Setup accept the value for PORT (21)
7. Click the ACTIVE control box under FTP-CLIENT.
8. If necessary, carry out entries under USER NAME (anonymous), PASSWORD (anonymous) and UPLOADPATH (uploadpath). The standard entries are specified in brackets. The entries carried out here have to correspond to the entries for the user account in the ImageFTP, otherwise the ImageFTP does not receive images.
9. Download and temporarily save the modified parameter values in the ICR840-2.




Configuring image acquisition in the ICR840-2:

1. Select the entry IMAGE ACQUISITION on the left-hand side of the device tree.
2. Set the criteria for automatic image output under ACQUISITION.
3. Select the greyscaled bitmap format under IMAGE FORMAT.
4. Set generation of the file name of the output images under IMAGE FILE:
 - Trigger no.: Continuous increment
 - Cyclic no./modulo x: After x image files, the first file is overwritten and then the second one, etc.
5. If necessary, select the reading diagnosis data to be transferred under DIAGNOSIS DATA. (the reading diagnosis data of the ICR840-2 are disabled for visualisation in the default setting of ImageFTP).
6. Download and temporarily save the modified parameter values in the ICR840-2.
7. After starting and configuring the ImageFTP, check automatic image transfer at the PC.
8. If desired, permanently save the image output configuration in the ICR840-2.

6.4.5 Starting the ImageFTP



1. In CLV-Setup, click on  in the toolbar.
The ImageFTP program window is displayed. The user interface language is English (another language cannot be selected).

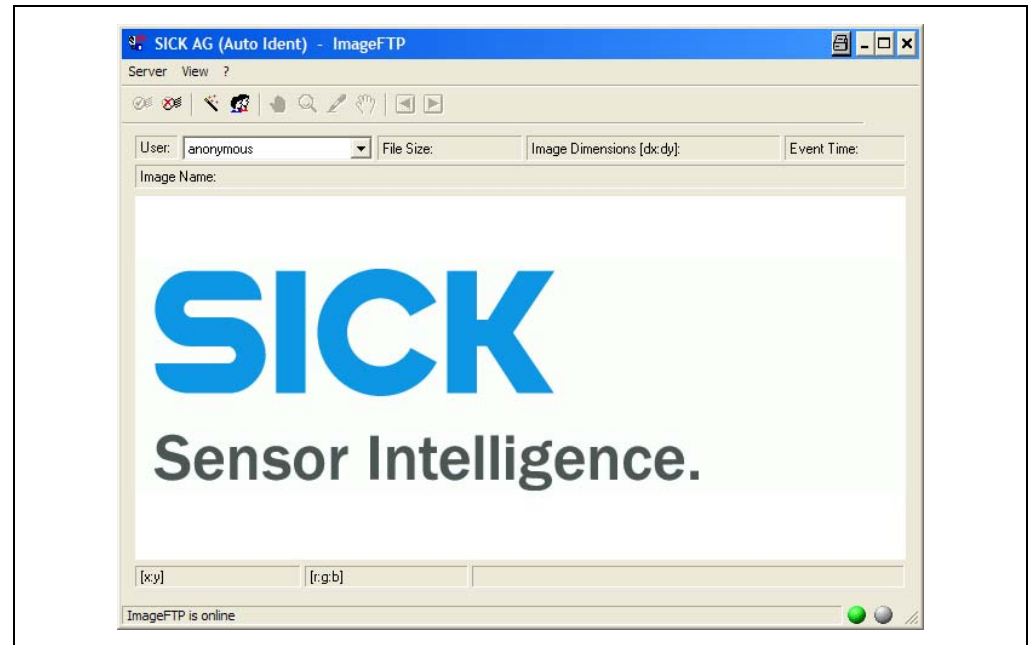









Fig. 6-12: ImageFTP: Program window

The status of FTP server is displayed by the status bar at the bottom right-hand corner of the ImageFTP window (green = online, red = offline). If image output has been enabled in the ICR840-2, the ImageFTP displays the image in the program window and automatically scales it to the size of the window.




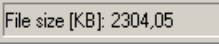
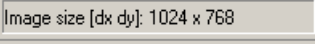
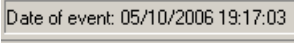

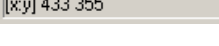
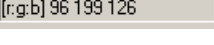
Fig. 6-13: ImageFTP: Image presentation mode, here with reading diagnosis data for the code

The symbol buttons in the tool bar have the following functions:

Symbol	Function
	Stops the FTP server (image transfer)
	Starts the FTP server (image transfer)
	Freezes the currently displayed image
	Gradually enlarges the frozen image
	Enables the colour value analysis (RGB values) of the frozen image pixel onto which the pipette tip is placed
	Starts the assistant for setting up user accounts
	Opens the dialog window for displaying/processing user account characteristics

Tab. 6-2: ImageFTP: Function of the symbol buttons










The text boxes above and below the presented image have the following functions::

Text box	Description
	User name (CLV-Setup: user name) of the user account
	File size in kBytes of the currently displayed image
	File size in pixel of the currently displayed image
	Date/Time of image transfer
	File name and path of the target directory
	Position of the pipette tip on the frozen image. Value range depends on the resolution of the ICR840-2.
	RGB value of the pixel onto which the pipette tip is placed for colour value analysis. Value range: 0 to 255

Tab. 6-3: ImageFTP: Description of the text boxes

6.4.6 Meaning of the displayed reading diagnosis data

The ImageFTP provides the reading diagnosis data for the Data Matrix code or 1D codes (bar codes) in the image with the following graphical forms/colours and text:

Diagnosis level	Reading diagnosis data	Form	Colour	Type	See Fig. 6-14
0	no (disabled)	-	-	-	Example 1
Data Matrix codes:					
1	Region of interest: Region with 2D code	Frame	Red		Example 2
1	Region of interest: Good Read	Frame	Green		Example 3
1	CP limits	Dot and dash line	Violet		-
1	Position of 2D decoder at the end of reading interval	Solid line	Blue		-
2	Text	Additional reading diagnosis data	Blue	Text	Example 4
Bar codes:					
1	Region of interest: Region with bar code	Frame	Red		-
1	Region of interest: Good Read	Frame	Green		-
1	CP limits	Dotted line	Violet		-
1	Position of omni decoder at the end of reading interval	Dashed line	Blue		-
1	Position of SMART decoder at the end of reading interval	Dashed line	Blue		-

Tab. 6-4: ImageFTP: Graphical forms/colours for presentation of the reading diagnosis data

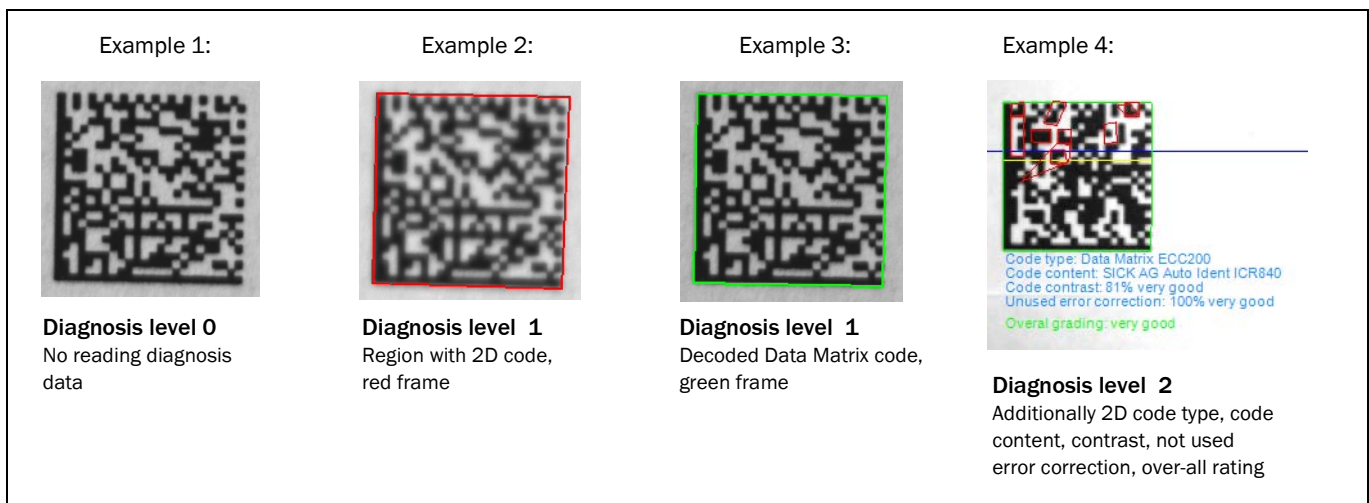


Fig. 6-14: ImageFTP: Examples for presentation of reading diagnosis data of diagnosis levels 0 to 2

The reading diagnosis data displayed in the image helps to determine the reasons for a No Read of the Data Matrix code (insufficient contrast of the code layout, insufficient sharpness, weak cells, partly damaged code, etc.).

Recommendation ➤ To analyse the images, freeze each image.

6.4.7 Intended use of reading diagnosis data

Diagnosis level 1:


- **Red frame:**
The ICR840-2 detects a 2D code-similar structure in the image, but cannot decode it.
 - Check whether the contrast and focus are sufficient or whether the displayed code is very distorted. Check the alignment of the ICR840-2 to the code. If necessary, check the parameter values on the device pages IMAGE PROCESSING, READING CONFIGURATION and CODE CONFIGURATION.
- **Green frame:**
Successful decoding of the Data Matrix code.

Diagnosis level 2:

Additional information about 2D code type, code content, contrast, not used error correction and over-all rating.

6.4.8 Further ImageFTP functions

The commands in the menu bar have the following functions:

Command	Function
Menu "Server"	
Start	Starts the FTP server (image transfer).
Stop	Stops the FTP server (image transfer).
User Account wizard	Starts the assistant for setting up new user accounts.
User Accounts	Opens the dialog window for viewing, creating, processing or deleting individual user accounts (user and directory). See also Chapter 6.4.9 Setting up user accounts, Page 65 .
Load Image	Loads the saved image from the sub-directory specified on the device page FTP SERVER of the ICR840-2 under UPLOAD PATH. The image is displayed as a frozen image. Click on  or select the command FREEZE IMAGE in the VIEW menu to restart the display of the currently received images.
Save Image	Saves the image displayed at the time of the call in the sub-directory specified on the device page FTP SERVER of the ICR840-2 under UPLOAD PATH.
Menu "View"	
Image	Displays the continuously updated or frozen images
Server Trace	Displays the communication progress between the ICR840-2 (client) and the ImageFTP (server). Is used for diagnosing faults during image transfer from the ICR840-2 to the PC. The appearance of selected types of information during the transfer can be recorded in a log file (see <i>Configuration</i>).
User Statistics	Displays the current number of ICR840-2 devices which can access the ImageFTP.
Server Statistics	Displays current values regarding the number of connections, the transferred files and the received bytes.

Tab. 6-5: ImageFTP: Menu command functions

Command	Function
Configuration	<p>Displays the used FTP port of the PC, the maximum possible number of accessing ICR840-2 devices, the timeout for the connection between the ICR840-2 and the ImageFTP as well as the IP address of the PC.</p> <p>Under LOGLEVEL it is possible to select the type of optionally recorded information for the log file (warning, fault, progress). Storage is performed in the target directory "Programs\SICK\CLV\Ftp_Server" under the name "ftptrace.txt" as standard.</p> <p>For viewing purposes the log file is automatically opened via a text editor available at the PC (VIEW LOG), the content can be deleted without a text editor (CLEAR LOG).</p> <p>UPDATE allows the ICR840-2 to accept the changes in the input fields.</p>
View Diag File	<p>Opens the XML file of the reading diagnosis data transmitted by the ICR840-2.</p>
Freeze Image	<p>Freezes the currently displayed image or re-activates the continuous display of transferred images.</p>

Tab. 6-5: ImageFTP: Menu command functions (contd.)

Important After executing a command (except "Stop FTP Server") and the resulting changeover from image presentation mode to the respective dialog window, the continuous storage of received images continues in the background.

6.4.9 Setting up user accounts

Each user account consists of the user name, password, directory path for the image files and access permissions to the directory via the ImageFTP. The preset user in the default setting is "anonymous".


The preset values for USER (NAME) and PASSWORD in the ImageFTP correspond to those of the ICR840-2 default setting on the ETHERNET tab. For each further user account the two freely selectable values in the respective ICR840-2 and in the ImageFTP have to correspond, otherwise the ImageFTP does not transfer images.

ImageFTP		ICR840-2	
Parameter	Default setting	Parameter	Default setting
User	anonymous	User name	anonymous
Password	anonymous	Password	anonymous
Physical Path	-	Uploadpath	Uploadpath
Permissions	All enabled	-	-

Tab. 6-6: Default setting: In the ImageFTP for user account/in the ICR840-2 (ETHERNET tab)

Modifying the user account "anonymous" in the ImageFTP:



1. If necessary, select IMAGE VIEW (image display mode) in the ImageFTP program window.
2. Select the entry ANONYMOUS in the list field of the USER section.
3. Click on  in the toolbar or select the command USER ACCOUNTS in the SERVER menu. The following dialog window opens:

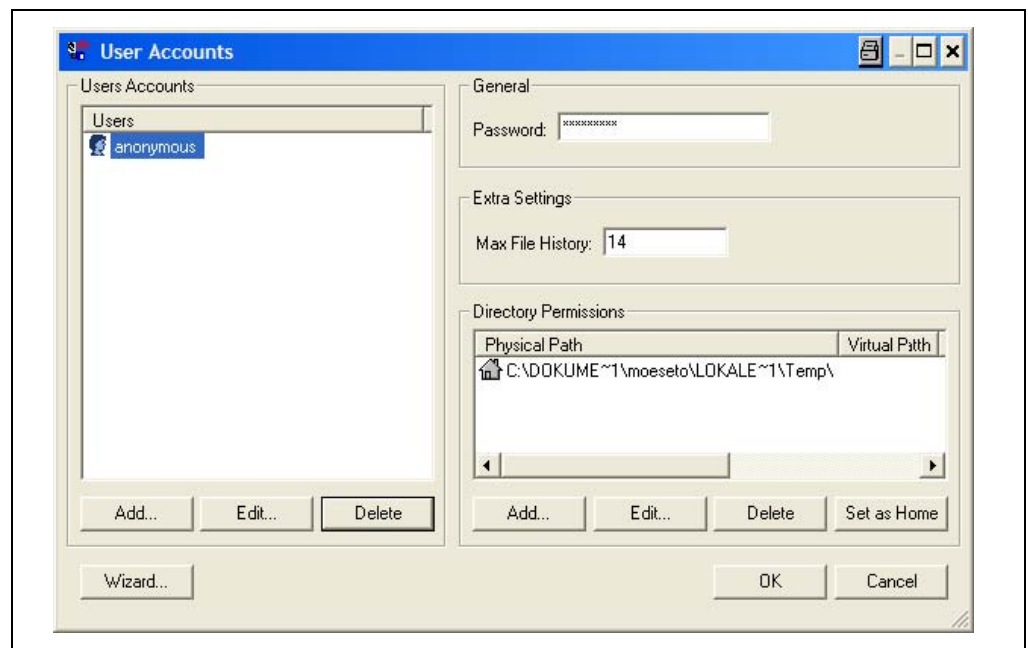


Fig. 6-15: ImageFTP: "User Accounts" dialog box

4. If the physical path on the right is not visible, enter the password anonymous in the field PASSWORD under GENERAL. Observe the spelling (lowercase letters)!
5. Highlight the displayed PHYSICAL PATH in the DIRECTORY PERMISSIONS section and click on the EDIT button. The EDIT DIRECTORY dialog box opens.

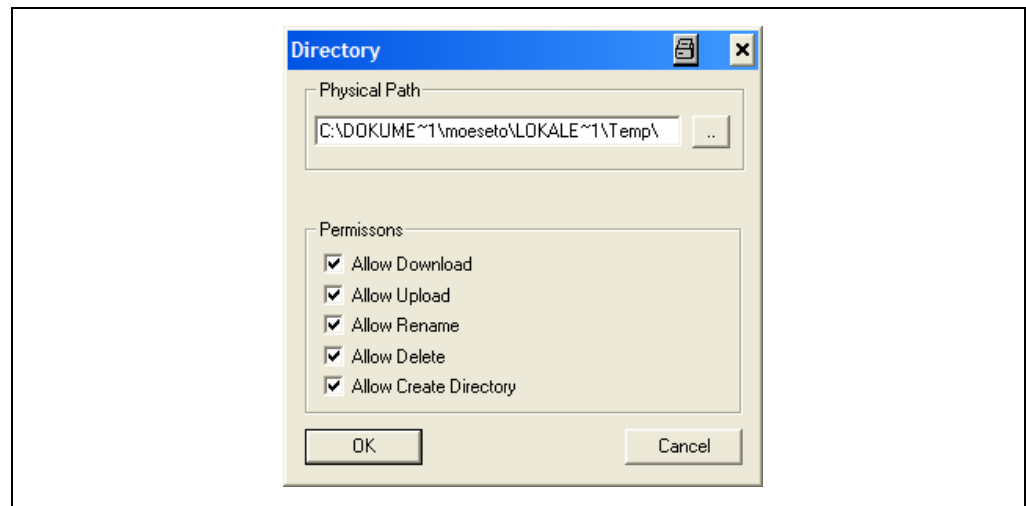





Fig. 6-16: ImageFTP: "DIRECTORY" dialog box

6. In the PHYSICAL PATH section click on  and change the proposed directory for the images in the dialog window, if necessary.
ImageFTP automatically adds the sub-directory to the selected target directory when returning to the image presentation mode; the name of the sub-directory is stated on device page FTP SERVER of the ICR840-2 under UPLOAD PATH. It is "uploadpath" in the default setting of the ICR840-2.
ImageFTP saves grey scaled bitmaps in the sub-directory "BMP", run length code formats in the sub-directory "BIN" and XML files containing the reading diagnosis data which are allocated to the corresponding grey scaled bitmaps (generated by the ICR840-2) in the sub-directory "DIAG".
7. If necessary, change the permissions.
8. Confirm the dialog window via OK.
The ImageFTP returns to the USER ACCOUNTS dialog window.
9. Confirm the USER ACCOUNTS dialog window via OK.
The ImageFTP returns to the image presentation mode.

Creating a new user account for an ICR840-2 in the ImageFTP:



1. Click on  in the toolbar or select the command USER ACCOUNTS in the SERVER menu.
The USER ACCOUNTS dialog box opens.
2. Click on the ADD button in the USER ACCOUNTS section.
3. In the dialog box enter a new user name which corresponds to the configured user name in the ICR840-2. Click on OK to confirm the dialog box.
4. In the GENERAL section enter the password in the PASSWORD field which corresponds to the configured password in the ICR840-2.
5. In the DIRECTORY PERMISSIONS section click on the ADD button.
The EDIT DIRECTORY dialog box opens.
6. In the PHYSICAL PATH section click on  and select the desired directory for the images.
Recommendation: Programs\SICK\CLV.
The ImageFTP automatically adds the sub-directory to the selected target directory when returning to the image presentation mode, the name of the sub-directory is stated on the ETHERNET tab of the ICR840-2 under UPLOAD PATH.
7. Enable access permissions.
Recommendation: Enable all five permissions.

8. Confirm the dialog box via OK.
The ImageFTP returns to the USER ACCOUNTS dialog window.
9. Confirm the USER ACCOUNTS dialog window via OK.
The ImageFTP returns to the image presentation mode.
10. Select the new user name in the list field of the USER section.
After correct configuration of the ICR840-2, the ImageFTP continuously displays the transferred images.

Important For multi-user operation of the ImageFTP a practical, structured allocation of user names and passwords is recommended for the ICR840-2 and thus also for the ImageFTP. Depending on the efficiency of the PC, the ImageFTP can operate up to 256 device.

Example:

ICR840-2 no.	User name	Password	Upload path
1	Camera1	Station1	Data1
2	Camera1	Station2	Data2
3	Camera1	Station3	Data3
4	Camera1	Station4	Data4

Tab. 6-7: Example of user name/password/upload path for multi-user operation

6.4.10 ImageFTP default setting

Parameter	Default setting
Dialog window	View (image presentation mode)
Status	FTP server started
FTP Port	21
Max. user	4
Connection timeout	5
Log level	No (no logging)
Visualisation of reading diagnosis data	All enabled

Tab. 6-8: ImageFTP: Default setting

See [Table 6-6, Page 65](#) for the default setting of a user account.

6.5 Using the function key

With the function key (located on device near by the LEDs) you can start a pre-configured function without starting the CLV-Setup configuration software. The response of the LEDs and the Beepers allows to check the performed functions. At the moment, only the reading interval can be triggered. The key can be deactivated with the CLV-Setup configuration software. In the default setting the function key is active.

Triggering the ICR840-2:

1. Press and keep the function key.
The ICR840-2 switches on the illumination (pulsed) and starts an internal reading interval. The beeper confirms the start of the reading interval with a tone.
2. Represent a code to be read.
The beeper confirms the successful reading with a tone.
The ICR840-2 automatically closes the reading interval and switches the illumination off. The beeper confirms the end of the reading interval with a tone.

- or -

3. To close early the reading interval (abort), loose the function key.
The beeper confirms the end of the reading interval with a tone.

Default setting When triggering the reading process (via the function key) the ICR840-2 operates with the following values:

- Enabled code types = Data Matrix ECC200
- Min./ Max. number of codes = 1
- Output of reading result = immediate (after fulfilling the reading conditions)

For further values see [Chapter 6.11 Default settings, Page 91](#).

6.6 First startup

The CLV-Setup configuration software optimises the ICR840-2 to reading conditions on site. Starting point for this is the factory default setting which can be adjusted to optimise the ICR840-2. The CLV-Setup configuration software is used to create an application-specific parameter set which can be loaded permanently into the ICR840-2 and saved/archived as a configuration file (.scl file) on the PC.

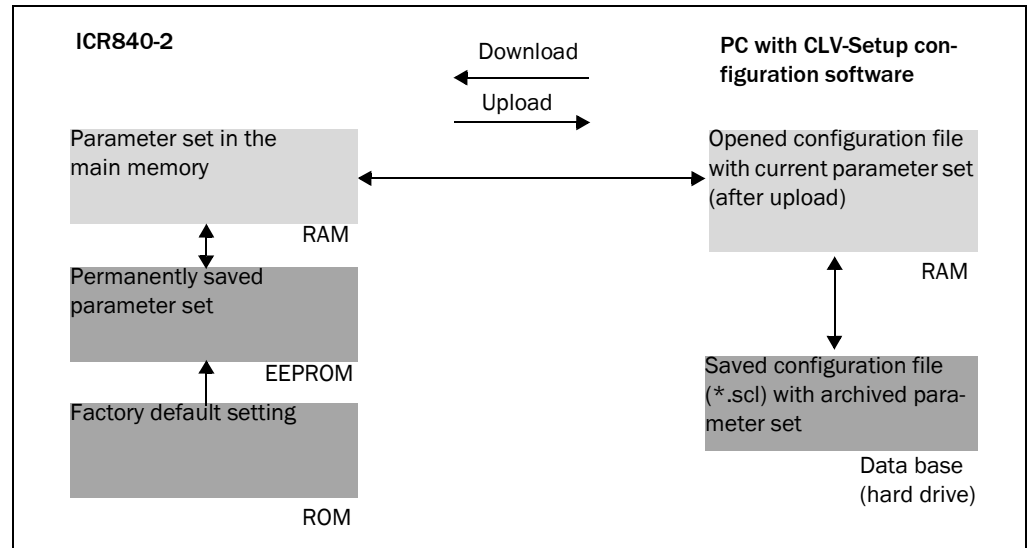


Fig. 6-17: Configuration with CLV-Setup and storage of the parameter set

External CMC600 parameter memory module

If the ICR840-2 is connected to a connection module CDB620/CDM420 with parameter memory module CMC600, the parameter set is saved to the permanent parameter memory of the ICR840-2 (download) and automatically also to the permanent parameter memory of the CMC600 (prerequisite for the CMC600: WR-protection switch in position OFF (WR-protection disabled)).


After the connection module is restarted (switching on the power supply), the ICR840-2 automatically copies the parameter set from the CMC600 into its permanent parameter memory. Then the ICR840-2 copies the parameter set back to the CMC600 when the write protection is disabled. Thereby the ICR840-2 can be replaced in an application without losing the configuration data.

6.6.1 Overview of the startup procedure

1. Connect data interfaces of the PC and the ICR840-2.
2. Start CLV-Setup configuration software.
3. Establish communication with the ICR840-2 and upload the current parameter set from the ICR840-2 to the PC for displaying in the tab.
4. Configure the ICR840-2 for the application.
5. Start the ImageFTP program to check the image content and configure the image acquisition/transfer in the ICR840-2 and in ImageFTP.
6. Download the optimised configuration (parameter set) permanently to the ICR840-2.
7. Save the configuration file with the current parameter set of the ICR840-2 on the PC.

6.7 Establish communication with the ICR840-2 manually

6.7.1 Configuring connection of the auxiliary interface (RS 232)

1. In CLV-Setup, click on  in the toolbar (AutoBaud-Detect) or select AUTO BAUD-DETECT under OPTIONS in the menu bar.
CLV-Setup scans the serial interface by varying the communication parameters and sends a telegram to the ICR840-2 repeatedly. As soon as a reply from the ICR840-2 is detected, CLV-Setup conveys the values found for the communication parameters. CLV-Setup displays "Connected" in the status bar on the bottom, right-hand side.
2. Confirm the AUTO DETECT dialog box with "OK".
CLV-Setup displays the detected ICR840-2 type in a separate dialog box and asks you whether you want to upload the current parameter set from the ICR840-2.
3. Confirm the dialog box with "Yes".
CLV-Setup then copies the current parameter set from the RAM of the ICR840-2 to its database and displays the values on the tabs.

6.7.2 Configuring connection of the Ethernet interface (static address)

TIP For rapid and easy establishing communication via Ethernet (with adaption of the ICR840-2's IP address to the customer-specific conditions) CLV-Setup provides the CLV-Assistant via the TOOLS menu. See also [Chapter 6.3.3 Configuring and starting the Ethernet communication with the Assistant, Page 50](#). The ICR840-2 has to connect using a Ethernet cable. The ICR840-2 operates exclusively with a static IP address.

When using static IP addresses, the IP addresses of the ICR840-2 and the PC must be in the same set of numbers. We recommend (starting with the default setting on the first startup) to adapt the IP address of the ICR840-2 to the address of the PC.

1. Connect the ICR840-2 to the PC via the serial auxiliary interface (RS 232) and establish communication (see above).
2. Double-click on ETHERNET in the device tree of the ICR840-2, left-hand side.
The ETHERNET tab is then displayed.
3. In der TCP/IP section, enter the required data (IP address of the ICR840-2 and subnet mask of the network) in accordance with the customer-specific conditions.
4. Copy the modified parameter values to the ICR840-2.
To do so, press the [F4] key (download) and select the "permanent" storage option.
5. Restart the ICR840-2.
To do so, switch off and switch on again the supply voltage.
6. The ICR840-2 starts with the modified communication parameters for its Ethernet interface.
7. Remove the RS 232 data cable from the ICR840-2 (connection module).
8. Connect the ICR840-2 directly to the PC using a crossover cable or connect the ICR840-2 to the Ethernet network using a patch cable.
9. Select INTERFACE under OPTIONS in the menu bar.
10. Activate the TCP/IP protocol of the ICR840-2 in the INTERFACE OPTIONS dialog box.
In the IP ADDRESS section enter the same IP address as choosen on the ETHERNET tab.
Confirm the dialog box with "OK".
CLV-Setup attempts to establish communication with the ICR840-2. If the attempt has been successful, CLV-Setup loads the current parameter values of the ICR840-2 for displaying in the tabs.

6.8 Configuring the ICR840-2

Start of point for configuring the ICR840-2 is either the factory default setting (at first start-up) or an already created application-specific parameter set.

All configurable parameters of the ICR840-2 are grouped in a device description in the CLV-Setup configuration software. The device description's tree in the user interface acts as a guideline for the configuration of the ICR840-2. See also [Chapter 6.13 Configuration guide, Page 94](#) for furthermore support.

Important The CLV-Assistant offers a guided configuration routine. The Assistant helps to establish the communication with ICR840-2 via Ethernet interface or via serial data interface (RS-232) in an easy manner. See [Chapter 6.3 Establish communication with the ICR840-2, Page 48](#).

The CLV-Setup configuration software has just one user level. No password is used or required. The configuration can not be protected with a password.

The meaning of a parameter's function and the valid values range are described in a context-sensitive manner in an online help (F1 key). For some parameters CLV-Setup displays automatically information in a light-yellow highlighted "Tooltip" when the mouse pointer is positioned more than 2 seconds on the parameter. The content of the Tooltip can also be displayed by opening the context menu with the right mouse button and selecting QUICKINFO (when the mouse pointer is positioned on the parameter). You can also use the context menu of the right mouse button to reset the selected parameter to the default setting. For an overview of the factory default setting see [Chapter 6.11 Default settings, Page 91](#).

All parameters on a tab which have been modified using the mouse pointer/the cursor will be marked blue to give better orientation when doing further operations with the context menu of the right mouse button.

Recommendation ➤ To enhance the reading reliability with fast applications, only activate those code types and code lengths that are actually relevant.

Important Instead of the CLV-Setup configuration software you can alternatively use simple commands via one of the data interfaces to configure the ICR840-2. See also [Chapter 10.5 Configuring the ICR840-2 with command strings, Page 148](#).

6.8.1 Download changed parameter set to the ICR840-2

When the ICR840-2 is being configured, CLV-Setup runs in the **offline mode**. This means that modifications of parameter values are first only done in the user interface of the CLV-Setup configuration software although CLV-Setup is connected with the ICR840-2. This allows to define parameter sets and save them as configuration files on the PC without effect to the ICR840-2. Later on you can download the configuration to the ICR840-2.

If you use the download options displayed with the right mouse button, all parameter values copied to the ICR840-2 will be first transferred temporarily to the non-volatile parameter memory (RAM). The procedure for transferring and saving the parameter values in the ICR840-2 is referred as a **download**.

- If you use "DOWNLOAD TO DEVICE" in the ICR840-2 menu or the [F4] key, CLV-Setup always send a copy of the complete parameter set to the ICR840-2, i.e. all of the existing parameter values in the ICR840-2 are overwritten.

Saving options:

- **Temporary:** CLV-Setup copies the parameter set to the RAM only. The changes are lost when the ICR840-2 power supply is switched off.

- **Permanent:** CLV-Setup copies the parameter set to the RAM and to the non-volatile parameter memory (EEPROM) of the ICR840-2.
- With the help of the context menu (right mouse button), only the parameter just edited ("Download parameter") or from version 3.6 all parameters of one tab or one dialog box ("Download parameters of this view") will be temporarily loaded into the ICR840-2's RAM .
- To finish the configuration done by this way the complete parameter set must be downloaded again to the ICR840-2 with the "**permanent**" option.

6.8.2 Uploading the parameter set from the ICR840-2

If the ICR840-2 is selected in the listing field of the CLV-Setup configuration software without being connected to the PC, CLV-Setup loads the default setting of the ICR840-2 from its internal data base and displays the parameter values in the tabs. Also an existing configuration file of the ICR840-2 can be opened.

To achieve synchronisation between the parameter values displayed in CLV-Setup and the saved current parameter values in the connected ICR840-2, the parameter set has to be copied from the ICR840-2 to CLV-Setup. This procedure is referred as an **upload**. CLV-Setup supports the user in certain activities with an automatic prompt for an upload.

- If you use "DOWNLOAD FROM DEVICE" in the ICR840-2 menu or the [F3] key, CLV-Setup always loads a complete copy of the current ICR840-2 parameter set. This parameter set remains unchanged in the ICR840-2 until it is overwritten by CLV-Setup.
- With the help of the context menu (right mouse button), only the parameter just selected can be loaded ("Upload parameter") or from version 3.6 all parameters of one tab or one dialog box ("Upload parameters of this view") from the ICR840-2's memory (RAM).
- If CLV-Setup does not recognize the parameters transferred during the upload, it outputs a warning. Unknown parameters can be edited on the Extras tab by following the conventions for command strings. When the parameter set is saved, these parameters are also taken into account.


6.8.3 Save, print or export the current parameter set

We recommended to print out the configuration file in order to archive a parameter set. The parameter set can also be exported into a RTF file for using in other text processing programs/ text editors.

Saving the parameter set:

1. In order to save the current parameter set, select SAVE AS in the FILE menu.
2. Enter a file name in the dialog box (file extension "*.scl") and confirm with SAVE. CLV-Setup saves the current settings in a configuration file on the PC.

Printing the parameter set:

3. In order to print out the current parameter set, click  in the symbol bar. The PRINT FILE dialog box is then displayed.
4. If desired, a comment can be entered in the input field for the header of the printout. Confirm the dialog box with "OK". The PRINT dialog box for configuring the printer is then displayed.
5. Edit the dialog box accordingly and confirm. CLV Setup prints out the complete default setting in the form of a table. The header contains the company and user names that were entered during the CLV-Setup installation routine.

ICR840-2

Export the parameter set:

6. In order to export the current parameter set into a RTF file, select EXPORT in the FILE menu.
7. Enter a file name in the dialog box (file extension "*.rtf") and confirm with SAVE.

6.9 Operating modes and outputting the reading result

The following ICR840-2 operating modes/functions can be selected in CLV-Setup:

Standard operating mode

- Reading mode

For startup

- Percentage Evaluation

For adapting device to application

- Configuration (parameterizing)
(see [Chapter 6.8 Configuring the ICR840-2, Page 71](#))
- Teach-in match code 1/activating match code comparison with "Sensor 2" switching input (see [Chapter 10.7.1 Triggering the Teach-in match code 1 and activating the code comparison via the "Sensor 2" switching input, Page 151](#))

For monitoring purposes/correcting faults

- Image acquisition (Ethernet interface)
- Reading diagnosis
- Monitor host interface
- Displaying and editing operating data
- Auxiliary input
- Code statistics for RDT400
- Self-test
- Monitor (communication between CLV-Setup and ICR840-2)

6.9.1 Reading mode (standard operating mode)

The ICR840-2 performs a self-test after it has been switched on. The start of Reading mode is confirmed with two consecutive tones from the beeper.

Default setting In the default setting, the "Sensor 1" switching input is the (external) trigger source of the reading pulse. The ICR840-2 only reads 2D codes. The ICR840-2 outputs the reading result at the end of the reading pulse, in the default setting, via the host and auxiliary interfaces. After a Good Read the "Result" LED lights up for a duration of 100 ms.

Depending of the configuration, the "Result 1" and "Result 2" switching outputs become live for the predefined pulse length when defined events occur during the reading process (e. g. Good Read).

Reading result of the auxiliary interface

The reading result of the **auxiliary interface** can be displayed in the CLV-Setup Terminal Emulator. For this, the auxiliary interface of the ICR840-2 must be in "Reading Diagnosis" mode. This mode is selected for the default setting. The reading result of the auxiliary interface has a fixed, invariable format.

The data communication of the **auxiliary interface** can also be routed via the Ethernet interface. The physical auxiliary interface (RS 232) will then become disabled. See [Chapter 5.5.5 Connecting the Ethernet interface, Page 40](#).

Important For **1D code (bar code)** reading, the corresponding bar code type must be activated for evaluation beforehand (all bar code types are deactivated in the default setting). The length of the readable code is reduced with respect to the decodable length as a result


of the distance-dependent dimensions of the field of view (see samples in [Table 9-2, Page 122](#)).

The Reading mode can be called up by choosing VIEW in the menu bar or via the Terminal Emulator.



Displaying the reading result in the Terminal Emulator

Reading 2D Codes (Data Matrix ECC200):

- Click on  in the toolbar.
The Terminal Emulator dialog box is then displayed.
- Click READING MODE under DEVICE MODE.
- Start the reading pulse.
The red illumination field (pulsed) appears.
- Represent the 2D code sample from [Fig. 6-18](#) in the field of view (no conveyor movement during reading!).
Required reading distance from reading window / resulting field of view:

ICR840-2A (High Density):	50 mm / 23.75 mm x 19 mm (1.97 in / 0.94 in x 0.75 in)
ICR840-2B (Standard Range):	80 mm / 40 mm x 32 mm (3.15 in / 1.58 in x 1.26 in)
ICR840-2C (Mid Range):	115 mm / 58.5 mm x 46.5 mm (4.53 in / 2.30 in x 1.83 in)
ICR840-2D (Long Range):	145 mm / 72.5 mm x 58 mm (5.71 in / 2.86 in x 2.29 in)
- End the reading pulse.
The ICR840-2 switches off the red illumination field.
The ICR840-2 outputs a tone via the beeper and the reading result is displayed in the window of the Terminal Emulator.



Fig. 6-18: 2D code sample: Data Matrix ECC200; cell size 0.3 mm (11.8 mil)

Reading 1D codes (bar codes):


- Select the CODE CONFIGURATION tab.
- Click the desired code type in the 1D SYMBOLOGIES group (in this case: CODE 39).
- Perform a download to the ICR840-2.
To do so, click the desired code type again with the right mouse button and choose DOWNLOAD PARAMETER in the context menu.
CLV-Setup copies the parameter to the ICR840-2 temporarily.
The selected bar code type is activated for reading until the ICR840-2 is switched off.
- Click on  in the toolbar.
The Terminal Emulator dialog box is then displayed.
- Click READING MODE under DEVICE MODE.
- Start the reading pulse.
The red illumination field (pulsed) appears.
- Represent the bar code sample from [Fig. 6-19](#) in the field of view (no conveyor movement during reading!). For the required reading distance / resulting field of view see above.



Fig. 6-19: Bar code sample (code 39; module width 0.35 mm (13.8 mil); print ratio 2:1)

8. End the reading pulse.

The ICR840-2 switches off the red illumination field. The ICR840-2 outputs a tone via the beeper and the reading result is displayed in the window of the Terminal Emulator.

[Fig. 6-20](#) shows an example of the "Good Read" reading result output for 2D codes and [Fig. 6-22, Page 78](#) shows an example of the "Good Read" reading result output for 1D codes. The structure of the "No Read" reading result is identical for 2D codes and bar codes, and is displayed in [Fig. 6-22, Page 78](#).

The reading result is composed of the data contents of the code(s) and the reading diagnosis data.

Reading result of the host interface

The ICR840-2 only outputs several codes in the reading result via the **host interface** if the configured "minimum and maximum number of codes" is > 1, and several codes have been presented. The number of codes to be read/output per reading interval can be selected on the CODE CONFIGURATION tab in the NUMBER OF CODES section.

The reading result of the **host interface** can also be displayed in the Terminal Emulator.

[Chapter 6.9.5 Monitor Host Interface, Page 84](#) describes the procedure and the structure of the read result in the default setting.

1. Output of reading result on the auxiliary interface: 2D code (Data Matrix ECC200)

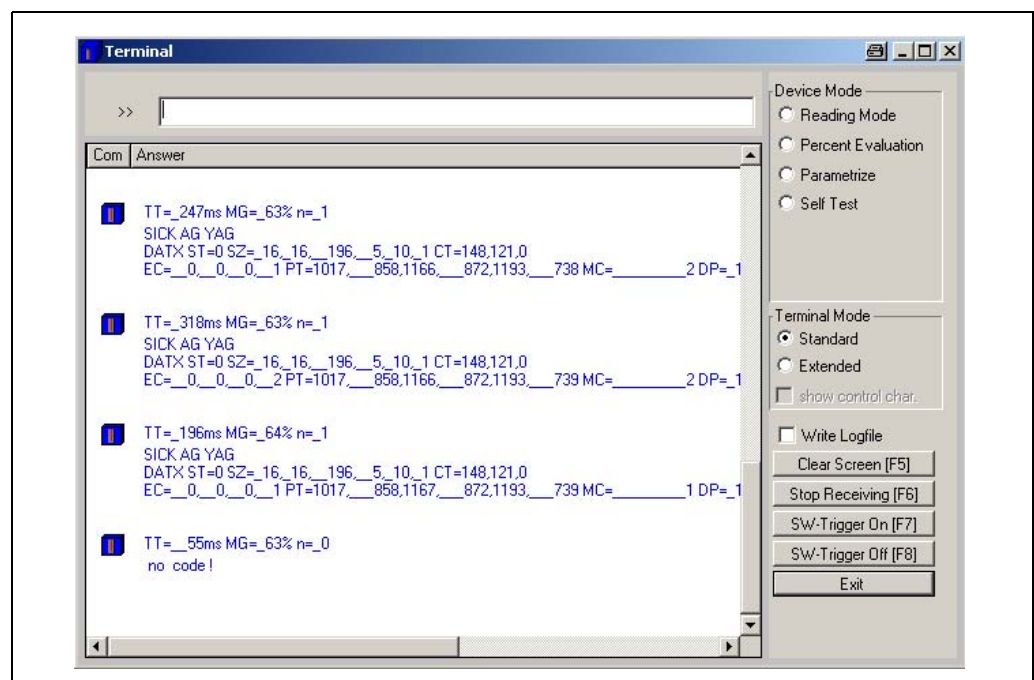


Fig. 6-20: CLV-Setup: Output of the reading result for 2D codes on the auxiliary interface, displayed in the Terminal Emulator

Structure of the reading result for Good Read (successful reading)

TT=_274 ms MG=_63 % n=_1

SICK AG YAG

DATX ST= 0 SZ=_16,_16,_196,_5,_10,_1 CT=148,121,0

EC= _0,_0,_0,_1 PT=1017,_858,1166,_872,1193,_738 MC=_____2 DP= 1

with:

- 1st line: **TT** = Reading interval time
MG = Long-term mean value of identification quality
n = Number of recognized codes
- 2nd line: **SICK AG YAG** = data content of the 2D codes
- 3rd line: **DATX** = ID: Data Matrix ECC200
ST = Read status (ST = 0: Good Read)
SZ = Symbol size (format: aaa, bbb, ccccc, ddd, eee, ff)
aaa = Number of lines in bits
bbb = Number of columns in bits
ccccc = Number of data bits in the code for simple data field
ddd = Average size of a cell in the movement direction (scans)
eee = Average size of a cell in the line direction (pixels)
ff = Number of data fields for a DataMatrix
CT = Contrast (format: aaa, bbb, c)
aaa = Min./max. contrast in the code (8-bit greyscale value)
bbb = Set contrast in the code for bit scanning (8-bit greyscale value)
c = Code inverted (0: no, 1: yes)
1 = white code on black background
- 4th line: **EC** = Error Correction (Format: aaa, bbb, ccc, ddd)
aaa = Number of error-correction code words used (persuant to Reed Solomon)
bbb = Percent ratio of the number of error-correction words used to the total number of available error-correction code words in the code (persuant to Reed Solomon)
ccc = Number of weak bits for error correction (bits)
ddd = Total number of weak bits in the symbol in image memory
- PT** = Position of the symbol in the image field of the image memory, measured in pixels (Format: aaaa, bbbbbb, cccc, dddddd, eeee, fffff)
aaaa = x position P 1
bbbbbb = y position P 1
cccc = x position P 2
ddddd = y position P 2
eeee = x position P 3
ffffff = y position P 3
- MC** = Multi Count (number of multiple readings), 8-digit
MC = 1: the ICR840-2 has read the code one time in the image (e.g. on output mode "immediate")
- DP** = The ICR840-2 has successfully read the code in the last recorded image with the Dynamic Parameter Switching no. 1

Fig. 6-21, Page 78 shows the definition of the position of the symbol in the image field.

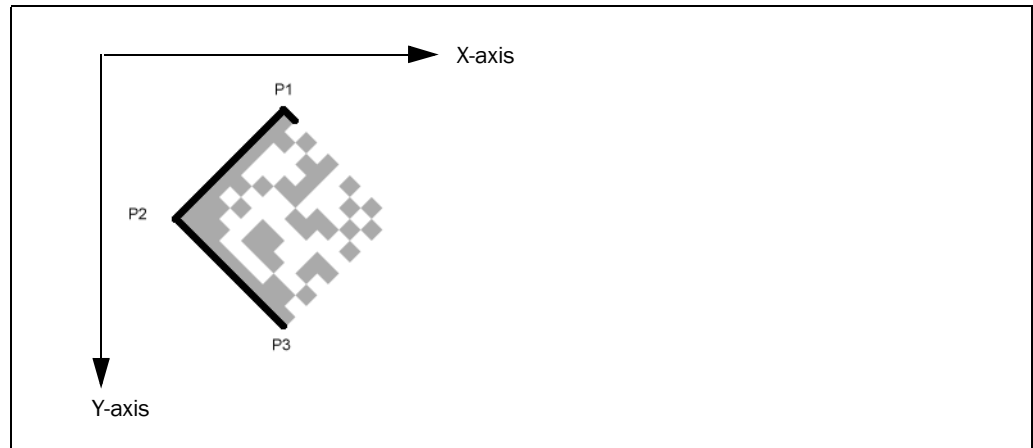


Fig. 6-21: Position of the symbol in the image field of the image memory

2. Output of reading result on the auxiliary interface: Bar code

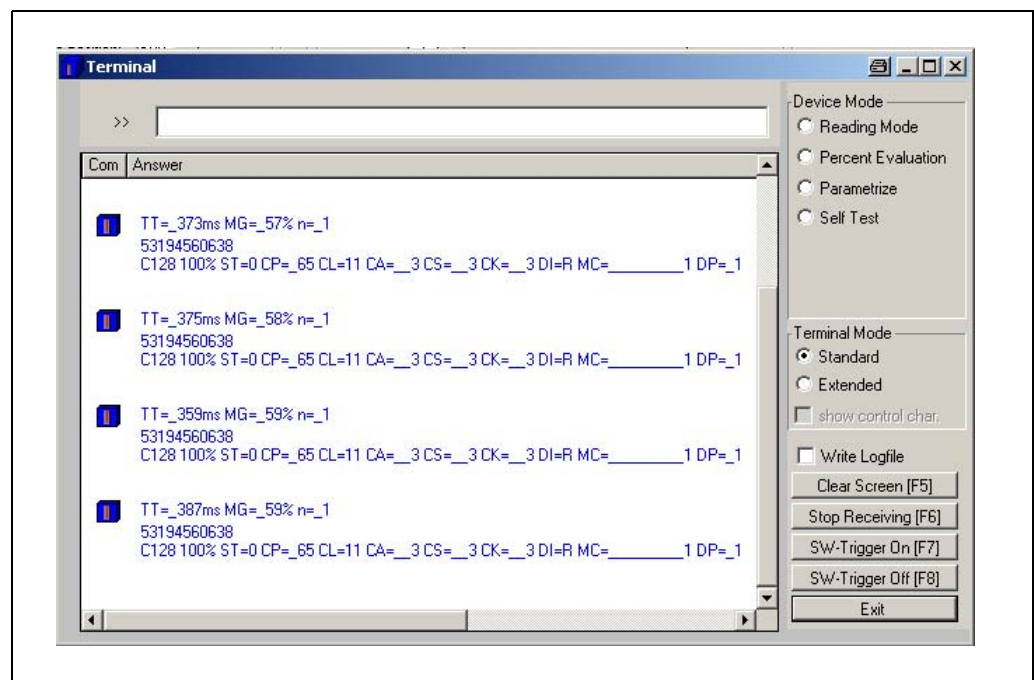


Fig. 6-22: CLV-Setup: Output of the reading result for bar codes on the auxiliary interface, displayed in the Terminal Emulator

Structure of the reading result for Good Read (successful reading)

TT=__373 ms MG=_57 % n=_1

53194560638

C128 100% ST=0 CP=_65 CL=11 CA=_3 CS=_3 CK=_3 DI=R MC = __1 DP = 1

with:

1st line: **TT** = Reading interval time

MG = Long-term mean value of identification quality

n = Number of recognized codes

2nd line: **53194560638** = Data content of the bar code

3rd line: **C128** = ID: Code type Code 128

100 %	=	Identification quality
ST	=	Read status (ST = 0: Good Read)
CP	=	Code position
CL	=	Code length (character count)
CA	=	Scanning expenditure
CS	=	Code security
CK	=	Code continuity
DI	=	Decoding direction, F = in counting direction of the CP, R = against counting direction of the CP
MC	=	Multi Count (number of multiple readings), 8-digit MC = 1: the ICR840-2 has read the code one time in the image (e.g. on output mode "immediate")
DP	=	The ICR840-2 has successfully read the code in the last recorded image with the Dynamic Parameter Switching no. 1

3. Output of reading result: No Read

The structure of the reading result for No Read is identical for 2D codes and bar codes.

TT=_55 ms MG=_63 % n=_0

no code!


with:

1st line:	TT	=	Reading interval time
	MG	=	Long-term mean value of identification quality
	n	=	Number of recognized codes
2nd line:	no code	=	No code found!

Triggering the reading pulse via the Terminal Emulator



In the default setting, the "Sensor 1" switching input is the trigger source of the reading pulse. The reading pulse can also be triggered directly via the terminal emulator of CLV-Setup for test purposes. To do so, a different trigger source must be selected temporarily in the ICR840-2.

1. Choose the **DEVICE CONFIGURATION** tab.
2. Click the **READING TRIGGER PARAMETERS** button.
The **READING TRIGGER PARAMETERS** dialog box is then displayed.
3. Click the **SERIAL INTERFACE** radio button in the **START OF READING INTERVAL** section.
4. Perform a download to the ICR840-2.
To do so, click the **SERIAL INTERFACE** option again with the right mouse button and choose **DOWNLOAD PARAMETER** in the context menu.
CLV-Setup copies the parameter temporary to the ICR840-2.
The serial interface has been activated as the trigger source of the reading pulse and is ready to receive appropriate commands (until the ICR840-2 is switched off).
5. Click on  in the toolbar.
The **Terminal Emulator** dialog box is then displayed.
6. Click **READING MODE** under **DEVICE MODE**.

7. Click the SW-TRIGGER ON button or press the [F7] key.
CLV-Setup sends a start command to the ICR840-2.
The red illumination field (pulsed) appears
8. Represent a 2D code sample (e.g. from [Fig. 6-18, Page 75](#)) in the field of view (no conveyor movement during reading!).

Required reading distance from reading window / resulting field of view:

ICR840-2A (High Density):	50 mm / 23.75 mm x 19 mm (1.97 in / 0.94 in x 0.75 in)
ICR840-2B (Standard Range):	80 mm / 40 mm x 32 mm (3.15 in / 1.58 in x 1.26 in)
ICR840-2C (Mid Range):	115 mm / 58.5 mm x 46.5 mm (4.53 in / 2.30 in x 1.83 in)
ICR840-2D (Long Range):	145 mm / 72.5 mm x 58 mm (5.71 in / 2.86 in x 2.29 in)

Important To read a bar code, proceed as described in [“Displaying the reading result in the Terminal Emulator“, Page 75](#).

9. Click the SW-TRIGGER OFF button or press the [F8] key.
CLV-Setup sends a stop command to the ICR840-2.
The ICR840-2 switches off the red illumination field.
The ICR840-2 outputs a tone via the beeper and the reading result is displayed in the window of the Terminal Emulator.

6.9.2 Percentage Evaluation

In Percentage Evaluation mode, the quality of the reading of codes which are brought statically into the field of view of the ICR840-2 is assessed (no conveyor movement).


The ICR840-2 records repeatedly sets of images (each with 10 images) in the Free running mode and evaluates the repeated recognising of the same code in sequential images. It outputs the reading result continuously via the **auxiliary interface**. The reading results can be displayed in the Terminal Emulator of CLV-Setup. The "Result 1" and "Result 2" switching outputs do not become live in the Percentage evaluation mode.

Important The data communication of the **auxiliary interface** can also be routed via the Ethernet interface. The serial auxiliary interface (RS 232) will then become disabled. See [Chapter 5.5.5 Connecting the Ethernet interface, Page 40](#).

Calling Percentage Evaluation for 2D codes:

The Percentage Evaluation mode can be called up by choosing VIEW in the menu bar or via the Terminal Emulator.



1. Click on  in the toolbar.
The Terminal Emulator window is then displayed.
2. Click PERCENT EVALUATION under DEVICE MODE.
The red illumination field (pulsed) appears repeatedly all 2 s.
The ICR840-2 initiates the percentage evaluation and outputs the reading results continuously.
3. Represent a 2D code sample (e.g. from [Fig. 6-18, Page 75](#)) in the field of view (no conveyor movement during reading!)
Required reading distance from reading window / resulting field of view:

ICR840-2A (High Density):	50 mm / 23.75 mm x 19 mm (1.97 in / 0.94 in x 0.75 in)
ICR840-2B (Standard Range):	80 mm / 40 mm x 32 mm (3.15 in / 1.58 in x 1.26 in)
ICR840-2C (Mid Range):	115 mm / 58.5 mm x 46.5 mm (4.53 in / 2.30 in x 1.83 in)
ICR840-2D (Long Range):	145 mm / 72.5 mm x 58 mm (5.71 in / 2.86 in x 2.29 in)
4. Monitor the reading results in the window of the Terminal Emulator.
An example is shown in [Fig. 6-23, Page 82](#)

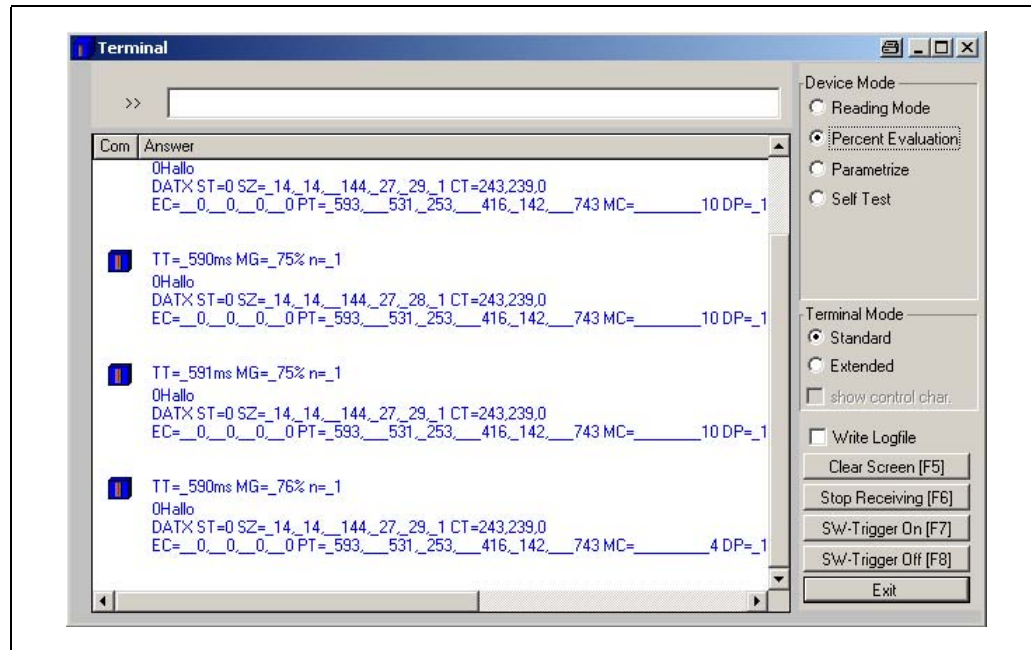


Fig. 6-23: CLV-Setup: Display of the percentage evaluation for 2D codes on the auxiliary interface, displayed in the Terminal Emulator

The output format of the reading result is the same as that of the Reading mode. [Fig. 6-20, Page 76](#) explains the structure and function of the reading diagnosis data

MC = 10: the ICR840-2 has read each the same code in all 10 images
(reading rate = 100 %)

Important The match code cannot be teach-in in the Percentage Evaluation mode. The code is entered on the DEVICE CONFIGURATION tab. The match code 1 can also be taught-in using the teach-in method.

Additional quality check of 2D code reading

In ImageFTP, the quality of 2D code reading can be checked with the reading diagnosis data (text) in the transferred image.

The quality of 2D code reading can additionally be checked with the four data fields of the "EC" reading diagnosis data. See also [“1. Output of reading result on the auxiliary interface: 2D code \(Data Matrix ECC200\)”, Page 76](#).

The smaller the number of error-correction code words and weak bits which use the ICR840-2 for decoding support, the greater the code quality.

When the code quality is high enough, the evaluation time of the ICR840-2 can be optimized by selecting the corresponding parameter values in order to increase reading performance. See [Chapter 10.2.2 Optimizing reading characteristics, Page 131](#).

ICR840-2



6.9.3 Displaying and editing operating data

This function enables statistical operating data, which the ICR840-2 maintains in the form of counters during the reading procedure, to be displayed and reset.

The ICR840-2 does not output a reading result in this mode


1. Click on  in the toolbar.
The ICR840-2 cancels Reading mode.
The OPERATING DATA dialog box appears (Fig. 6-24).
2. After checking/resetting the desired counters, click "OK" to confirm any changes made.
The ICR840-2 returns to Reading mode.

Fig. 6-24: CLV-Setup: "Operating Data" dialog box

6.9.4 Reading diagnosis

Function of the **auxiliary interface**. In this mode, the ICR840-2 outputs the data contents of all read codes with the accompanying reading diagnosis data via the auxiliary interface. Codes which are considered incomplete according to the evaluation criteria, and which are therefore incorrect, are output as well. The number of codes output can, therefore, be higher than the number of those that were sent via the host interface in the reading result. In the default setting, this mode is selected for the auxiliary interface.


[Fig. 6-20, Page 76](#) and [Fig. 6-22, Page 78](#) shows the relevant output format of the auxiliary interface for 2D codes and bar codes.

Important The data communication of the **auxiliary interface** can also be routed via the Ethernet interface. The serial auxiliary interface (RS 232) will then become disabled. See [Chapter 5.5.5 Connecting the Ethernet interface, Page 40](#).

In the default setting, the ICR840-2 does not output any reading diagnosis data via the host interface.

If the reading diagnosis is to remain inactive, this can be set via the AUXILIARY INTERFACE tab.



1. In the AUXILIARY INTERFACE drop-down list, select READING DIAGNOSIS.
2. Perform a download to the ICR840-2. This is done by clicking  in the toolbar. The DOWNLOAD PARAMETER dialog box is displayed.
3. Confirm the dialog box by selecting the PERMANENT save option. The auxiliary interface is now set to the "Reading Diagnosis" mode.

6.9.5 Monitor Host Interface

Function of the **auxiliary interface**. In this mode, the ICR840-2 outputs the data traffic of its host interface via the auxiliary interface. Protocol driver handshakes and protocol-specific data, such as start and stop characters, are suppressed here ([Table 6-9](#)). Each data string is displayed on a separate line on the screen.

Direction of data	Output format	Representation on screen
ICR840-2 receives from host	<STX> I data <CR> <LF> <ETX>	I data
ICR840-2 sends to host	<STX> O data <CR> <LF> <ETX>	O data

Tab. 6-9: "Monitor Host Interface" function

Important The data communication of the **auxiliary interface** can also be routed via the Ethernet interface. The serial auxiliary interface (RS 232) will then become disabled. See [Chapter 5.5.5 Connecting the Ethernet interface, Page 40](#).



"Monitor Host Interface" is activated via the AUXILIARY INTERFACE tab.


1. In the AUXILIARY INTERFACE drop-down list, choose MONITOR HOST INTERFACE.
2. Perform a download to the ICR840-2.
To do so, click the MONITOR HOST INTERFACE option again in the list with the right mouse button and choose DOWNLOAD PARAMETER in the context menu.
CLV-Setup copies the parameter temporary to the ICR840-2.
The auxiliary interface then operates in "Monitor Host Interface" mode until the ICR840-2 is switched off again.

Important On Good Read, the ICR840-2 only outputs the number of read bar codes being defined for maximum on the CODE CONFIGURATION tab, in the NUMBER OF CODES section.



Displaying the data traffic of the host interface in the Terminal Emulator

The data traffic of the host interface can be displayed in the Terminal Emulator of CLV-Setup. [Fig. 6-25](#) shows an example of how the reading result can be output.

1. Choose the serial interface as the external trigger source for the reading pulse.
See ["Triggering the reading pulse via the Terminal Emulator", Seite 79](#).
2. Click on  in the toolbar.
The Terminal Emulator window is then displayed.
3. Click READING MODE under DEVICE MODE.
4. Click the SW-TRIGGER ON button or press the [F7] key.
The red illumination field (pulsed) of the ICR840-2 appears
5. Represent a 2D code sample (e.g. from [Fig. 6-18, Page 75](#)) in the field of view (no conveyor movement during reading!)

Required reading distance from reading window / resulting field of view:

ICR840-2A (High Density):	50 mm / 23.75 mm x 19 mm (1.97 in / 0.94 in x 0.75 in)
ICR840-2B (Standard Range):	80 mm / 40 mm x 32 mm (3.15 in / 1.58 in x 1.26 in)

ICR840-2

ICR840-2C (Mid Range):	115 mm / 58.5 mm x 46.5 mm (4.53 in / 2.30 in x 1.83 in)
ICR840-2D (Long Range):	145 mm / 72.5 mm x 58 mm (5.71 in / 2.86 in x 2.29 in)

- Click the SW-TRIGGER OFF button or press the [F8] key.
The ICR840-2 switches off the red illumination field.
CLV-Setup outputs the reading result in the Terminal Emulator.
Example: "SICK AG Auto Ident ICR 840".

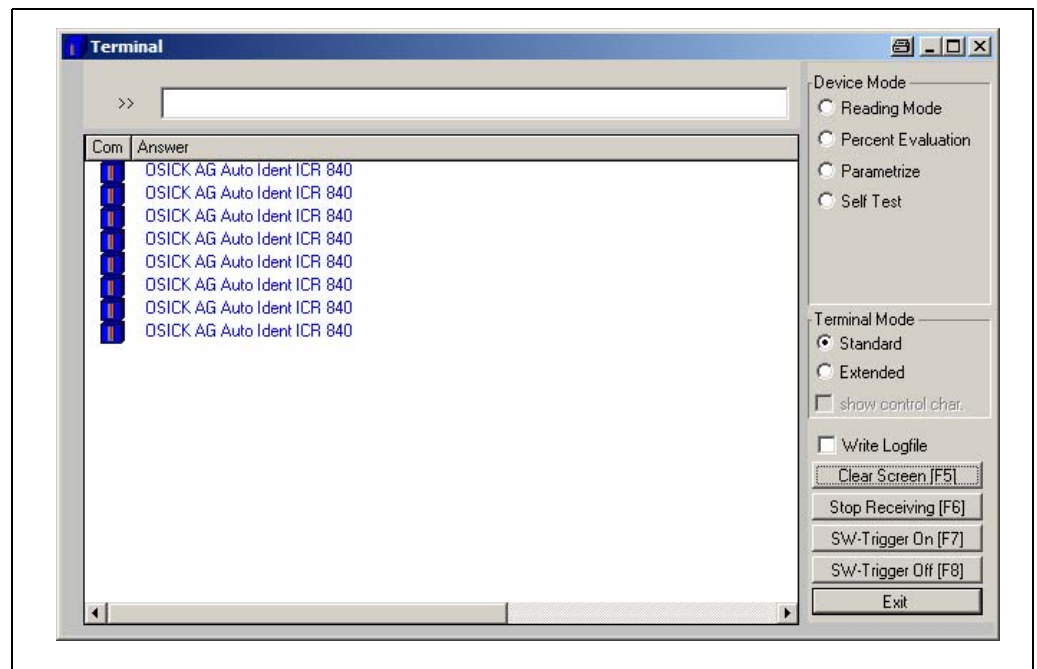


Fig. 6-25: CLV-Setup: Output of the reading result of the host interface on the auxiliary interface, displayed in the Terminal Emulator (in this case: O = Output)

To perform reading of a bar code see [“Displaying the reading result in the Terminal Emulator”, Page 75](#).

Important Large amounts of data received at high speeds via the host interface and high data transfer rates may cause the flow of host interface traffic to no longer be completely displayed on the auxiliary interface (display " ... ").

This is caused by the slower data transfer speed of the auxiliary interface (9,600 bd).

In the default setting, the ICR840-2 sends the following in the data output string of the host interface:

- Good Read: data contents of the code
- No Read: NOREAD string

The "Header" and "Terminator" blocks are empty, the code contents are not separated by reading diagnosis data and/or constants.




Tip

The structure of the data output string of the host interface can be configured via the DATA STRINGS tab:

Up to 10 elements, consisting of constants (letters, digits, control characters) and/or reading diagnosis data, can be entered in the "Header", "Reading data" and "Terminator" blocks.

- Choose the DATA STRINGS tab.
- Click the HEADER field.

The dialog window EDIT PARAMETER: TFH is displayed.

3. Click the desired constants or placeholders for the reading diagnosis data.
The selected elements appear in the input field at the top the dialog box in the order in which they were selected.
4. Confirm the dialog box with "OK".
The selected elements are displayed in the HEADER field.
5. Proceed in a similar manner for the terminator.
6. The constants or placeholders for reading diagnosis data can be placed freely before or after the code contents in the READING DATA field. The selected arrangement is the same for all output code contents.
7. Perform a download to the ICR840-2. This is done by clicking  in the toolbar.
The DOWNLOAD PARAMETER dialog box is displayed.
8. Confirm the dialog box by selecting the PERMANENT save option.
The ICR840-2 outputs the selected elements in the data output string of the host interface with the next reading result.

6.9.6 Auxiliary input


Function of the **auxiliary interface**. In this mode, the ICR840-2 accepts a code input to the auxiliary interface (via keyboard or hand scanner with decoder). It sends the code to the host in a separate data string via its host interface. No Reads can, therefore, be corrected by transmitting missing codes subsequently.

[Chapter 10.7.5 Auxiliary input via the auxiliary interface, Page 162](#) describes this function and the associated procedure in greater detail.

6.9.7 Self-test

After the ICR840-2 has been switched on, it performs a self-test before it is initialized with the parameter set. The test can be called up explicitly at any time via CLV-Setup. During the self-test, the ICR840-2 checks that its hardware components are functioning correctly. A final message via the auxiliary interface provides information on the test result. The ICR840-2 does not output a reading result during the test routine.



1. Click on  in the toolbar.
The Terminal Emulator window is then displayed.
The ICR840-2 is in Reading mode.
2. Click SELF TEST under DEVICE MODE.
The ICR840-2 cancels the Reading mode and starts the test routine.
After a few seconds, the ICR840-2 outputs the encoded test result in the form of a code number ([Fig. 6-26](#)).

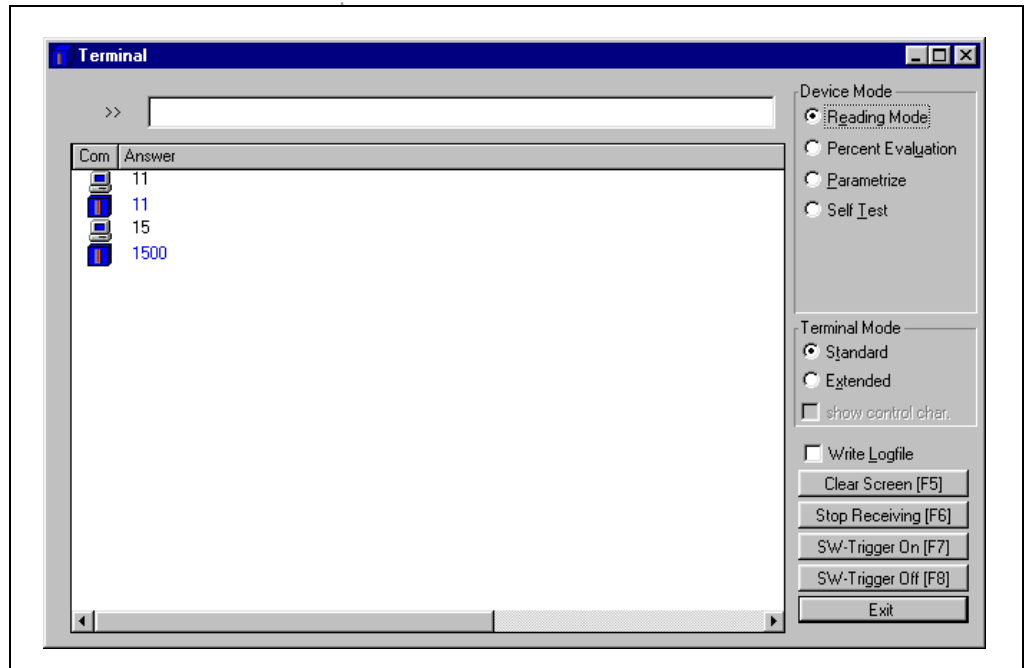


Fig. 6-26: CLV-Setup: Displaying the self-test result in the Terminal Emulator

- To return to Reading mode, click the READING MODE radio button or close the Terminal Emulator.

The ICR840-2 returns to Reading mode.

The code number "1500" means that the self-test was completed successfully and that no faults were diagnosed.

[Chapter 8.3 Error messages, Page 106](#) lists the error key together with the associated corrective measures.

6.9.8 Code statistics for RDT400

Function of the **auxiliary interface**. In this mode, the ICR840-2 outputs a data string with statistic information on the reading situation.



For detailed description of the functions and applications of the Remote Diagnostic Tool RDT400 see the *RDT400 Operating Instructions* (no. 8009385, English).



"Code statistics for RDT400" is activated via the AUXILIARY INTERFACE tab.

- Select the CODE STATISTICS FOR RDT400 option on the AUXILIARY INTERFACE tab.
- Perform a download to the ICR840-2.

To do so, click the listing field again with the right mouse button and choose DOWNLOAD PARAMETER in the context menu.

CLV-Setup copies the parameter temporary to the ICR840-2.

The auxiliary interface then operates in "Code statistics for RDT400" mode until the ICR840-2 is switched off again.

6.9.9 Performing device functions of ICR840-2 in the dialog box



CLV-Setup enables a number of ICR840-2 functions to be executed interactively. CLV-Setup prompts the user to carry out specific actions and provides information on the progress of the function being executed

The following functions are available:

- Match code 1 Teach-in
 - Analyze scanner network (only if the CAN interface is used)
 - Activate factory defaults in device
1. In the menu bar, select the desired function from ICR840-2, DEVICE FUNCTIONS.
– or –
Press the [F2] key.
The DEVICE FUNCTIONS dialog box is then displayed.
 2. Select the desired function from the EXECUTE menu.
CLV-Setup starts the function and, where appropriate, prompts the user to carry out the necessary actions.

Fig. 6-27 shows an example of the dialog box that appears after Matchcode 1 Teach-in has been started.



Fig. 6-27: CLV-Setup: Dialog box for executing Matchcode 1 Teach-in

6.10 ICR840-2 messages

The ICR840-2 outputs encoded system and error messages via the **auxiliary interface** to report user actions or events in the reading process. When the system is started, the ICR840-2 also outputs system messages in plain text (English). If configured accordingly, the ICR840-2 transfers the error status ST in the data output string of the host interface.

6.10.1 Displaying messages

In the 4th field from the left in the status bar at the bottom of the screen, CLV-Setup displays system and error messages that occur at the terminal interface of the ICR840-2. These are recorded in a file, which is continuously updated. The messages have the following format:

- System message: "ICR SYS-Message: xxx"
- Error message:"ICR SYS-Error: 048ID8xxx"

The additional system messages in plain text can be displayed in the terminal emulator if CLV-Setup and the terminal emulator are started before the ICR840-2 is connected.

Additional system messages:

When the system is started, these system messages inform the user whether the starting process was successful. To do this, the ICR840-2 must be connected to CLV-Setup via the serial auxiliary interface (RS 232) and the Terminal Emulator must be opened before starting the device. No further measures are normally required. [Fig. 6-28](#) shows an example.

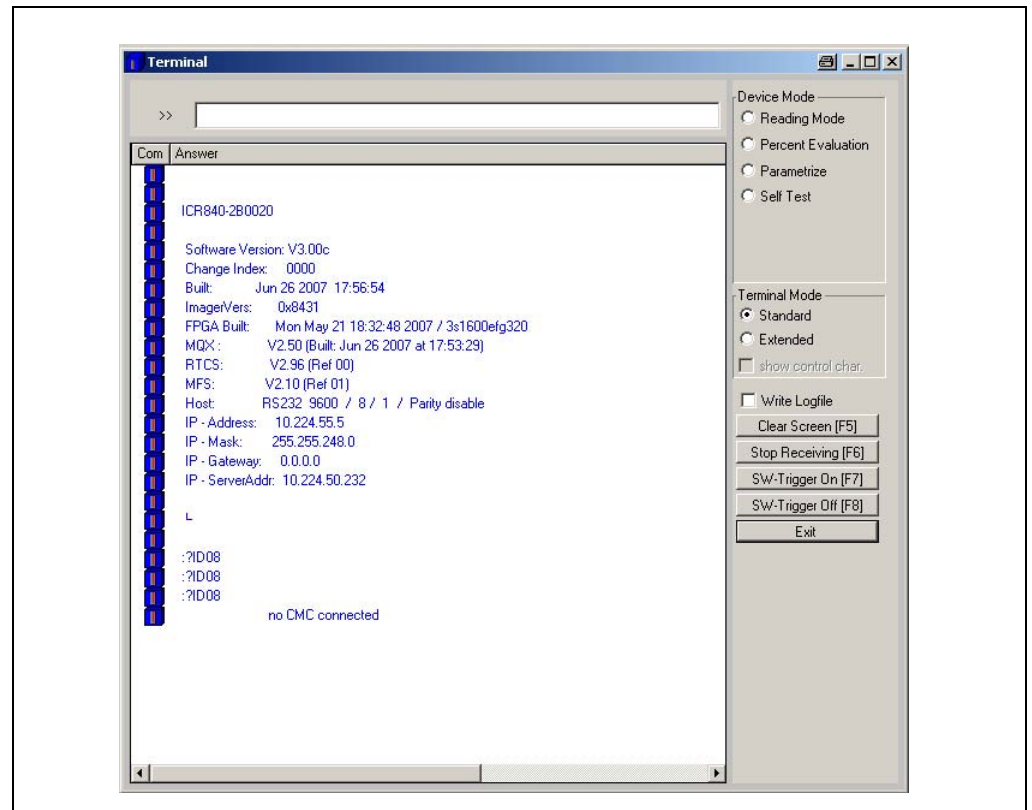


Fig. 6-28: CLV-Setup: Displaying the system messages in the Terminal Emulator when starting the ICR840-2

[Chapter 8.3 Error messages, Page 106](#) explains the meaning of the messages.

Error messages:

Error messages indicate the following types of error:

- a device defect
- incorrect parameter settings
- errors during data transmission to the host

Table 8-1, Page 106 lists the messages with the associated corrective measures.

Important To call up the most recent error to occur in the ICR840-2, enter command "2?SF" in the command line of the terminal emulator.



6.11 Default settings

The values of the default setting are stored permanently both in the ICR840-2 and in the database of the CLV-Setup configuration software (for storage management see [Fig. 6-17, Page 69](#)). They can be loaded into the RAM of the ICR840-2 or displayed on the tabs of CLV-Setup at any time.

A PC is not required to start up the ICR840-2 with the default setting.

6.11.1 Resetting the default setting in ICR840-2 and displaying the setting in CLV-Setup

Prerequisite The CLV-Setup configuration software is connected online to the ICR840-2.

- In order to discard completely changes to the parameter set of ICR840-2, click  in the toolbar or press the [F7] key.
CLV-Setup loads the default setting from the data base and displays the parameter values in the register tabs.
- In der toolbar, click  or press the [F4] key.
CLV-Setup copies the parameter set to the RAM of the ICR840-2.
The DOWNLOAD PARAMETERS dialog box with the storage options is then displayed.
- Confirm the dialog box with PERMANENT.
The default setting has been resetted in the ICR840-2.


– or –

- Select ACTIVATE FACTORY DEFAULTS IN DEVICE under ICR84x-2/DEVICE FUNCTIONS in the menu bar.
CLV-Setup loads the default setting to the RAM and also to the permanent parameter memory of the ICR840-2 and prompts whether an upload from the device is desired.
- Confirm the dialog box with Yes.
CLV-Setup loads the default setting from the ICR840-2 and displays the parameter values in the register tabs.

Important If the ICR840-2 is connected to a connection module CDB620/CDM420 equipped with a parameter memory module CMC600, the default setting is also copied to the permanent parameter memory of the CMC600 (if the write protection of CMC600 has been disabled). [Table 6-10, Page 92](#) shows an extract of the ICR840-2's factory default setting. The default parameters are such that the ICR840-2 can be put into operation for 2D code reading (Data Matrix ECC200) either straight away or following a few minor adjustments.



Printing complete default setting in CLV-Setup:

- Load the the default setting as described above.
- Click  in the toolbar.
The PRINT FILE dialog box is then displayed.
- If desired, a comment can be entered in the input field for the header of the printout.
Confirm the dialog box with "OK".
The PRINT dialog box for configuring the printer is then displayed.
- Edit the dialog box accordingly and confirm.
CLV-Setup prints out the complete default setting in the form of a table. The header contains the company and user names that were entered during the CLV-Setup installation routine.

6.11.2 Default setting

Type	ICR840-2
Decoder	2D decoder
Active codes types	DataMatrix ECC 200 (square data field, data field not mirrored)
Background	Black or white
Symbol length/Code length	Free
Number of codes	Min./max. 1
Min./max. code position 2D code	0/100 CP (area of interest 1), 0/0 CP (area of interest 2)
Image recording rate	25 Hz at 1.3 mega pixel (1,280 x 1,024 pixels)
Flash pulse duration	1,000 μ s
Efficiency of matrix sensor (image geometry)	100% (Y1= 0%, Y2=100%, X1= 0%, X2=100%)
Resolution (min. cell size/min. bar width)	0.20 to 0.5 mm (7.9 to 19.7 mil), depending on type/0.30 mm (11.8 mil)
Object velocity	No movement
Marking method	Standard
Illumination mode	Internal, all LEDs on
Dynamic Parameter Switching	disabled
Reading pulse source	Start: "Sensor 1" switching input (active high); end: "Sensor 1" switching input
Delay	Start of reading interval: no delay; end of reading interval: no delay
"Sensor 1" switching input	Start and end of reading pulse (level: active high), debouncing 10 ms
"Sensor 2" switching input	No function
Switching outputs	Not inverted; pulse duration: 100 ms
Status output function	Result 1: "Device Ready" (static), Result 2: "Good Read"
Beeper	Status output function: "Good Read", beeper "ON"
Output of the reading result	Serial host Interface
Device number	1
Host interface (type)	RS 232
Protocol	NAK; start character: STX, stop character: ETX
Data transfer rate/data format	9,600 bd/ 8 data bits, no parity, 1 stop bit
Output format	Header: empty, reading data: code contents, terminator: empty, Error string: reading data + N O R E A D
Output sorting	In accordance with code position
Output time	Reading result: immediate
Test string	disabled
Auxiliary interface	Serial auxiliary interface (fixed values: RS 232, 9,600 bd, 8 data bits, no parity, 1 stop bit)
Function	Reading diagnosis
Ethernet interface	10/100 Mbps: TCP/IP: IP address: 192.168.000.001, IP gate address: 000.000.000.000 IP mask: 255.255.255.000, IP port Aux: 2111 (server), IP port Host: 2112 (server) (MAC address: see type plate on the ICR840-2)
CAN interface	disabled
Image acquisition	disabled

Tab. 6-10: Extract: Default setting of the ICR840-2 parameter values

6.12 Adjusting the ICR840-2

6.12.1 Adjusting the ICR840-2

To completely adjust the ICR840-2, the electrical installation must be complete and the device must be operated, see [Chapter 5.5 Performing electrical installation, Page 37](#) and [Chapter 6 Startup and configuration, Page 47](#).

1. Align the ICR840-2 in such a way that the red illumination area lights the code(s) on the objects.
2. Rotate the ICR840-2 from the plumb line to the object surface with an angle of approx. 20° so that the emitting light does not meet the code perpendicularly and does not send back disruptive reflections. See also [Chapter 4.3.4 Selecting the rotation angle \(skew\) to avoid surface reflections, Page 27](#).
3. Bring objects with codes sequentially into the ICR840-2's field of view (trigger the ICR840-2 for reading) and stop the objects for reading the code(s). Present objects in different positions (angles) to the ICR840-2.
4. Check the reading result with the CLV-Setup configuration software.
5. Align the ICR840-2 in such a way that the good read rate is between 70 and 100 %.
6. Tighten the screws on the ICR840-2.
The ICR840-2 is aligned with the object carrying the code.

6.13 Configuration guide

6.13.1 Overview of configuration procedure

- Adjusting the optical reading characteristics
- Setting up reading pulse
- Configuring the illumination timeout
- Configuring the evaluation characteristics of the decoder
- Configuring the output characteristics (data, result status)
- Defining the function of the auxiliary interface

When the ICR840-2 is started up for the first time, the **factory default setting** is in effect. The following parameters must then be set:

6.13.2 Adjusting optical reading characteristics

General:

- Code quality ⇒ READING CONFIGURATION tab ⇒ IMAGE PROCESSING section ⇒ MARKING METHOD section
- Evaluation range of the reading area ⇒ READING CONFIGURATION tab ⇒ READING PARAMETERS 2D section ⇒ AREA OF INTEREST section (CP values)
- Illumination mode ⇒ READING CONFIGURATION tab ⇒ IMAGE PROCESSING section and CODE PROPERTIES PARAMETERS button ⇒ INTERNAL ILLUMINATION MODE section

For 2D codes (Data Matrix ECC200):

- Minimum cell size ⇒ READING CONFIGURATION tab ⇒ READING PARAMETERS 2D section
- Configuring (if necessary):
 - Image brightness ⇒ READING CONFIGURATION tab ⇒ IMAGE PROCESSING section ⇒ CODE PROPERTIES PARAMETERS button ⇒ GLOBAL CAMERA SETTINGS section ⇒ Brightness (Gain)
 - For ink-jet printing: Compensation of poor dot size ⇒ READING CONFIGURATION tab ⇒ IMAGE PROCESSING section ⇒ CODE PROPERTIES PARAMETERS button ⇒ GLOBAL CAMERA SETTINGS section ⇒ Diavation of dot size
 - Contrast improvement ⇒ READING CONFIGURATION tab ⇒ IMAGE PROCESSING section ⇒ CODE PROPERTIES PARAMETERS button ⇒ GLOBAL CAMERA SETTINGS section ⇒ Background (Gamma correction)
 - Illumination mode ⇒ READING CONFIGURATION tab ⇒ CODE PROPERTIES PARAMETERS button ⇒ INTERNAL ILLUMINATION MODE section
 - See also [Chapter 10.2.1 Improving the image quality, Page 129](#)
- If necessary setting up of dynamic parameter switchings ⇒ READING CONFIGURATION tab ⇒ DYNAMIC PARAMETER SWITCHING ACTIVE button

For bar codes:

- Minimum bar width ⇒ READING CONFIGURATION tab ⇒ READING PARAMETERS 1D section
- Configuring (if necessary):
 - Bar saturation ⇒ READING CONFIGURATION tab ⇒ IMAGE PROCESSING section ⇒ CODE PROPERTIES PARAMETERS button ⇒ SETTING 1D SMART/STANDARD DECODER section ⇒ Saturation of bars

See also [Chapter 10.2.1 Improving the image quality, Page 129](#).

6.13.3 Configuring reading trigger

Action	Settings in CLV-Setup
Configure reading trigger: one external sensor - or -	⇨ DEVICE CONFIGURATION tab ⇨ SENSOR 1 section <ul style="list-style-type: none"> - Debouncing - Invert Input (if necessary) ⇨ READING TRIGGER PARAMETERS button Start: ⇨ START OF READING INTERVAL section <ul style="list-style-type: none"> - Sensor Input ⇨ START DELAY section <ul style="list-style-type: none"> - Time controlled: value or - Track controlled: value (with connected increment encoder) ⇨ DELAY CONTROLLING section <ul style="list-style-type: none"> - Time controlled delaying or - Track controlled delaying ⇨ FIRST TRIGGER SENSOR section <ul style="list-style-type: none"> - Edge or - Level Stop: ⇨ END OF READING INTERVAL section (No Read) <ul style="list-style-type: none"> - Trigger Source or - Timer: Timeout (referred to beginning of reading interval) ⇨ STOP DELAY section <ul style="list-style-type: none"> - Auto or - User defined <ul style="list-style-type: none"> - Time controlled: value or - Track controlled: value (with connected increment encoder) Output of reading result referred to beginning of reading interval: ⇨ RESULT OUTPUT section (Good Read) <ul style="list-style-type: none"> - End of reading interval or - Immediate output Important: Connect the external sensor to "Sensor 1" switching input!

Tab. 6-11: Guide: Parameterizing the reading trigger and output of reading result

Action	Settings in CLV-Setup
Parameterize reading trigger: two external sensors - or -	⇨ DEVICE CONFIGURATION tab ⇨ SENSOR 1 section <ul style="list-style-type: none"> - Debouncing - Invert Input (if necessary) ⇨ READING TRIGGER PARAMETERS button Start (sensor 1): ⇨ START OF READING INTERVAL section <ul style="list-style-type: none"> - Sensor Input ⇨ START DELAY section <ul style="list-style-type: none"> - Time controlled: value ⇨ DELAY CONTROLLING section <ul style="list-style-type: none"> - Time controlled delaying ⇨ FIRST TRIGGER SENSOR section <ul style="list-style-type: none"> - Edge or - Level Stop (sensor 2): ⇨ END OF READING INTERVAL section (No Read) <ul style="list-style-type: none"> - Trigger source ⇨ DEVICE CONFIGURATION tab ⇨ SENSOR 2 section <ul style="list-style-type: none"> - Assignment <ul style="list-style-type: none"> - Reading trigger stop - Debouncing: value - Invert Input (if necessary) Output of reading result referred to beginning of reading interval: ⇨ RESULT OUTPUT section (Good Read) <ul style="list-style-type: none"> - End of reading interval or - Immediate output Important: Connect external sensor 1 (start) to "Sensor 1" switching input and sensor 2 (stop) to "Sensor 2" switching input!
Parameterize reading trigger: command strings - or -	⇨ DEVICE CONFIGURATION tab ⇨ READING TRIGGER PARAMETERS button Start: ⇨ START OF READING INTERVAL section <ul style="list-style-type: none"> - Serial Interface Stop: ⇨ END OF READING INTERVAL section (No Read) <ul style="list-style-type: none"> - Trigger source or - Timer: Timeout (referred to beginning of reading interval) Trigger characters: ⇨ SERIAL INTERFACE section <ul style="list-style-type: none"> - Standard Trigger or - Single character ⇨ Using single character: start and stop characters Output of reading result referred to beginning of reading interval: ⇨ RESULT OUTPUT section (Good Read) <ul style="list-style-type: none"> - End of reading interval or - Immediate output

Tab. 6-11: Guide: Parameterizing the reading trigger and output of reading result (contd.)

Action	Settings in CLV-Setup
Parameterize reading trigger: free-running with timeout	⇨ DEVICE CONFIGURATION tab ⇨ READING TRIGGER PARAMETERS button Start: ⇨ START OF READING INTERVAL section - Free-running with Timeout Stop (generated by reading trigger source): ⇨ END OF LABEL/FREE-RUINNING section - Timeout: value Output of reading result referred to beginning of reading interval: ⇨ RESULT OUTPUT section (Good Read) - End of reading interval <i>or</i> - Immediate output Important: No laser timeout function (defined switching off of laser diode due to too long active reading gate) available in this trigger mode.

Tab. 6-11: Guide: Parameterizing the reading trigger and output of reading result (contd.)

6.13.4 Configuring evaluation characteristics

For 2D codes (Data Matrix ECC200):

- Rectangular data field ⇒ CODE CONFIGURATION tab ⇒ 2D SYMBOLOGIES section ⇒ EDIT button ⇒ DATA FIELDS section
- Positive/negative code printing ⇒ CODE CONFIGURATION tab ⇒ 2D SYMBOLOGIES section ⇒ EDIT button ⇒ BACKGROUND section
- Contrast level ⇒ CODE CONFIGURATION tab ⇒ 2D SYMBOLOGIES section ⇒ EDIT button ⇒ OPTIMIZATION PARAMETERS button ⇒ SYMBOL CONTRAST section

See also [Chapter 10.2.1 Improving the image quality, Page 129](#)

For bar codes:

- Selecting decoder type ⇒ CODE CONFIGURATION tab ⇒ 1D DECODER section
- Activating code type ⇒ CODE CONFIGURATION tab ⇒ 1D SYMBOLOGIES section ⇒ EDIT button
- Multiple reads ⇒ CODE CONFIGURATION tab ⇒ 1D SYMBOLOGIES section ⇒ EDIT button
- Positive/negative code printing ⇒ CODE CONFIGURATION tab ⇒ 1D SYMBOLOGIES section ⇒ 1-D BACKGROUND section

General:

- Activate code comparison ⇒ DEVICE CONFIGURATION tab ⇒ MATCH CODE PARAMETERS button
- Mode for teaching in match code 1 via the "Sensor 2" switching input ⇒ DEVICE CONFIGURATION tab ⇒ SENSOR 2 section ⇒ Assignment
- Set output time for the reading result ⇒ DEVICE CONFIGURATION tab ⇒ READING TRIGGER PARAMETERS button ⇒ READ RESULT OUTPUT section (Good Read) and END OF READING INTERVAL section (No Read)

Separation of identical bar codes (same code type/identical contents)

No. of codes per object	Moving conveyor object
1. Number $n = 1$	⇒ CODE CONFIGURATION tab ⇒ CODE POSITION section - Deactivate "Compare"
2. Number $n > 1$: - Same code type - Contents different or identical	⇒ CODE POSITION section - Activate "Compare" ⇒ NUMBER OF CODES section - Minimum - Maximum
3. Number $n > 1$: - Code type different - Contents different or identical	⇒ CODE POSITION section - Deactivate "Compare" ⇒ NUMBER OF CODES section - Minimum - Maximum

Tab. 6-12: Guide: Settings to be made for the evaluation of identical codes

6.13.5 Configuring output characteristics

Image output:

- Activating image acquisition ⇒ IMAGE ACQUISITION tab

Result status:

- Setting the function of the result status output of the "Result 1" and "Result 2" switching outputs:
⇒ DEVICE CONFIGURATION tab ⇒ RESULT OUTPUT PARAMETERS button
- Defining function of result status output and activity of beeper:
⇒ DEVICE CONFIGURATION tab ⇒ BEEPER section and RESULT OUTPUT PARAMETERS button
- Check: success of multiple reads ⇒ DATA STRINGS tab ⇒ STATUS 5 OUTPUT section
- Check: min. and max. number of codes ⇒ CODE CONFIGURATION tab ⇒ NUMBER OF CODES section

Host interface general:

- Destination of the reading result ⇒ HOST INTERFACE tab ⇒ DESTINATION OF RESULT DATA STRINGS section
- Sorting of the reading result ⇒ DATA STRINGS tab ⇒ OUTPUT SEQUENCE SORT section
- Masking of the reading result ⇒ DATA STRINGS tab ⇒ FORMAT MASK section

Serial host interface:

- Physical interface ⇒ HOST INTERFACE tab ⇒ DATA FORMAT section
- Communication parameters ⇒ HOST INTERFACE tab ⇒ DATA FORMAT section
- Protocol ⇒ HOST INTERFACE tab ⇒ INTERFACE PROTOCOL section

Function of the CAN interface (alternative):



See "Application of the CAN Interface" Operating Instructions (no. 8009180, English)

Function of the Ethernet interface (alternative):

- ICR840-2: IP address, IP gateway address, IP mask and IP port
- PC: server address
- Activating FTP client for image transfer to ImageFTP

Data output string of host interface:

- Selecting contents of the "header" and "terminator" blocks ⇒ DATA STRINGS tab ⇒ OUTPUT FORMAT section
- Providing code contents with reading diagnosis data ⇒ DATA STRINGS tab ⇒ OUTPUT FORMAT section ⇒ READING DATA section
- Setting up wrong read format ⇒ DATA STRINGS tab ⇒ READING DATA IN CASE OF ERROR, CHARACTER COUNT and ERROR STRING sections
- If necessary, configure/activate test string ⇒ DATA STRINGS tab ⇒ TEST STRING section

6.13.6 Configuring auxiliary interface

- AUXILIARY INTERFACE tab

6.14 Switching the ICR840-2 off

1. If the parameter set was modified in CLV-Setup or was only stored temporarily in ICR840-2 via a download ("Temporary" option or via context menu (right mouse button)), the parameter set must be stored permanently in the ICR840-2 by choosing the PERMANENT storage option ([F4] key).
2. Save parameter set as a "*.scl" configuration file in CLV-Setup.
3. Switch off the power supply of the CDB620 or CDM420 or pull the plug of the ICR840-2 from the connection module.

The last parameter set stored permanently in the ICR840-2 remains valid.

7 Maintenance

7.1 Maintenance during operation

The ICR840-2 operates maintenance free. Maintenance is not required to ensure compliance with LED class 1.

Important Do not open the housing of the ICR840-2. If the device is opened, the SICK AG warranty shall not apply.

Any faults or malfunctions are listed as error codes in the error memory of the ICR840-2. They can be requested using command strings.

7.2 Cleaning the ICR840-2

Recommendation In order to make use of the full optical reading capacity of the ICR840-2, the reading window should be checked regularly (e.g. weekly) for soiling. This is especially recommended when operating the device in harsh conditions (dust, abrasion, humidity, finger prints, etc.)

7.2.1 Cleaning the reading window of the ICR840-2



CAUTION

LED radiation!

The illumination of ICR840-2 operates with LEDs of LED class 1.

Under normal and sensible conditions, the accessible radiation of the LEDs is not hazardous. Blinding, impairment of ability to see color, or other irritations, however cannot be excluded.

The entire area of the reading window acts as a LED outlet aperture.

Caution – use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

- Never look directly into the illumination.
- Do not open the housing.
(Opening the housing does not deactivate the LEDs by the reading pulse.)
- Always observe the latest valid version of laser protection regulations.

NOTICE

Damage to the reading window!

Scratches and streaks on the window will reduce the reading performance.

The reading window is made of plastic.

- Do not use aggressive cleaning agents.
- Do not use cleaning agents which cause increased abrasion (e.g. powder).

Cleaning the reading window:

Important Electrostatic charges cause dust particles to stick to the reading window. This effect can be combated by using anti-static SICK synthetic cleaner (no. 5600006) in combination with a SICK lens cloth (no. 4003353).

1. Switch off the device while you are cleaning it (see warning notice "LED radiation").
2. Use a clean, soft brush to free the reading window.
3. If necessary, additionally clean the reading window with a clean, damp, lint-free cloth and a mild, anti-static window cleaning fluid.

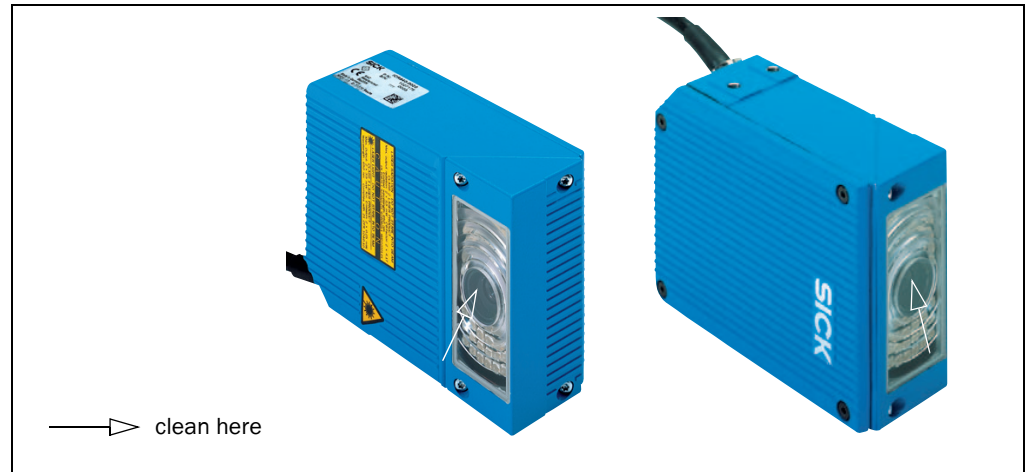


Fig. 7-1: Cleaning the reading window

If the reading window is scratched or damaged (cracked, broken), it must be replaced. Please contact the SICK Service.

Cleaning the housing

To ensure sufficient cooling of the ICR840-2, clean the housing regularly from dust.

- Use a soft cloth to free the housing of dust.
- If necessary, also clean the LEDs on the back side of the housing.

7.2.2 Cleaning further optical effective surfaces

If an external reading pulse generator with a sensor (e.g. photoelectric reflex switch) is used, make sure to clean the relevant optical surfaces regularly (Fig. 7-2). Contamination on these surfaces can cause switching errors.

- In order to prevent incorrect switching behaviour, remove soiling from the optical effective surfaces of the external sensor.

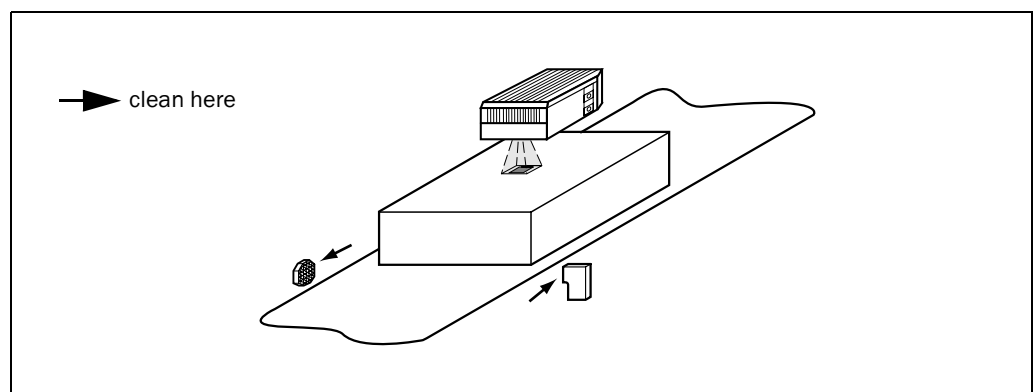


Fig. 7-2: Cleaning the external optical sensor (reading pulse generator)

7.3 Checking the incremental encoder

If an incremental encoder is used, the position of the friction wheel at the drive system should be checked at regular intervals.

- Ensure that the incremental encoder has direct and fixed contact with the drive system and that the friction wheel rotates without slipping.

7.4 Replacing an ICR840-2

An incorrect or damaged ICR840-2 has to be removed and replaced with either a new or an repaired ICR840-2.

Important Repairs to the ICR840-2 should only be carried out by qualified and authorised SICK AG service staff.

7.4.1 Removing the ICR840-2

1. Switch off the power supply to the ICR840-2.
2. Remove the cable plug of the ICR840-2 from the connection module.
3. Mark the situation and alignment of the ICR840-2 on the holder or environment.
4. Remove the ICR840-2 from the holder.

7.4.2 Replacing the ICR840-2

1. Align and install the new or repaired ICR840-2.
To do so, observe any marks made previously on the holder or environment (see [Chapter 7.4.1 Removing the ICR840-2, Page 103](#) und [Chapter 4.4 Installing and adjusting the ICR840-2, Page 29](#)).
2. Reconnect the cable plug of the ICR840-2 to the connection module.
3. Switch on the power supply to the ICR840-2.
The ICR840-2 starts with the factory default settings.
4. Establish communication to the ICR840-2 using the CLV-Setup configuration software.
5. Transfer the configuration of the replaced device stored on the PC via download to the new ICR840-2 (see [Chapter 6 Startup and configuration, Page 47](#)). The configuration can only be transferred between identical device types.
6. Check the behaviour of the ICR840-2 in the reading process.

Important If the replaced ICR840-2 has been operated at a CDB620 connection module with a CMC600 parameter memory module, the parameter set is stored in the non-volatile parameter memory of the ICR840-2 and in the non-volatile parameter memory of the CMC600. If the new ICR840-2 is restarted, the configuration data stored in the module CMC600 will be transferred automatically to the non-volatile parameter memory of the new ICR840-2.

7.5 Disposal

Dispose of unusable or irreparable devices in accordance with the respective state regulations on waste disposal in a manner compatible with the environment.

At present SICK AG does not take back devices which have become unusable or irreparable.

Removing ICR840-2 for decommissioning

1. Switch off the power supply to the ICR840-2.
2. Disconnect the cable plug of the ICR840-2 from the connection module.
3. Remove the ICR840-2 from the holder.

Disposing the ICR840-2

1. Remove the ICR840-2 housing.
2. Remove the electronic modules and the connection cable.
3. Send the electronic modules for disposal as special waste.
4. Send the chassis and cover (zinc) to be recycled.
5. Send the connection cable (metal) to be recycled.

8 Troubleshooting

8.1 Overview of errors and malfunctions which could occur

8.1.1 Installation errors

- ICR840-2 positioned incorrectly in reading distance
- The code is not completely in the field of view
- Reading pulse sensor positioned incorrectly (e.g. internal reading interval starts too late or stops too soon)

8.1.2 Electrical connection errors

- Interfaces on the ICR840-2 connected incorrectly (wiring error in the CDB620 or CDM420)

8.1.3 Parameterization errors

- Functions not adapted to local conditions, e.g. communication parameters of the host interface set incorrectly
- Technical limits of device not taken into consideration, e.g. resolution-specific depth of field

8.1.4 Malfunctions during operation

- Timeout for illumination field elapsed
- Device error (hardware/software)

8.2 Monitoring errors and malfunctions

The ICR840-2 is self-monitoring:

- After the power supply has been switched on, the ICR840-2 automatically carries out a self-test, in which it checks important hardware components, before it is initialized (parameter set loaded and device functions initialized). The self-test can be repeated at any time by cancelling Reading mode.
For calling up, see [Chapter 6.9.7 Self-test, Page 86](#).
- If the ICR840-2 detects an error during the self-test or at any other time, it outputs the error status ST = 3 via the host interface.
Prerequisite: the error status is enabled for transmission.
By default, transfer is blocked.
The ICR840-2 displays the diagnosed errors in encoded form as a number combination in the fourth field from the left on the bottom on the status line of the CLV-Setup user interface via the auxiliary interface ([Table 8-1, Page 106](#)).
- During operation, the ICR840-2 constantly monitors the operation of its illumination LEDs. In addition, a watchdog circuit responds to error statuses.
- A timer automatically deactivates the illumination LEDs in Reading mode ("Sensor input" and "Serial interface" trigger mode) if the reading interval has not ended after 10 minutes (default setting). However, it does not end the reading interval.
In this case, the ICR840-2 outputs the following message to the auxiliary interface: "Illumination safety timeout".
The reading pulse must be terminated by resetting the pulse signal. The next reading pulse switches on the LEDs and, thus, the illumination field again.

8.3 Error messages

The ICR840-2 outputs coded error messages (as number combinations) via the **auxiliary interface** only. [Table 8-1](#) lists the messages.

Displaying messages:

To display the messages on the PC screen, proceed as follow in the user interface of CLV-Setup:

- Click  in the toolbar.

The Terminal Emulator window is then displayed.

CLV-Setup logs the error messages automatically in a file (sys_msg.log).

Message	Meaning	Possible cause	Remedy
"ICR SYS-Error: 048ID890x" ¹⁾ with x: 1 Error SPI interface 5 SC2D configuration failed 6 SC2D parametrization failed 7 ADC9840 parametrization failed 8 CT2D parametrization failed 9 laser current measurement failed	The ICR840-2 has diagnosed a system error. The "Device Ready" LED does not light up, rather it extinguishes. The ICR840-2 attempts to restart the system.	Device defect	If this system error occurs again after the ICR840-2 is restarted: Contact the SICK Service department.
"ICR SYS-Error: 048ID8902" EEPROM read failed ¹⁾	The ICR840-2 cannot download the parameter set which is permanently stored in the EEPROM to the memory (RAM).	Device defect	Contact the SICK Service department.
"ICR SYS-Error: 048ID8903" EEPROM write failed ¹⁾	The ICR840-2 cannot write the current parameters in the RAM to the EEPROM.	Device defect	Contact the SICK Service department.
"ICR SYS-Error: 048ID8904" EEPROM device too small for eeMap parameter ¹⁾	The EEPROM is too small.	Device defect	Contact the SICK Service department.
"ICR SYS-Error: 048ID8109" Error DSP boot ¹⁾	The ICR840-2 can not boot the DSP.	Device defect	Contact the SICK Service department.
"ICR SYS-Error: 048ID810A" Error DSP memory test ¹⁾	Error when proofing the DSP.	Device defect	Contact the SICK Service department.
"ICR SYS-Error: 048ID8401" Start of reading mode after initialization failed ¹⁾	After switching on and initializing, the ICR840-2 can not start reading mode.	Device defect	Contact the SICK Service department.

¹⁾ ID: parametrized adress of ICR840-2

Tab. 8-1: Error message output to the auxiliary interface

ICR840-2

8.4 ST error status in the reading result of an 1D code (bar code)

Value	Meaning	Possible cause	Remedy
0	"Good Read"	-	Not applicable.
1	Incorrect check digit	The check digit calculated by the ICR840-2 during the reading process does not match that printed in the bar code.	Check whether the check digits in the bar code which were generated by the print process are correct.
2	No code of the enabled code type found according to the evaluation criteria.	<ul style="list-style-type: none"> No code in the ICR840-2's field of view during the reading pulse Code type/length in the ICR840-2 not enabled for decoding Code too long for distance-dependent field of view Reading window obstructed/dirty 	<ul style="list-style-type: none"> Synchronize the pulse of the ICR840-2 with the entry of a code into the field of view. Correct the code configuration parameters. Reduce code length Check the reading window.
3	Device defect	Device defect	Call up the self-test! (see Chapter 6.9.7 Self-test, Page 86). If result ≠ 000: Contact the SICK Service department.
5	Required number of successful multiple reads for the bar code not reached.	<ul style="list-style-type: none"> Conveyor speed of the object is too high Scanning frequency is too low Ladder-type arrangement for bar code relative to the conveyor direction: code height (bar length) too poor Layout/print quality too poor 	<ul style="list-style-type: none"> Check the conveyor speed. Adapt the "Object velocity" parameter in the ICR840-2. Check the code height. Check the layout/print quality.
7	The source of the reading result is the auxiliary input via the auxiliary interface.	The code was not recorded by the reading function of the ICR840-2, but was entered subsequently with the auxiliary function of the auxiliary interface and sent to the host in a separate data string.	-
9	The "OUTPUT FILTER" function is also activated for the code comparison. The ICR840-2 has detected valid codes. However, these do not match the active match code(s).	The read object does not have a code that matches the specified match code.	-
A	The CHECK MAX. NUMBER OF CODES function is active. The number of valid codes detected by the ICR840-2 in Reading mode exceeds that specified under NUMBER OF CODES: MAXIMUM. Instead of the code contents, it outputs the defined error string in the quantity defined under NUMBER OF CODES: MINIMUM	One object in a set of objects with a constant number of codes, for example, contains more codes than defined in the application.	This message is used to indicate errors on the objects (e.g. check whether objects are homogeneous: mix with incorrect objects).
D	The "Code 32" evaluation option is activated for Code 39. The ICR840-2 is attempting to interpret 6-digit C39 bar codes as C32 bar codes (output as 9-digit decimal values).	The read 6-digit bar code is not a C32 bar code. The ICR840-2 outputs the defined error string instead.	-

Tab. 8-2: Meaning of the ST error status in the reading result

Value	Meaning	Possible cause	Remedy
F	The CHECK MIN. NUMBER OF CODES function is active. The number of valid codes detected by the ICR840-2 in Reading mode is less than that specified under NUMBER OF CODES: MINIMUM. Instead of the code contents, it outputs the defined error string in the quantity defined under NUMBER OF CODES: MINIMUM	One object in a set of objects with a constant number of codes, for example, contains fewer codes than defined in the application.	This message is used to indicate errors on the objects (e.g. check whether objects are homogeneous: mix with incorrect objects).

Tab. 8-2: Meaning of the ST error status in the reading result (contd.)

8.5 Troubleshooting

The following are required for troubleshooting purposes using the tables below:

- These operating instructions
- Tool
- A digital measuring device (ammeter/voltmeter)
- A PC running "CLV-Setup"

A 3-core RS 232 data cable (null modem cable), pins 2 and 3 crossed, e.g. no. 2014054

8.5.1 General malfunction: ICR840-2 not ready

Prerequisite CDB620 or CDM420 Connection Module is supplying the correct voltage to the ICR840-2 (15 to 30 V DC).

Fault	Possible cause	Remedy
<p>The "Device Ready" LED is not lit. The "Result 1" switching output (default setting: "Device Ready") does not switch from HIGH to LOW.</p>	<p>After switching on the power supply:</p> <ul style="list-style-type: none"> • The ICR840-2 is not supplied with operating voltage (15 to 30 V DC) • The ICR840-2 diagnosed a device error during the self-test <p>During operation:</p> <ul style="list-style-type: none"> • The ICR840-2 is not in "Reading mode" • The ICR840-2 has deactivated the LEDs of the red illumination field (pulsed) 10 min. (default setting) after the start of the current reading pulse (pulse mode: sensor input/serial interface) 	<ul style="list-style-type: none"> • Check the wiring (correct seating of the cable plug of the ICR840-2 on the CDB620 or CDM420 Connection Module). Measure voltage at pin 1 and pin 5. • Switch the ICR840-2 off and on again. Does the LED light up? If not, contact the SICK Service department. • Return to Reading mode using CLV-Setup. (see Chapter 6.9.1 Reading mode (standard operating mode), Page 74). • Terminate reading pulse. Check the reading pulse function. Generate new pulses or parameterize illumination timeout duration using CLV-Setup (see Chapter 6.13 Configuration guide, Page 94).

Tab. 8-3: Troubleshooting: Restoring operation (Reading mode)

8.5.2 Malfunctions in Reading mode: Reading pulse error

Prerequisite The "Device Ready" LED lights up. If not, see [Table 8-3, Page 109](#).

Fault	Possible cause	Remedy
<p>1. Pulse mode: "sensor 1" input (external sensor).</p> <p>The ICR840-2 cannot be pulsed:</p> <ul style="list-style-type: none"> - the "Laser On" LED does not light up - the red illumination field (pulsed) does not appear 	<ul style="list-style-type: none"> • Sensor not connected or connected to incorrect switching input • If sensor supplied by ICR840-2: sensor not connected to ground potential • Incorrect reading pulse source parameterized on the ICR840-2 • Level of the "Sensor 1" switching input inverted • Incorrect debouncing of the "Sensor 1" switching input parameterized on the ICR840-2 • Incorrect delay of the "Sensor 1" switching input parameterized on the ICR840-2 • Photoelectric switch not aligned with the reflector (photoelectric proximity switch/ inductive sensor not dampened) • The object does not pass the reading pulse sensor for trigger start with the conveyor running 	<ul style="list-style-type: none"> • Connect sensor to "Sensor 1" switching input. Check sensor wiring (see Chapter 5.5.6 Connecting the switching inputs, Page 41). Measure output signal of sensor. • Insert jumper between pin 5 and pin 15. (CDB620: switch S3 "SGND-GND", CDM420: switch S6 "SGND-GND"). • Check with CLV-Setup: Select the DEVICE CONFIGURATION tab, click the READING TRIGGER PARAMETERS button, START OF READING INTERVAL section: "Sensor input" selected? (active high: reading pulse starts when power applied) • Check with CLV-Setup: Select the DEVICE CONFIGURATION tab, SENSOR 1 section: NOT INVERTED selected? (Active high: current at input starts reading interval, active low: reading interval starts when power removed)) • Check with CLV-Setup: Select the DEVICE CONFIGURATION tab, SENSOR 1 section: debouncing: selected value too small/large? • Check with CLV-Setup: Select the DEVICE CONFIGURATION tab, click the READING TRIGGER PARAMETERS button, START DELAY section: Values set by mistake? Time controlled: selected value too high? Track controlled: incremental encoder connected to "Sensor 2" input, ICR840-2 parametrized correctly? • Align sensor. Check functioning. • Install the reading pulse sensor in front of the ICR840-2 in conveyor direction. See also Chapter 4.5.2 Installing the external reading pulse sensor, Page 30.

Tab. 8-4: Troubleshooting: Reading pulse errors in Reading mode

ICR840-2

Fault	Possible cause	Remedy
<p>2. Pulse mode: Serial Interface</p> <p>The ICR840-2 cannot be pulsed:</p> <ul style="list-style-type: none"> - the "Laser On" LED does not light up - the red illumination field (pulsed) does not appear 	<ul style="list-style-type: none"> • Incorrect reading pulse source parameterized on the ICR840-2 • Incorrect commands use • The ICR840-2 is not receiving any command strings to start the reading interval on the data interface. 	<ul style="list-style-type: none"> • Check with CLV-Setup: Select the DEVICE CONFIGURATION tab, click the READING TRIGGER PARAMETERS button. In the START OF READING INTERVAL section: is serial interface selected? SERIAL INTERFACE section: Is trigger type correct? • Use correct commands. Standard trigger: Start: <START>21<STOP> Stop: <START>22<STOP> – or – defined single characters (DEVICE CONFIGURATION tab, click the READING TRIGGER PARAMETERS button, SERIAL INTERFACE section). • Check data connection to host. Check with CLV-Setup: Select the HOST INTERFACE tab. DATA FORMAT section: are the correct interface type (hardware) and data format selected? INTERFACE PROTOCOL section: are the correct start and stop characters selected? Use CLV-Setup to check the host command strings: Select the AUXILIARY INTERFACE tab. Select the MONITOR HOST INTERFACE function (see Chapter 6.9.5 Monitor Host Interface, Page 84). Download temporarily to the ICR840-2.
<p>3. ICR840-2 does not respond to an external signal that ends the reading pulse (Pulse mode: sensor input(s), serial interface)</p>	<p><i>Trigger mode: one external sensor</i></p> <ul style="list-style-type: none"> • Incorrect end of reading pulse parameterized on the ICR840-2 • Signal/no signal from the sensor at the "Sensor 1" input <p><i>Trigger mode: two external sensors</i></p> <ul style="list-style-type: none"> • If "Sensor 2" switching input is selected as trigger source for end of reading interval: no sensor connected or end of reading interval configured incorrectly • The object does not pass the reading pulse sensor for trigger stop with the conveyor running • Illumination timeout exceeded. 	<ul style="list-style-type: none"> • Check with CLV-Setup: Select the DEVICE CONFIGURATION tab, click the READING TRIGGER PARAMETERS button. END OF READING INTERVAL section: is "Trigger Source" selected? • Check wiring of the sensor: Measure output signal of sensor. • Connect sensor to "Sensor 2" switching input. Check sensor wiring (see Chapter 5.5.6 Connecting the switching inputs, Page 41). Check with CLV-Setup: Select the DEVICE CONFIGURATION tab, SENSOR 2 section: Assignment: is "Reading trigger stop" selected, is "not inverted" (active high) selected? (Active high: current at input stops reading interval, active low: reading interval stops when power removed) • Install the sensor for stopping the reading pulse in front of the sensor for starting the reading pulse in conveyor direction. • See remedy in Tab. 8-3, Seite 109

Tab. 8-4: Troubleshooting: Reading pulse errors in Reading mode (contd.)

Fault	Possible cause	Remedy
<p>4. ICR840-2 stops reading with delay after the end of reading pulse (Pulse mode: sensor input(s), serial interface)</p>	<p><i>Trigger mode: one external sensor</i></p> <ul style="list-style-type: none"> • Stop delay for "Sensor 1" parameterized incorrectly <p><i>Trigger mode: two external sensors</i></p> <ul style="list-style-type: none"> • Debouncing for "Sensor 2" switching parameterized incorrectly • Stop delay for "Sensor 2" parameterized incorrectly 	<ul style="list-style-type: none"> • Check with CLV-Setup: Select the DEVICE CONFIGURATION tab, click the READING TRIGGER PARAMETERS button. STOP DELAY section: Values set by mistake? Time controlled: selected value too high? Track controlled: incremental encoder connected to "Sensor 2" input, ICR840-2 parameterized correctly? • Check with CLV-Setup: Select the DEVICE CONFIGURATION tab, SENSOR 2 section: correct the values for debouncing. Download to the ICR840-2. • Check with CLV-Setup: Select the DEVICE CONFIGURATION tab, click the READING TRIGGER PARAMETERS button. STOP DELAY section: Values set by mistake? Time controlled: selected value too high?

Tab. 8-4: Troubleshooting: Reading pulse errors in Reading mode (contd.)

8.5.3 Malfunctions in Reading mode: Result output errors

Prerequisite The "Device Ready" LED lights up. If not, see [Table 8-3, Page 109](#).
 The reading pulse is functioning correctly. If not, see [Table 8-4, Page 110](#).

General malfunctions

Fault	Possible cause	Remedy
<p>No Read:</p> <p>1. The "Result" LED (default setting: "Good Read") does not light up at the end of the reading pulse.</p> <ul style="list-style-type: none"> - The "Result 2" switching output (default setting: "Good Read") does not output a pulse - The ICR840-2 outputs the status ST = 2 in the reading result of the host interface (if ST is enabled for output in the Reading data on the DATA STRINGS tab; this is not selected in the default setting) - The ICR840-2 outputs the system message "no code" via the auxiliary interface (Terminal Emulator of CLV-Setup) 	<ul style="list-style-type: none"> • Read not successful, since there was no code in the illumination field during the reading pulse • Code not completely within the distance-dependent field of view (red illumination field positioned incorrectly) • Code presented at incorrect reading distance • Evaluation range of the field of view was incorrectly limited (image geometry or area of interest) • Insufficient light on the reading area 	<ul style="list-style-type: none"> • Perform the reading while the code is stationary. Check the content of the image memory with CLV-Setup/ImageFTP: trigger the ICR840-2; is the code in the image memory once the reading cycle is complete? • Align ICR840-2: ICR840-2A: field of view 23.75 mm x 19 mm (0.94 in x 0.75 in) at reading distance 50 mm (1.97 in) ICR840-2B: field of view 40 mm x 32 mm (1.58 in x 1.26 in) at reading distance 80 mm (3.15 in) ICR840-2C: field of view 58.5 mm x 46.5 mm (2.30 in x 1.83 in) at reading distance 115 mm (4.53 in) ICR840-2D: field of view 58 mm x 72.5 mm (2.86 in x 2.29 in) at reading distance 145 mm (5.71 in) (see also Chapter 9.3 Specification diagrams, Page 124). Is the code in the center of the illumination field? For remedy, see above. If necessary, call up PERCENTAGE EVALUATION (see Chapter 6.9.2 Percentage Evaluation, Page 81). • Check: reading distance of code in specified reading range? See also Chapter 9.3 Specification diagrams, Page 124. Check with image output via ImageFTP: Is the code recorded in sharp focus in the image memory? • Check with image output via ImageFTP: Has all the code been recorded in the image memory? Check with CLV-Setup: Select the READING CONFIGURATION tab, click the CODE PROPERTIES PARAMETERS button, find the IMAGE GEOMETRY section: Active evaluation range ok? Select the READING CONFIGURATION tab. Find the AREA OF INTEREST section: Are the min. and max. code position values correct? • Check with CLV-Setup: Select the READING CONFIGURATION tab, click the CODE PROPERTIES PARAMETERS button, find the INTERNAL ILLUMINATION MODE section: is the number of selected segments sufficient? See also Chapter b) Illumination mode, Page 130

Tab. 8-5: Troubleshooting: Result output errors in Reading mode (general malfunctions)

Fault	Possible cause	Remedy
<p>Good Read/No Read:</p> <p>2. The ICR840-2 is not transferring any reading results to the host</p> <ul style="list-style-type: none"> - It does output the code contents via the auxiliary interface, however (Terminal Emulator of CLV-Setup) 	<ul style="list-style-type: none"> • Wiring fault in data connection • Host interface on CDB620 or CDM420 Connection Module configured incorrectly • Host interface in ICR840-2 configured incorrectly • No Read format for output suppressed (permitted in default setting) 	<ul style="list-style-type: none"> • Check wiring as shown in Fig. 5-3, Page 38. • Check configuration in the CDB620 or CDM420 (switch setting, wiring). • Check with CLV-Setup: Select the HOST INTERFACE tab, DESTINATION OF RESULT DATA STRINGS section: "Asynch. Host Interface" selected? DATA FORMAT section: Are the correct interface type (hardware) and data format selected? Check settings in INTERFACE PROTOCOL section. • If not set intentionally, select the DATA STRINGS tab, READ DATA IN CASE OF ERROR section: Select "Reading information and error string" in the drop-down list.
<p>Good Read:</p> <p>3. The ICR840-2 does not output all read codes, but rather it replaces the code contents partially or completely with the error string (default setting: NOREAD)</p>	<p><i>The number of codes to be read is 1:</i></p> <ul style="list-style-type: none"> • Min. and max. number of codes parameterized to > 1 <p><i>The number of codes to be read is > 1:</i></p> <ul style="list-style-type: none"> • Defined min. and max. number of codes are not reached or are exceeded • Output of error string for ST=5 activated • Sorting based on code length list activated • Code comparison (match code) and output filter for host interface activated 	<ul style="list-style-type: none"> • Check with CLV-Setup: Select the CODE CONFIGURATION tab, NUMBER OF CODES section: min. and max. no. of codes = 1? • Objects have too many or too few codes during reading process. • Number of multiple reads was not reached. • Length of read codes does not correspond with the set lengths. • Read codes do not correspond with the match code
<p>Good Read:</p> <p>4. The ICR840-2 outputs the data contents of the bar code incorrectly, incompletely or modified via the host interface.</p>	<ul style="list-style-type: none"> • The data format of the host interface is configured incorrectly in the ICR840-2 • Format mask is activated 	<ul style="list-style-type: none"> • Check with CLV-Setup: Select the HOST INTERFACE tab, DATA FORMAT section. Are the values correct? • In CLV-Setup: Enter the value 00 (zero) in the input field of the FORMAT MASK section. Download to the ICR840-2.
<p>No Read:</p> <p>5. The ICR840-2 transfers the status ST = 3 to the host in the reading result (if ST is enabled for output in the Reading data field on the DATA STRINGS tab; this is not selected in the default setting)</p>	<p>The ICR840-2 has diagnosed a device error in the self-test</p>	<p>Switch the ICR840-2 off and on again. Does the "Device Ready" LED light up? If not, contact the SICK Service department.</p>

Tab. 8-5: Troubleshooting: Result output errors in Reading mode (general malfunctions) (contd.)

ICR840-2

Malfunction when reading 2D codes (Data Matrix ECC 200)

See also [Chapter 10.2.1 Improving the image quality, Page 129](#) und [Chapter 10.2.2 Optimizing reading characteristics, Page 131](#).

Fault	Possible cause	Remedy
<p>No Read: The "Result" LED (default setting: "Good Read") does not light up at the end of the reading pulse.</p> <ul style="list-style-type: none"> - The "Result 2" switching output (default setting: "Good Read") does not output a pulse. - The ICR840-2 outputs the status ST = 2 in the reading result of the host interface (if ST is enabled for output in the Reading data on the DATA STRINGS tab; this is not selected in the default setting). - The ICR840-2 outputs the system message "no code" via the auxiliary interface (Terminal Emulator of CLV-Setup). 	<ul style="list-style-type: none"> • Read not successful, since there was no code in the illumination field during the reading pulse • Parameterized resolution lower than required • Parameterized number of multiple reads not reached • Insufficient contrast between dark cells and light background • For ink-jet printing: The individual points of the code do not touch sufficiently • Finder pattern is visibly corrupted due to print errors • Code consists of rectangular data fields • Code printed negatively (light on dark background) 	<ul style="list-style-type: none"> • Perform the reading while the code is stationary. Check the content of the image memory with CLV-Setup/ImageFTP: trigger the ICR840-2; is the code in the image memory once the reading cycle is complete? • Check with CLV-Setup: Select the READING CONFIGURATION tab and enter the correct value for "Minimum cell size 2D" in the READING PARAMETERS 2D section. Download to the ICR840-2 • Select the CODE CONFIGURATION tab, find the 2D SYMBOLOGIES section. Click the EDIT button, find the MULTIPLE READS section: selected value too large? • Select the READING CONFIGURATION tab and click the CODE PROPERTIES PARAMETERS button. Improve the contrast with the "contrast" slider. Download to the ICR840-2! • Compensate for the insufficiently small dots with the "Deviation of dot size" slider. Download to the ICR840-2. • Select the CODE CONFIGURATION tab and click the EDIT button in the 2D SYMBOLOGIES section. Click the OPTIMISATION PARAMETERS button. Click the "Tolerate finder errors" checkbox. Download to the ICR840-2. • Select the CODE CONFIGURATION tab and click the EDIT button in the 2D SYMBOLOGIES section. In the DATA FIELDS section, click the "Allow rectangular data fields" option. Download to the ICR840-2! • With CLV-Setup: Select the CODE CONFIGURATION tab and click the EDIT button in the 2D SYMBOLOGIES section. Select the "Black" option in the BACKGROUND section. Download to the ICR840-2.

Tab. 8-6: Troubleshooting: Result-status output errors in Reading mode (reading 2D codes)

Malfunctions when reading 1D codes (bar codes)

Fault	Possible cause	Remedy
<p>1. No Read The "Result" LED (default setting: "Good Read") does not light up at the end of the reading pulse.</p> <ul style="list-style-type: none"> - The "Result 2" switching output (default setting: "Good Read") does not output a pulse - the ICR840-2 outputs the status ST = 2 in the reading result of the host interface (if ST is enabled for output in the Reading data on the DATA STRINGS tab; this is not selected in the default setting) - the ICR840-2 outputs the system message "no code" via the auxiliary interface (Terminal Emulator of CLV-Setup) 	<ul style="list-style-type: none"> • Read not successful, since there was no bar code in the illumination field during the reading pulse • Bar code type not activated for reading • Code not completely within the distance-dependent field of view • Configured resolution lower than required • Configured number of multiple reads not reached • The bar code is tilted excessively with respect to the illumination field • The reading angles at which the bar code appears to the ICR840-2 are too large • Evaluation criteria for bar code not set correctly 	<ul style="list-style-type: none"> • Perform the reading while the code is stationary. Check the content of the image memory with CLV-Setup/ImageFTP: trigger the ICR840-2; is the code in the image memory once the reading cycle is complete?? • All bar code types are deactivated in the default setting. With CLV-Setup: Select the CODE CONFIGURATION tab and find the 1D SYMBOLOGIES section. Click the checkbox of the desired code type. Click the relevant EDIT button. Make the settings on the tab of the selected code type. Download to the ICR840-2! • Check with image output via ImageFTP: Has all the code been recorded in the image memory? Is the code too long? • With CLV-Setups: Select the READING CONFIGURATION tab and enter the correct value for "Minimum bar width 1D" in the READING PARAMETERS section. Download to the ICR840-2. • Extend the reading pulse, reduce the number with CLV-Setup • With CLV-Setup: Select the CODE CONFIGURATION tab and find the 1D DECODER section. Select the SMART decoder. Download to the ICR840-2. • With CLV-Setup: Select the CODE CONFIGURATION tab and find the 1D DECODER section. Select the Standard decoder. Download temporarily to the ICR840-2. Start PERCENTAGE EVALUATION. Observe the reading quality (reading quality > 70 %!). Realign ICR840-2 if necessary. If ok, choose SMART decoder. Download to the ICR840-2. • With CLV-Setup: Select the CODE CONFIGURATION tab and find the 1D SYMBOLOGIES section. Enable all code types (except Pharmacode), set code lengths to FREE. Download temporarily to the ICR840-2. Start PERCENTAGE EVALUATION.

Tab. 8-7: Troubleshooting: Result-status output errors in Reading mode (reading bar codes)

ICR840-2

Fault	Possible cause	Remedy
<p>1. No Read The "Result" LED (default setting: "Good Read") does not light up at the end of the reading pulse.</p> <p>- continued -</p>	<ul style="list-style-type: none"> Bar code quality inadequate Bar code printed negatively (light on dark background) 	<ul style="list-style-type: none"> Check: Is the print contrast adequate? With CLV-Setup: Select the READING CONFIGURATION tab and click the CODE PROPERTIES PARAMETERS button. Improve the contrast with the "Contrast" slider. Download to the ICR840-2. Check: Are sufficient blank zones present? Is the print contrast adequate? Are the specified print tolerances exceeded? With CLV-Setup: Select the READING CONFIGURATION tab and find the QUIET ZONE section: Is "Start/Stop auto" selected? Perform test read with a reference code in good condition. With CLV-Setup: Select the CODE CONFIGURATION tab and click the "Black" option in the 1D BACKGROUND field in the 1D SYMBOLOGIES section. Download to the ICR840-2.
<p>2. Good Read: The ICR840-2 outputs the data contents of the bar code incorrectly, incompletely or modified via the host interface.</p>	<p>The ICR840-2 suppresses the last character in the bar code</p>	<p>With CLV-Setup: Select the CODE CONFIGURATION tab. In the 1D SYMBOLOGIES section, click the EDIT button for the relevant code: Is Transmit Check Digit activated? Change if necessary. Download zum ICR840-2!</p>

Tab. 8-7: Troubleshooting: Result-status output errors in Reading mode (reading bar codes) (contd.)

8.5.4 Malfunctions in Reading mode: Errors when outputting the result status

Prerequisite The "Device Ready" LED lights up. If not, see [Table 8-3, Page 109](#).

Fault	Possible cause	Remedy
<p>1. The switching output "Result 1" (default setting: Device Ready) does not switch from HIGH to LOW. The switching output "Result 2" (default setting: Good Read) do not output a pulse.</p>	<ul style="list-style-type: none"> The event of the assigned function for outputting the result status does not occur during the reading process Incorrect switching mode parameterized in ICR840-2 	<ul style="list-style-type: none"> Not applicable. Check with CLV-Setup: Check by choosing the DEVICE CONFIGURATION tab. Click the RESULT OUTPUT PARAMETERS button. Are the outputs set to "Not Inverted Output"? Change if necessary. Download to the ICR840-2.
<p>2. The beeper is not confirming the output of the reading result (default setting: "Good Read")</p>	<p>Beeper deactivated</p>	<p>Check with CLV-Setup: Select the DEVICE CONFIGURATION tab and find the BEEPER section: is "On" selected?</p>

Tab. 8-8: Troubleshooting: Errors in the result status output in Reading mode

8.5.5 Malfunctions: Errors when using the image outputting in reading mode

Prerequisite The "Device Ready" LED lights up. If not, see [Table 8-3, Page 109](#)

Fault	Possible cause	Remedy
ImageFTP does not display the contents of the ICR840-2 image memory.	<ul style="list-style-type: none"> • The ICR840-2 is not triggered • Image acquisition parameterized incorrectly in the ICR840-2 • Ethernet connection: The PC (server) has an incorrect FTP address • Ethernet connection: The ICR840-2 has not been defined as an FTP client • ImageFTP: the server has been stopped or the image has been frozen • The evaluation range in the image memory was incorrectly limited 	<ul style="list-style-type: none"> • Trigger the ICR840-2 accordingly. • Check with CLV-Setup: Select the IMAGE ACQUISITION tab and find the ACQUISITION section: output activated? If condition is selected, does this occur during the read process? IMAGE FORMAT section: is at least one image type selected? • Check with CLV-Setup: Select the ETHERNET tab and find the SERVER ADDRESS section: enter the address. This must not be the same as the TCP/IP address. • ETHERNET tab, FTP-CLIENT section: active? • In the program window, restart the server or unlock the current image • Check with image output via ImageFTP: Is the code recorded completely in the image memory? Check with CLV-Setup: Select the READING CONFIGURATION tab, click the CODE PROPERTIES PARAMETERS button, find the IMAGE GEOMETRY section: Active evaluation range ok? Select the READING CONFIGURATION tab. Find the AREA OF INTEREST section: Are the min. and max. code position values correct?

Tab. 8-9: Troubleshooting: Errors when using the image transfer via the Ethernet interface

8.6 SICK Service

If a system error occurs repeatedly or if an error cannot be eliminated using the above measures, the ICR840-2 may be defective. The ICR840-2 cannot be repaired by the user, meaning that it is not possible to re-establish functions after a failure. However, the ICR840-2 can be rapidly replaced by the user. See [Chapter 7.4.2 Replacing the ICR840-2, Page 103](#).

- If an error occurs which cannot be eliminated, please contact SICK Service:
 - International: Competent SICK branch office or SICK subsidiary.
 - For telephone numbers and e-mail addresses see the *back page* of these operating instructions.
 - For the postal addresses please visit www.sick.com.
- Only return devices after consultation with the SICK Service.

Important Repairs to the ICR840-2 should only be carried out by qualified and authorised SICK AG service staff.

ICR840-2

9 Technical data

9.1 Data sheet for the ICR840-2 Image Code Reader

Type	ICR840-2A	ICR840-2B	ICR840-2C	ICR840-2D
Reading range	High Density	Standard Range	Mid Range	Longe Range
Front reading window	ICR840-2A0020	ICR840-2B0020	ICR840-2C0020	ICR840-2D0020
Side reading window	ICR840-2A1020	ICR840-2B1020	ICR840-2C1020	ICR840-2D1020
Focus	Fixed focus			
Illuminon LEDs (wavelength)	Red light ($\lambda = 617 \pm 15$ nm)			
MTFB of LEDs	20,000 h			
LED class of device	Class 1 according to EN 60825-1/IEC 60825-1 (for publication date see the warning label on the device), shut off of LEDs after 10 min ¹⁾ , see also Chapter 2.3.3 LED radiation, Page 10			
Image sensor	CMOS matrix sensor, 1.3 Mega pixel (1,280 x 1,024 Pixel)			
Image recording rate	25 Hz at 1.3 Mega pixel			
Resolution	0.1 to 2 mm (3.9 to 78.7 mil)	0.15 to 2 mm (5.9 to 78.7 mil)	0.25 to 2 mm (9.8 to 78.7 mil)	0.3 to 2 mm (11.8 to 78.7 mil)
Focus position	50 mm (1.97 in)	80 mm (3.15 in)	115 mm (4.35 in)	145 mm (5.71 in)
Reading ranges	see Fig. 9-2, Page 124	see Fig. 9-3, Page 124	see Fig. 9-4, Page 125	see Fig. 9-5, Page 125
Print contrast (PCS)	≥ 60 %			
Ambient light compability	2,000 lx (on 2D code/bar code)			
No. of 2D codes per image/reading interval ²⁾	1 to 50			
2D code types	Data Matrix ECC200			
2D code size	Accord. to ISO/IEC 16022			
No. of bar codes per image/reading interval ²⁾	1 to 50 (standard decoder), 1 to 6 (SMART decoder)/1 to 50 (autodiscriminating)			
Bar code types	Code 39, Code 128, Codabar, EAN, EAN 128, UPC, 2/5 Interleaved, Pharmacode ³⁾ , RSS limited ³⁾			
Bar code length	Max. 50 characters ⁴⁾ (max. 4,000 characters about all bar codes per reading interval). Due to the distance-dependent dimensions of the field of view, the scannable code length has decreased with respect to the length that can be decoded (see also examples in Table 9-2, Page 122).			
Print ratio	2:1 to 3:1			
No. of multiple reads (bar code)	1 to 99			
Visual indicators	4 x LEDs (status indicators)			
Acoustic indicator	Beeper, can be deactivated and assigned to functions for read result status indication			
Reading pulse	"Sensor 1" switching input (option: additionally "Sensor 2")/serial interface/free running			
Start/stop delay	0 to 10,000 ms ("Sensor" switching input/serial interface)			
"Host" data interface	Serial (RS 232 or RS 422/485) or Ethernet (port 2112), variable data format (serial) and data output format			
<p>1) (default setting); in Reading mode with the "switching input" and "serial interface" pulse types</p> <p>2) Reading interval: time window generated internally for evaluating the code</p> <p>3) Only with standard decoder for bar codes</p> <p>4) SMART decoder for bar codes: Code 39: max. 30 characters; Codebar: max. 30 characters; Code 128, EAN 128: max. 48 characters (max. 96 "half characters")</p>				

Tab. 9-1: Technical specifications of ICR840-2

Type	ICR840-2A	ICR840-2B	ICR840-2C	ICR840-2D
Data transfer rate	300 to 57,600 Bd			
Protocols	SICK-Standard			
Physical configurations	Stand-alone			
"Ethernet" data interface	10/100 MBit/s, TCP/IP and FTP			
"CAN" data interface	10 kbps to 1 Mbps, CANopen protocol, CAN scanner network			
"Aux" data interface	Serial: RS 232 (9,600 Bd, 8 Data bits, no parity, 1 stop bit) or Ethernet (port 2111), fixed data output format			
Digital switching inputs	2 ("Sensor 1", "Sensor 2") <ul style="list-style-type: none"> - Optodecoupled, $V_{in} = \text{max. } 28 \text{ V}$, non-interchangeable, can be connected to a PNP output - "Sensor 1" (reading pulse): variable debouncing time (min. 3 ms) - "Sensor 2" (variable function): variable debouncing time (min. 3 ms) 			
Digital switching outputs	2 ("Result 1", "Result 2") <ul style="list-style-type: none"> - Variable output function for result status indication - Variable pulse duration (static, or 10 to 990 ms) - "Result 1": Low side switch, additional function: amongst others triggering or direct powering of an external illumination, NPN, $I_{out} = \text{max. } 100 \text{ mA}$, short-circuit-proof - "Result 2": High side switch, PNP, $I_{out} = \text{max. } 100 \text{ mA}$, short-circuit-proof 			
Electrical connection	Cable 0.9 m (2.95 ft) with 15-pin D-Sub HD plug, Ethernet connection: RJ45 socket 10base T on the device			
Operating voltage/power consumption	15 to 30 V DC/ max. 13 W (with disconnected switching outputs) SELV respectively PELV according to IEC 60364-4-41 (2005)			
Housing	Zinc die-cast			
Electrical safety	According to EN 61010-1 (2001-03)			
Protection class	III, according to EN 61140 (2002-03)			
Enclosure rating	IP 65 according to EN 60529 (1991-10); A2: 2002-02 with mounted adapter frame and IP 65 Ethernet cable or with mounted adapter frame and IP 65 cover. IP 30 without covered Ethernet connection or with standard Ethernet cable.			
EMC test	According to EN 61000-6-2 (2005-08), EN 61000-6-4 (2001-10)			
Vibration/ shock test	According to EN 60068-2-6 (1995)/ to EN 60068-2-27 (1993)			
Weight	Approx. 900 g (31.75 oz) with connection cable			
Operating/storage temperature	0 to +40 °C/-20 to +70 °C (+32 to +100 °F/-4 to +158 °F)			
Max. rel. humidity	90 %, non-condensing			
Colour	SICK blue (RAL 5012)			

Tab. 9-1: Technical specifications of ICR840-2 (contd.)

9.1.1 Suitable bar code length in the field of view

Bar code type	Modul with	Number of characters	Length incl. quiet zone
Code 128	0.15 mm (5.9 mil)	18	38 mm (1.49 in)
	0.25 mm (9.8 mil)	9	39 mm (1.53 in)
	0.35 mm (13.8 mil)	5	39 mm (1.53 in)
Code 39	0.15 mm (5.9 mil)	16	38 mm (1.49 in)
	0.25 mm (9.8 mil)	8	37 mm (1.45 in)
	0.35 mm (13.8 mil)	5	39 mm (1.53 in)

Tab. 9-2: Standard Range: Suitable bar code lengths at focus position (distance 80 mm (3.15 in), field of view 40 mm x 32 mm (1.58 in x 1.26 in))

ICR840-2

Bar code type	Modul with	Number of characters	Length incl. quiet zone
2/5 Interleaved	0.15 mm (5.9 mil)	32	38 mm (1.49 in)
	0.25 mm (9.8 mil)	18	39 mm (1.53 in)
	0.35 mm (13.8 mil)	12	39 mm (1.53 in)

Tab. 9-2: Standard Range: Suitable bar code lengths at focus position (distance 80 mm (3.15 in), field of view 40 mm x 32 mm (1.58 in x 1.26 in)) (contd.)

9.2 ICR840-2 dimensional drawing

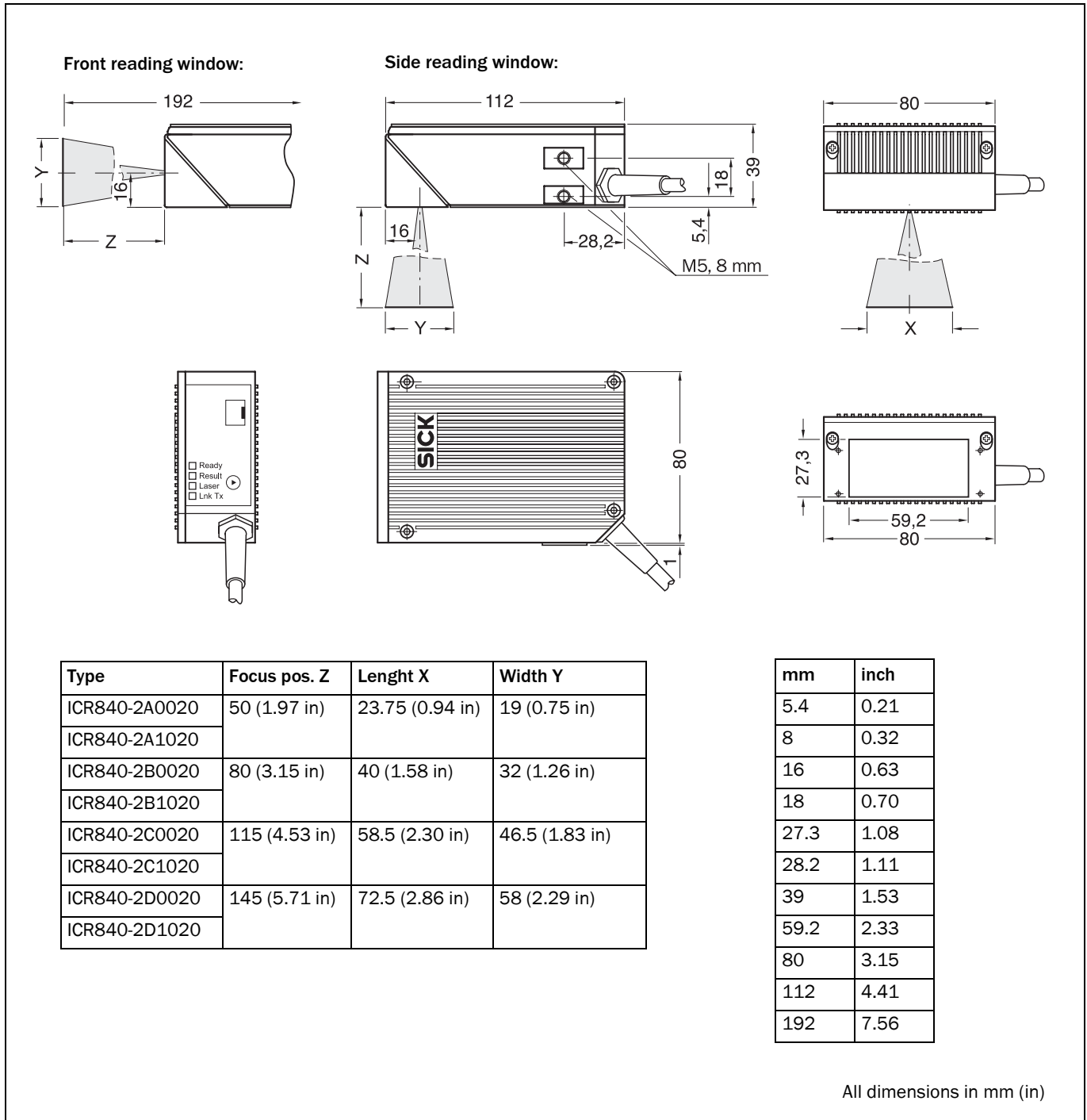


Fig. 9-1: Dimensions of the ICR840-2 with reading distance (Z) and resulting field of view (X,Y)

9.3 Specification diagrams

9.3.1 Reading conditions for the diagrams

Test code	Code 128/Data Matrix ECC200
Print ratio	2:1
Print contrast	Bar codes: > 90 %, Data Matrix: Grade A accord. to ISO/IEC 16022
Tilt	typical $\pm 30^\circ$ and resolution 0.17 to 0.5 mm (6.7 to 19.7 mil)
Ambient light	< 2,000 lx
Good read rate	> 75 %

Tab. 9-3: Reading conditions for specification diagrams

9.3.2 Reading ranges ICR840-2A0020/-2A1020 (High Density)

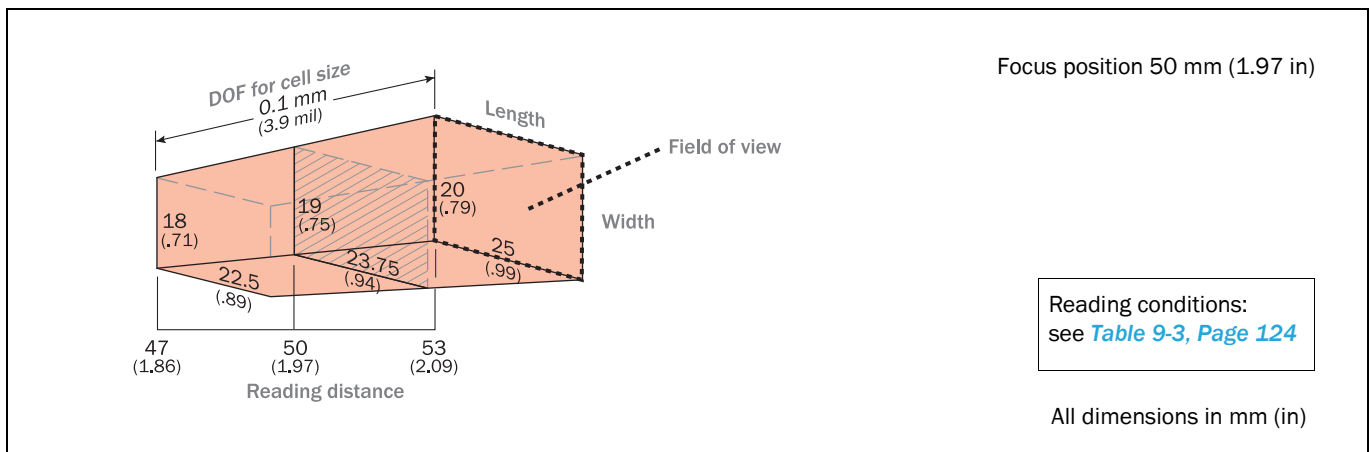


Fig. 9-2: ICR840-2A0020/-2A1020 (High Density): Reading ranges and dimensions of the field of view

9.3.3 Reading ranges ICR840-2B0020/-2B1020 (Standard Range)

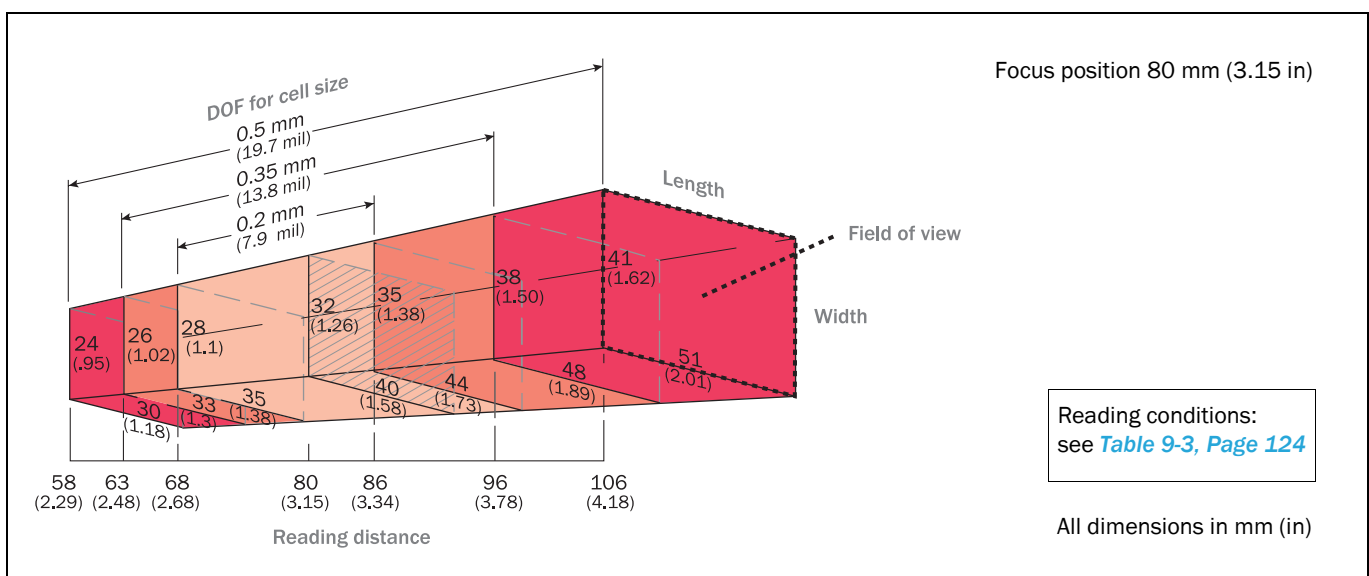


Fig. 9-3: ICR840-2B0020/-2B1020 (Standard Range): Reading ranges and dimensions of the field of view

ICR840-2

9.3.4 Reading ranges ICR840-2C0020/-2C1020 (Mid Range)

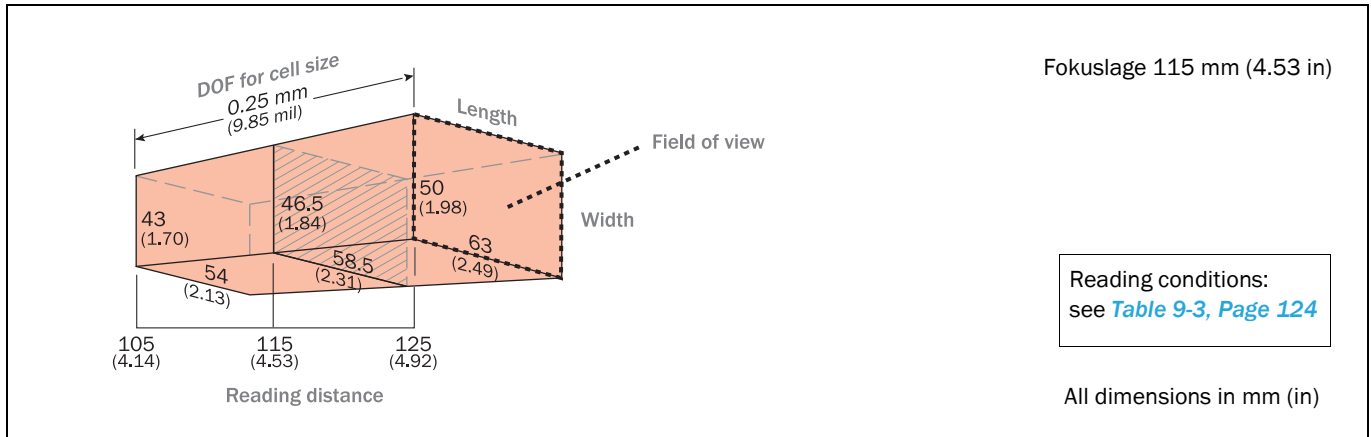


Fig. 9-4: ICR840-2C0020/-2C1020 (Mid Range): Reading ranges and dimensions of the field of view

9.3.5 Reading ranges ICR840-2D0020/-2D1020 (Long Range)

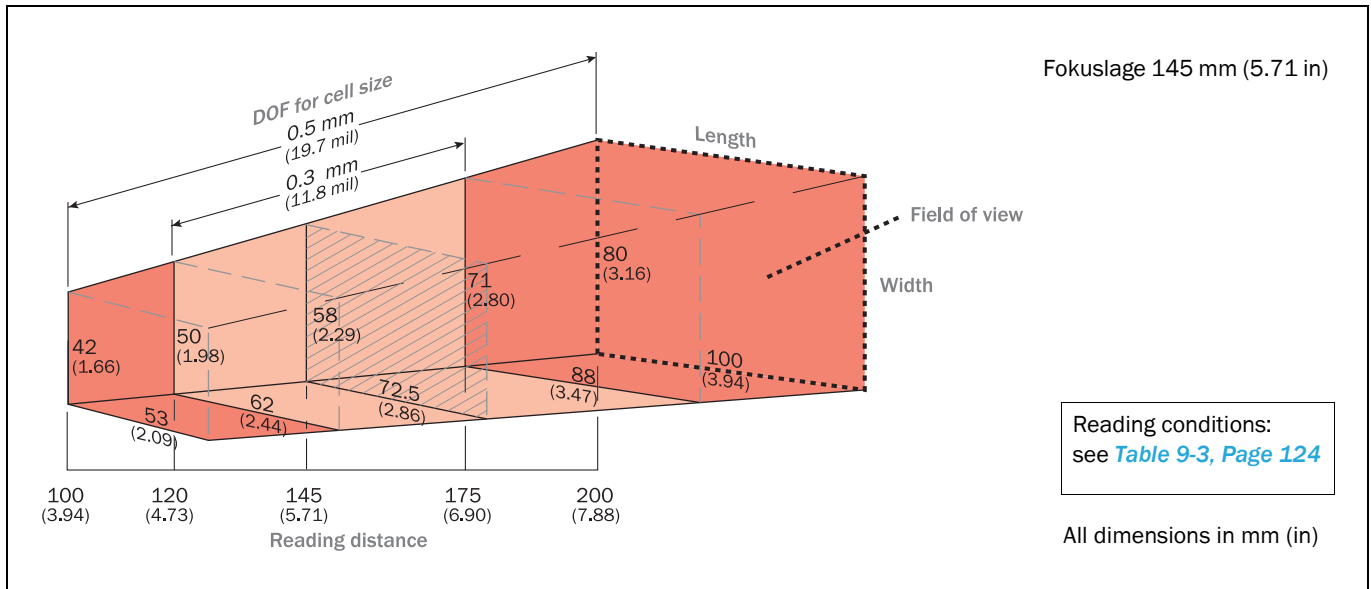


Fig. 9-5: ICR840-2D0020/-2D1020 (Long Range): Reading ranges and dimensions of the field of view

10 Appendix

10.1 Appendix overview

The Appendix contains the following additional information:

- Settings for reading 2D codes (Data Matrix ECC200)
- System messages
- Installation and operating instructions for the PC-based "CLV-Setup" program
- Configuring the ICR840-2 with command strings
- Auxiliary tables
- Special applications and procedures
- Ordering information
- Dimensional drawings of the accessories
- Supplementary documentation (overview)
- Glossary
- Copy of the EC Declaration of Conformity
- List of tables and figures
- Index
- Scannable sample 1D and 2D codes

10.2 Settings for reading Data Matrix ECC200

The parameter values for reading are selected in the default setting of the ICR840-2 in such a way that the largest possible bandwidth is covered by applications.

If reading with the parameter values of the default setting is not successful, appropriate adjustments can be made to improve the image quality in the ICR840-2 (before decoding) in accordance with [Chapter 10.2.1 Improving the image quality, Page 129](#).

To optimize the reading characteristics, especially for time-critical applications, the evaluation parameters can be further restricted in accordance with [Chapter 10.2.2 Optimizing reading characteristics, Page 131](#). This accelerates the output of the reading result in the "immediate" output mode, as the decoder requires less computation time



For all changes to the parameter set using CLV-Setup, proceed as follows:

1. Change parameter value(s) as desired.
2. Download to the ICR840-2 with the TEMPORARY save option.
3. Repeat reading with modified parameter value(s).
4. Change additional parameter values if necessary.
5. If reading is successful, download to the ICR840-2 with the PERMANENT save option.

Important We recommend to check the content of the image memory (ICR840-2) using ImageFTP. See also [Chapter 6.4 The image transfer program ImageFTP, Page 58](#).

The adjustments cover the following settings (initial status: default settings):

Improving the image quality:

- a) Properties of the code layout
- b) Illumination mode

Optimizing the reading characteristics:

- a) Minimum and maximum cell size
- b) Setting the symbol size
- c) Code properties
- d) Minimum code contrast
- e) Image geometry
- f) Resolution

10.2.1 Improving the image quality

a) Properties of the code layout

1. Select the READING CONFIGURATION tab.

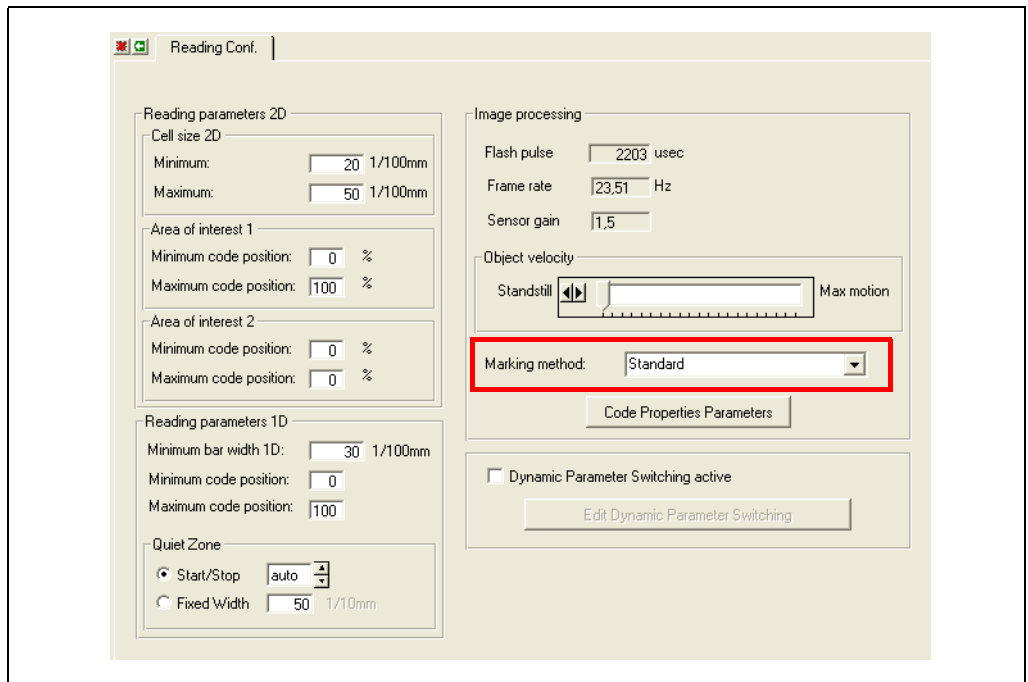


Fig. 10-1: CLV-Setup: "Reading Configuration" tab

2. Select the used marking method.
3. Click the CODE PROPERTIES PARAMETERS button.
The CODE PROPERTIES PARAMETERS dialog box is then displayed.

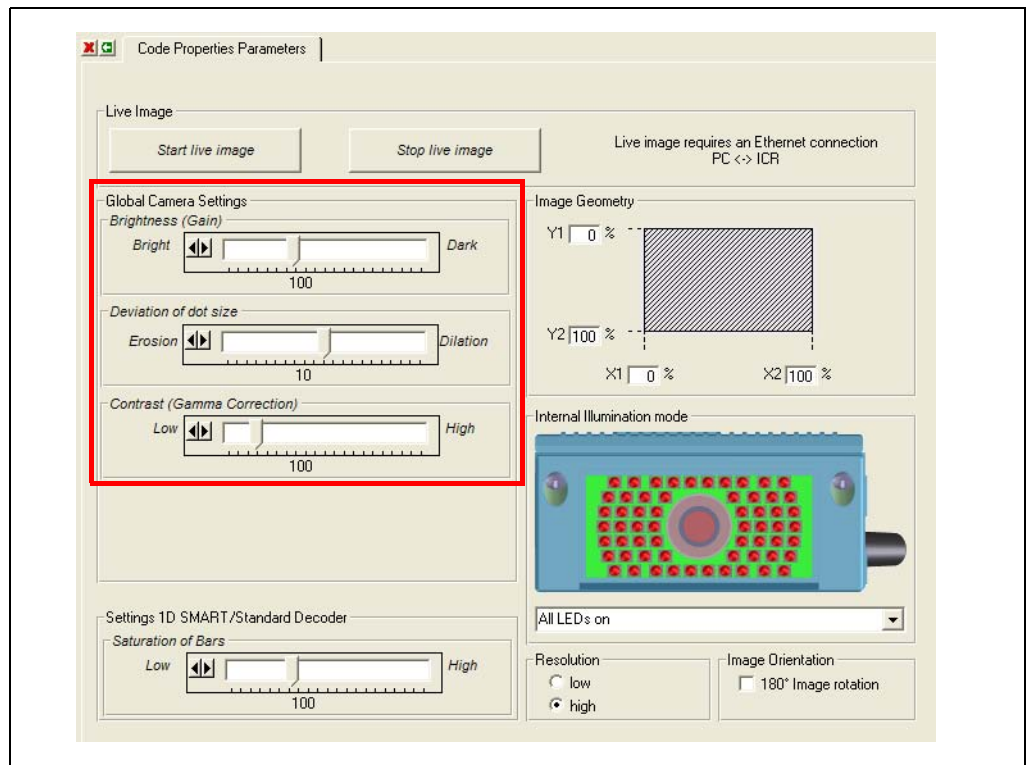


Fig. 10-2: CLV-Setup: "Code Properties Parameters" tab

4. Adapt the following parameter values if necessary:

"Brightness" slider:

The slider affects the brightness and provides better contrast to the cells in the code layout when reading 2D codes.

- For codes with a dark background which are to be read, move the slider incrementally in the LIGHT area until reading is successful.

"Deviation of dot size" slider:

The slider is specifically used to adjust the ICR840-2 in line with 2D codes layouts created with ink-jet printers or with needles (dot peening).

In these marking procedures, the individual dots are often so small that they do not touch each other which means that cells and bars are not solid.

You can use the slider to increase the white/black cells in the image buffer memory incrementally:

- Depending on the code to be read, move the slider incrementally until the reading is successful.

Fig. 10-3 shows an example of using the slider.

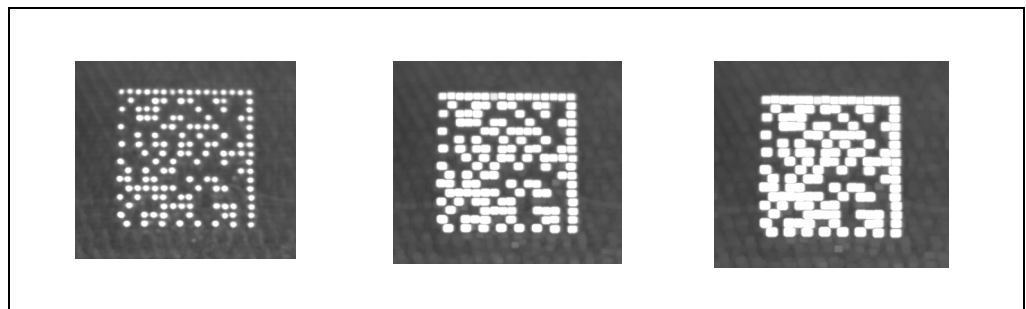


Fig. 10-3: CLV-Setup: using the "Deviation of dot size" slider

"Contrast (Gamma correction)" slider:

The slider increases or decreases non-linearly the image contrast. The noise will be decreased, the contrast in the "middle range" of the grey tone will be increased.

b) Illumination mode

1. Select the READING CONFIGURATION tab (*Fig. 10-1, Page 129*).
2. Click the CODE PROPERTIES PARAMETERS button.
The CODE PROPERTIES PARAMETERS dialog box is then displayed (*Fig. 10-4*).
3. In the INTERNAL ILLUMINATION MODE group, define the number of LED segments for the ICR840-2 which are to be used for illuminating the reading area.
The LEDs are grouped in 4 segments, which can be switched on by the ICR840-2 independent of each other. In this way, the illumination can be specially adjusted to different applications. In CLV-Setup, you can select the various LEDs accordingly.

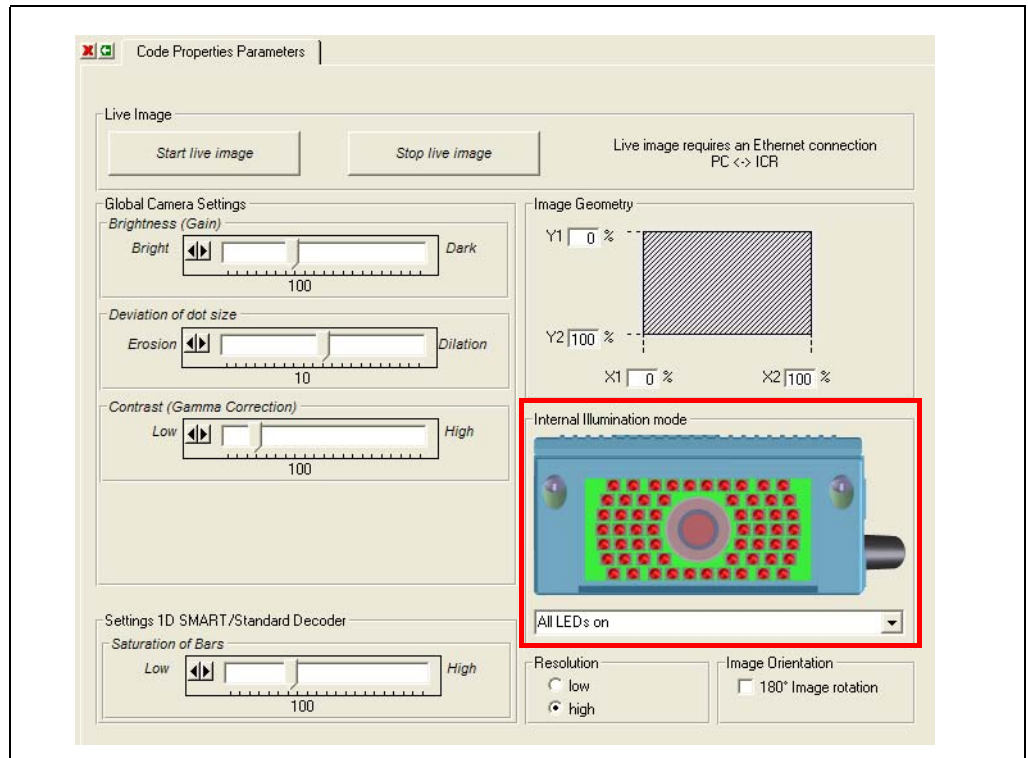


Fig. 10-4: CLV-Setup: "Code Properties Parameters" tab

10.2.2 Optimizing reading characteristics

Prerequisite High code quality (high contrast, coherent structure, error-free alternating pattern).

a) Minimum and maximum cell size

1. Select the READING CONFIGURATION tab.

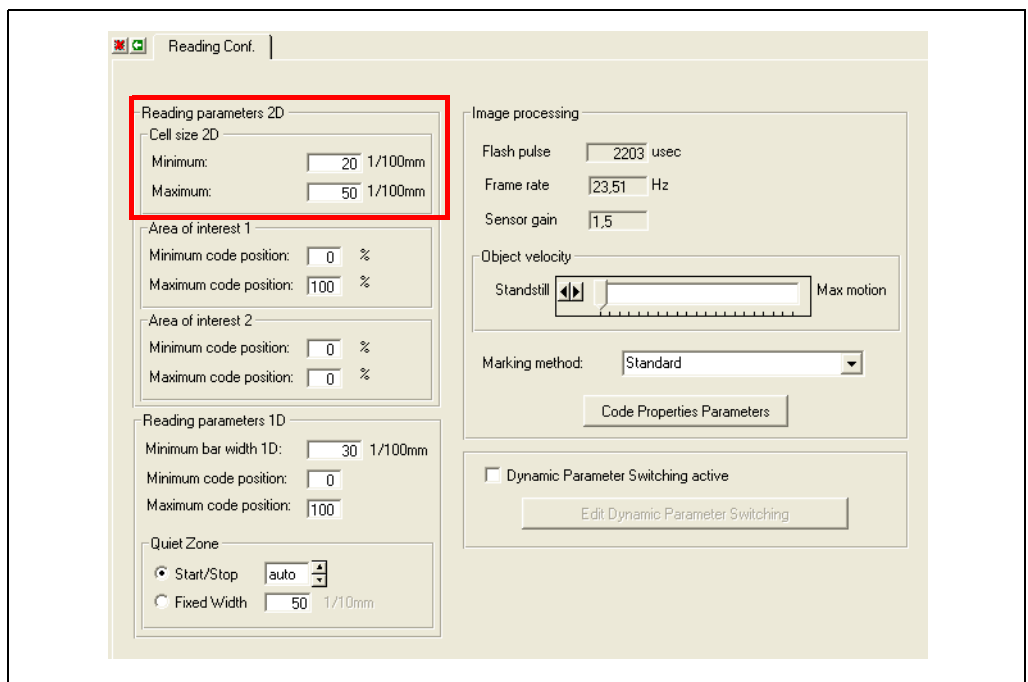


Fig. 10-5: CLV-Setup: "Reading Configuration" tab

- Adjust the following parameter values:

"2D reading parameters" section: minimum/maximum cell size 2D

The cell size setting is a key factor in the reading quality:

If the ICR840-2 is to read symbols with different cell sizes, the area of the cell sizes that occur must be set here.

- Adjust the minimum cell size in line with the code to be read. The minimum cell size should be slightly smaller than the cell size in the code layout.
- Adjust the maximum cell size in line with the code to be read. The maximum cell size should be slightly larger than the cell size in the code layout.

The smaller the range between the minimum and maximum cell size the shorter will be the decoding time.

b) Setting the symbol size

- Select the CODE CONFIGURATION tab.

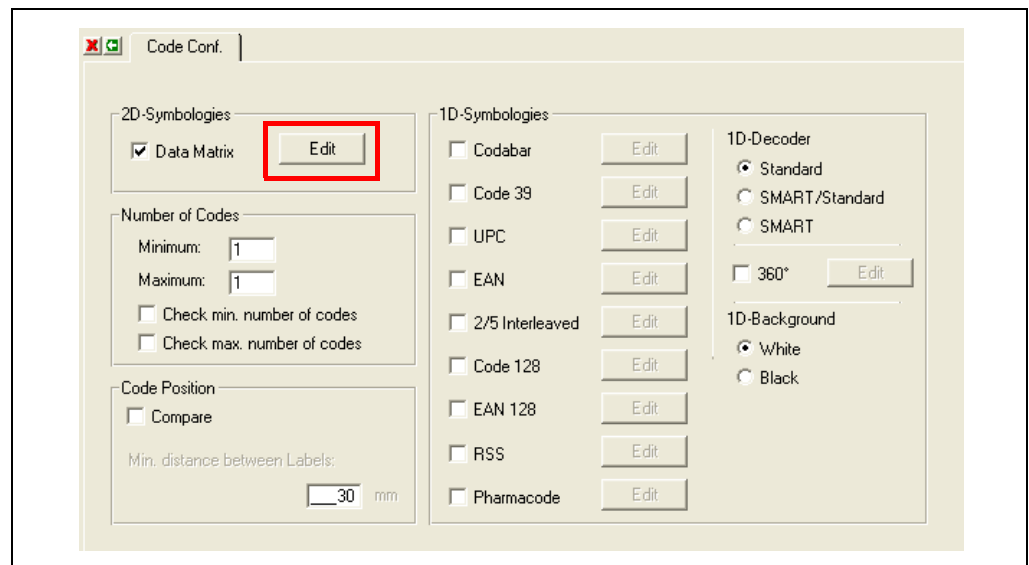


Fig. 10-6: CLV-Setup: "Code configuration" tab

- Click the EDIT button in the 2D-SYMBOLOGIES section.
The DATA MATRIX tab opens.

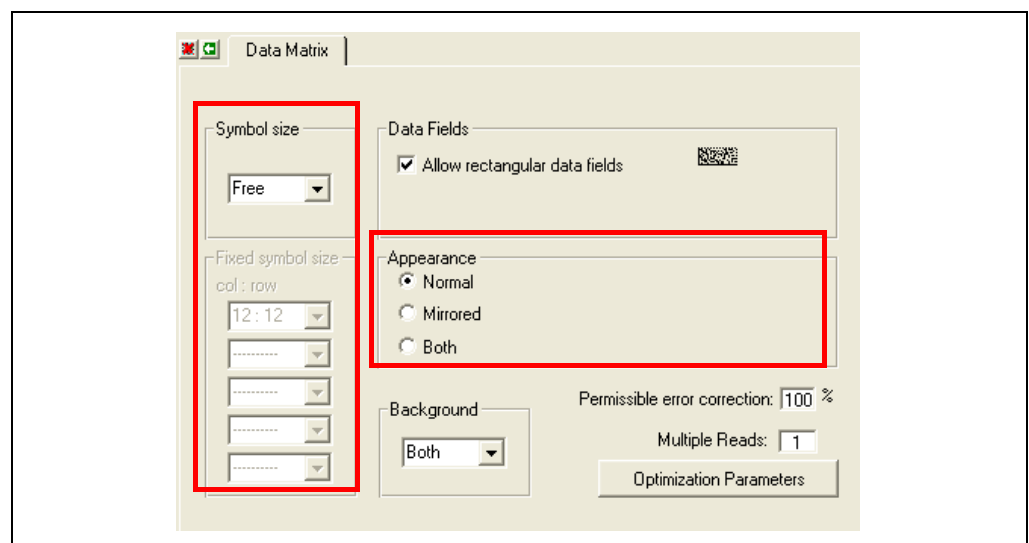


Fig. 10-7: CLV-Setup: "Data Matrix" tab

- Adapt the following parameter values if necessary:

Symbol size:

When the symbol size is set to free, the ICR840-2 reads all symbol sizes based on the specification of the Data Matrix ECC200. In the DATA FIELDS section, additional evaluation characteristics can be defined if the symbol size is not square.

Important

To increase reading performance, we recommend only permitting symbol sizes which are actually relevant for evaluation.

- If codes with between one and five different symbol sizes are to be read, click the FIXED radio button.
- Select the individual symbol sizes in the drop-down lists of the input fields in the FIXED SYMBOL SIZE section.

Reading of mirrored codes

If the ICR840-2 is to be read a mirrored code (code layout is applied in mirrored manner or e.g. read from back through a glass panel) the code is also mirrored in the image buffer memory of the ICR840-2.

- For decoding the code, select the MIRRORED option.

c) Code properties

- Select the CODE CONFIGURATION tab.

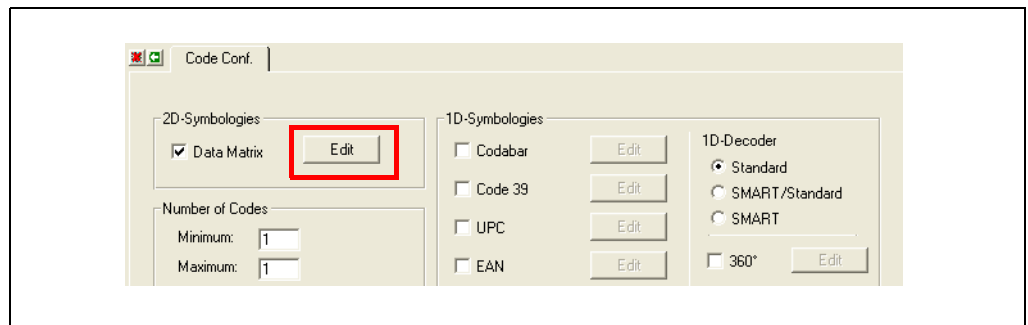


Abb. 10-8: CLV-Setup: "Code configuration" tab

- Click the EDIT button in the 2D-SYMBOLOGIES section.
The DATA MATRIX tab opens.

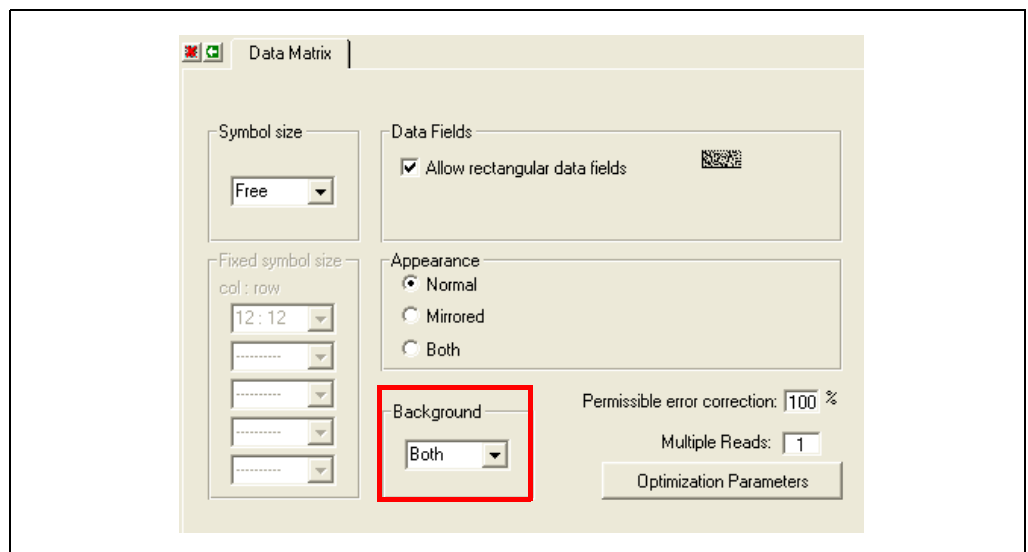


Fig. 10-9: CLV-Setup: "Data Matrix" tab

- Adapt the following parameter values if necessary:

"Background" section:

- If the code to be read is printed negatively (white on black), select the BLACK option in the listing field.

The setting BOTH allows mixed operation.

d) Minimum code contrast

- On the DATA MATRIX tab click the OPTIMIZATION PARAMETERS button.
The OPTIMIZATION PARAMETERS tab opens.

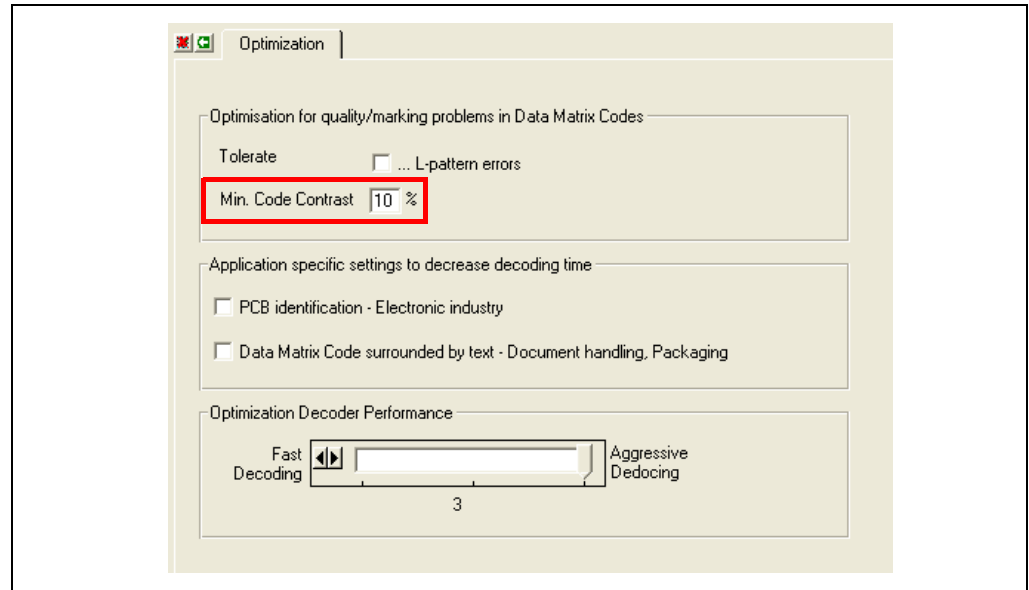


Fig. 10-10: CLV-Setup: "Optimisation" tab

- Adapt the following parameter value:

Symbol contrast:

The ICR840-2 only starts the evaluation of 2D symbologies if the symbology contrast in the image buffer memory has reached a defined level. This level can be set.

The function helps if the contrast is weak or to improve the decoder performance.

The lower the contrast value is set the lower may be the contrast in the code layout. If the contrast is good, the contrast value can be increased to reduce decoding time.

- Set the symbology contrast corresponding to the 2D code and check reading performance again.

e) Image geometry

1. Select the READING CONFIGURATION tab (*Fig. 10-5, Page 131*).
2. Click the CODE PROPERTIES PARAMETERS button.
The CODE PROPERTIES PARAMETERS dialog box is then displayed.

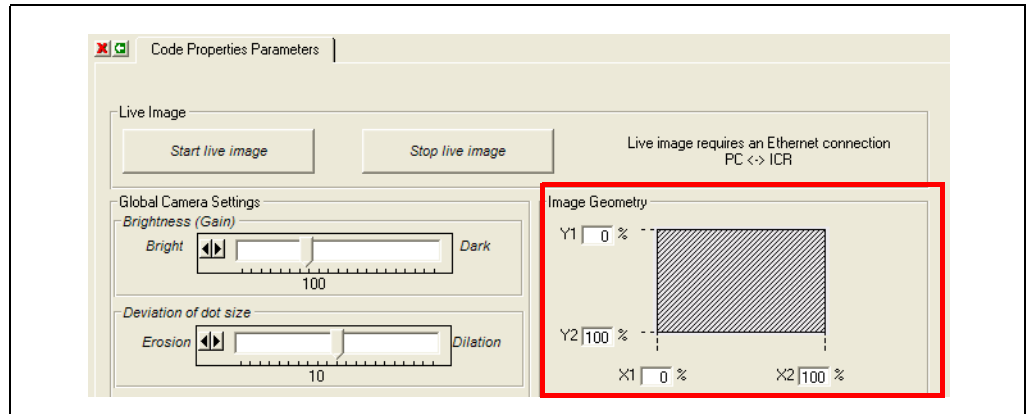


Fig. 10-11: CLV-Setup: "Code Properties Parameters" tab

3. When objects are conveyed in a consistent manner and the code is in the same position on the objects, you can reduce the matrix sensor area to be evaluated by entering the relevant percentage values in the IMAGE GEOMETRY section.

Sample:

Y1 = 20 %, Y2 = 70 %; X1 = 10 %, X2 = 80 %

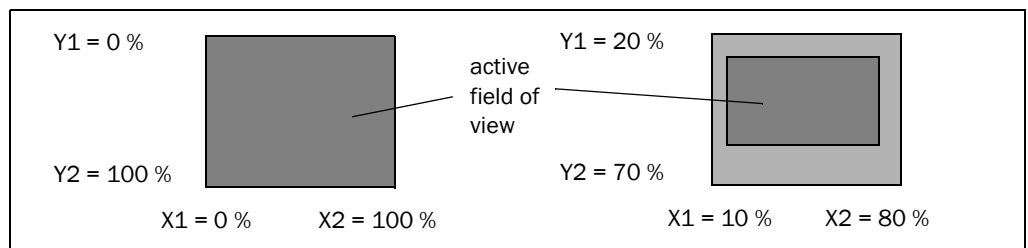


Fig. 10-12: Limiting the active image recording area of the matrix sensor

Important The limitation of the matrix sensor area for the selected values is not displayed graphically in the dialog box.

f) Resolution

1. Select the READING CONFIGURATION tab (*Fig. 10-5, Page 131*).
2. Click the CODE PROPERTIES PARAMETERS button.
The CODE PROPERTIES PARAMETERS dialog box is then displayed.
3. In the RESOLUTION section, switch from HIGH to LOW (if necessary) (*Fig. 10-13, Page 136*).

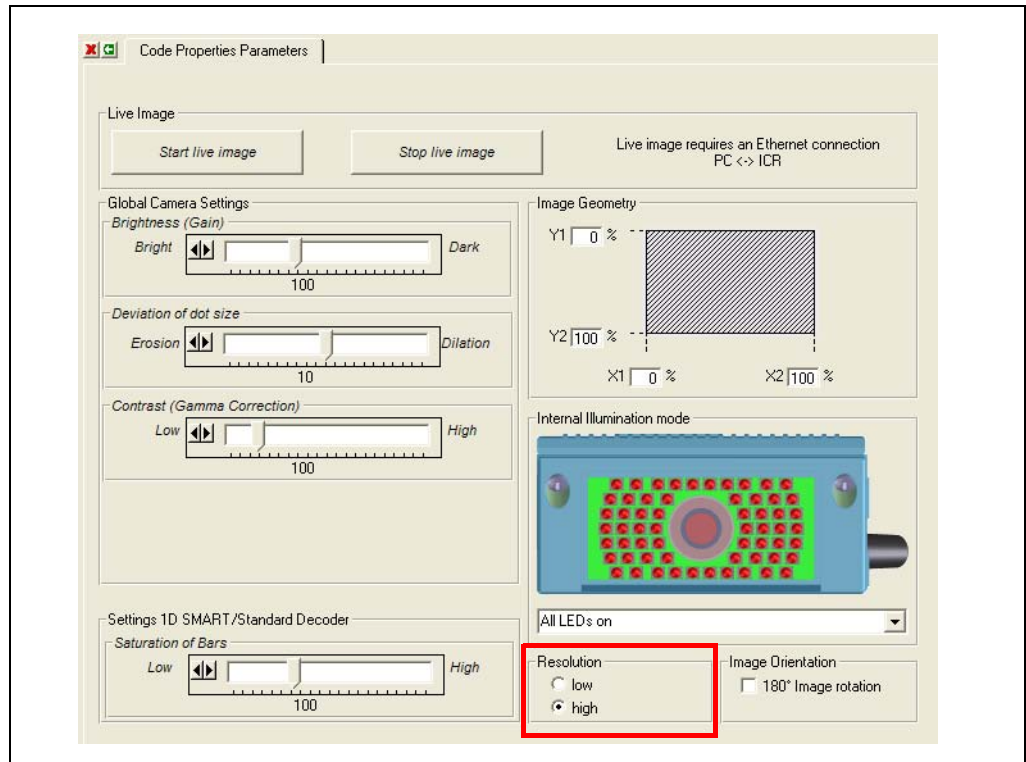


Fig. 10-13: CLV-Setup: "Code Properties Parameters" tab

Explanation When you switch from HIGH (default setting) to LOW, the ICR840-2 only uses a fourth of all the pixels in each cell over the same reading area for the evaluation. This can speed evaluation with large cell sizes.

10.3 System messages

The ICR840-2 outputs all system messages in plain text via the auxiliary interface. The messages are in English and can be displayed in the Terminal Emulator of CLV-Setup (see also [Chapter 6.10.1 Displaying messages, Page 89](#)).

Message	Meaning
"ICR840-2 SoftwareVersion VX.XX Change Index: 0000 Built: ... SC2D Built: ... Host: RS232 ..." ...	The software version and revision is displayed when the power supply is switched on
"no code"	In Reading/Parameter Evaluation mode, the ICR840-2 indicates that no codes matching the parameterized evaluation conditions were detected during the reading interval. (Error status ST = 2 output on the host interface)
"laser safety timeout"	The ICR840-2 has deactivated the illumination LEDs 10 min. (default setting) after the start of a reading pulse. The reading pulse is still active, even though the ICR840-2 is no longer reading. The reading pulse is to be terminated by resetting the pulse signal. The illumination LEDs is activated again with the next reading pulse.

Tab. 10-1: System messages of the ICR840-2

10.4 Installation and operating instructions for the CLV-Setup configuration software

The scope of delivery of the ICR840-2 includes a CD ROM ("Manuals & Software Bar Code Scanners") containing the CLV-Setup configuration software.

Important The latest version of the software can also be downloaded at www.sick.com.

10.4.1 Preparing for installation

For system requirements for the see [Chapter 6.2.2 System requirements for the CLV-Setup configuration software, Page 47](#).

1. Make sure you have the CD ROM ("Manuals & Software Bar Code Scanners") at hand.
2. Connect the ICR840-2 to the connection module CDB620 or CDM420 (see [Chapter 5.5.1 Connecting the power supply for the ICR840-2, Page 37](#)).
3. Connect the PC to the serial auxiliary interface of the ICR840-2 using a 3-core RS 232 data cable (null modem cable) (CDB620 or CDM420: connect the PC to the internal, 9-pin "Aux" plug). See [Chapter 5.5.3 Connecting the serial auxiliary interface, Page 39](#).
 – or –
 Connect the PC to the Ethernet interface of the ICR840-2.
 See also [Chapter 5.5.5 Connecting the Ethernet interface, Page 40](#).
4. Switch on the power supply to the CDB620 or CDM420.
 After the ICR840-2 has been started and has successfully completed the self-test, it outputs a tone and then two consecutive tones shortly afterwards when the Reading mode is initiated. The "Device Ready" LED lights up.
1. Switch on the PC and start Windows

10.4.2 Performing installation

The CLV-Setup installation program creates a main directory called "CLV", a series of sub-directories and the necessary links. Using the included uninstaller, CLV-Setup can be completely removed from the PC. As of version V2.6, CLV-Setup will only be available and further developed as a 32-bit application.

Important The following instructions describe how to install the software on Windows XP™. These instructions may differ depending on the operating system you are using (for example, administrator rights are required to install the software on Windows XP™).

Initial installation



CLV-Setup configuration software:

1. Shut down all the applications running in Windows.
2. Insert the CD ROM into the CD ROM drive.
3. If the auto run function is enabled, the start page (table of contents) of the CD ROM is automatically displayed in the your browser.
4. Select the SOFTWARE folder on top left.
5. Select CLV, ICR, OPS SETUP SOFTWARE in the listing.
 A table with CLV-Setup information is displayed.
6. Select DOWNLOAD under SOFTWARE FILE.
7. In the FILE DOWNLOAD dialog box select the option to install directly from the CD ROM.
 Confirm with OK. The software is automatically saved in the "Programs\CLV" directory

on your hard disk.

– or –

Select the option to save the software locally on your local hard disk and confirm with OK.

In the FILE DOWNLOAD dialog box select the desired target directory on your hard disk.

The "CLVSetupxx.exe" file is then saved at this location (xx = version number).

Select OPEN in the dialog box to start the file.

8. The installation program starts and guides you through the installation with screen messages. The program asks you for your user name and company name. This information appears as a header in printouts. "CLV-Setup" and CLV Assistant are installed. The software will be entered in the Windows start menu under "Programs\CLV-Setup".
9. Please read the Readme file, as it contains the latest information and problems regarding CLV-Setup.
10. Then confirm the final installation message by clicking "OK".

Online help CLV-Setup Help:

1. Return to the start page of the CD ROM with the opened folder "Software".
2. Select CLV, CLV HELP SOFTWARE in the listing.
A table with CLV Help information is displayed.
3. Select DOWNLOAD under SOFTWARE FILE.
4. In the FILE DOWNLOAD dialog box select the option to install directly from the CD ROM. Confirm with OK. The software is automatically saved in the "Programs\CLV" directory on your hard disk

– or –

Select the option to save the software locally on your local hard disk and confirm with OK.

In the FILE DOWNLOAD dialog box select the same target directory as selected for CLV-Setup on your hard disk.

The "CLVHelp.exe" file is then saved at this location.

5. After downloading the software, select OPEN in the dialog box to start the software. The software is installed in the sub directory "Help" of the main directory "CLV". CLV Help will also be entered in the Windows start menu under "Programs\CLV-Setup".

➤ Restart the PC.

Some Windows DLL files are possibly updated.

The "CLV-Setup" program, the CLV Assistant and the online "CLV-Setup Help" are installed and ready.

The program logs all of the files that are installed to the "install.log" file. This list is used by the uninstaller to remove CLV-Setup and must not be deleted if you want to use the uninstaller at some time in the future.

Updating program

There are two options for installing a new version of CLV-Setup:

- You can install the new version and still keep the old version (parallel installation)
– or –
- You can install the new version over the old version (overwrite)

Installing new version and retaining old version:

If you want to install the new version and still keep the old version of CLV-Setup, follow the procedure described under Initial installation. When the program asks you for the target directory, you must specify a **new directory**. Both versions of the software are then available but may not be started simultaneously.

The configuration files "*.scl" (scanner configuration), "*.npj" (network project), "*.opj" (OTS project) or "*.rpj" (redundant OTS project) of the old version can be used in the new version and contain the ICR840-2 parameter sets as well as project data if several devices had been organized logically by projects. In order to do so, copy the configuration files from the "data" directory of the old version to the "data" directory of the new version.

Installing new version over old version:

Before you can install the new version of the software, you must remove the files of the old version – with the exception of the configuration files "*.scl" (scanner configuration), "*.npj" (network project), "*.opj" (OTS project) or "*.rpj" (redundant OTS project). They contain the ICR840-2 parameter sets as well as project data if several devices had been organized logically by projects.

The uninstaller of the old version removes the program files. Using the uninstaller you can remove all of the files (with the exception of the configuration files) or only selected files. The default setting is a complete uninstall (the configuration files are not deleted). With the custom uninstall, the files are listed and only selected files are uninstalled. If you choose this uninstall method, ensure that the main directory containing the configuration files "*.scl" is not deleted.

We recommend that you move these files to another main directory and copy them back to the "data" directory later.

1. From the Windows Start menu, select PROGRAMS and the uninstaller for CLV-Setup. The uninstaller starts and guides you step by step through the uninstall procedure.
2. Select the uninstall method (complete or custom).
3. Install the new version of CLV-Setup as described under „[Initial installation](#)“. Select the same directory.

The new version of CLV-Setup is installed. The configuration files of the old version can be used again.

10.4.3 Starting "CLV-Setup"

The "CLV-Setup" program is launched with the following default settings:

Communication	COM 1 (RS 232), 9,600 bd, 8 data bits, 1 stop bit, no parity
Transmit control character	Start: STX, Stop: ETX
Receive control character	Start: STX, Stop: ETX
Unit of measure	Metric (depending on the selected installation)
Browser	user dependent
Language	As selected for the installation
Company name	As entered for the installation
User name	As entered for the installation
Establish connection to ICR840-2 automatically	At startup: Yes On scanner selection: Yes When the Terminal Emulator is started/closed: Yes
Initial screen	Yes
Storage confirmation prompt	Yes
Last type selected	CLV41x
File storage location	"data" (configuration files for ICR840-2)

Tab. 10-2: Default settings in CLV-Setup (extract)

Data communication via the serial auxiliary interface (RS 232):


1. Switch on the PC and start Windows
2. Choose CLV-Setup from the Start menu.
The introductory dialog box is displayed after the identifier for the SICK software.
3. Confirm the initial screen with "OK".
CLV-Setup then checks whether an ICR840-2 is connected to the **COM 1** port on the PC and whether the communication parameters on the PC match those on the ICR840-2. If this is the case, the "Connected" status is displayed with the ICR840-2 specification on the bottom, right-hand side in the status bar. The detected device type is displayed in the toolbar in the DEVICE drop-down list (in this case: ICR840).

The software then loads the internal device description of the ICR840-2 and the default settings of the parameter values from its database and displays these on the tabs. The software then copies the current parameter set from the memory (RAM) of the ICR840-2. This is displayed on the tabs instead of the default settings.

You can edit the current parameter set on the tabs. The default values are displayed when the device is used for the first time.

Troubleshooting

If CLV-Setup cannot establish a connection with the ICR840-2, it displays "No connection" in the status field on the bottom, right-hand side. There are two possible causes for this. The ICR840-2 is not connected or the communication parameters of the ICR840-2 do not match those of the PC. In this case, CLV-Setup enters the device type of the device it last communicated with in the DEVICE drop-down list on the toolbar. The default setting is CLV41x the first time CLV-Setup is started. The software then loads the internal device description for this type and the default settings of the parameter values from its database and displays these on the tabs.

1. Connect the PC to the serial auxiliary interface (port) of the ICR840-2 using a 3-core RS 232 data cable (null modem cable) (CDB620 or CDM420: connect the PC to the internal, 9-pin "Aux" plug). See [Chapter 5.5.3 Connecting the serial auxiliary interface, Page 39](#).
2. Click  (AutoBaud detect) in the toolbar or select the menu item AUTOBAUD DETECT from the Options menu.
CLV-Setup scans the serial interface by varying the communication parameters and sends a telegram to the ICR840-2 repeatedly. As soon as a reply from the ICR840-2 is detected, CLV-Setup conveys the values found for the communication parameters. [Fig. 10-14](#) shows an example of the AutoBaud detect result display.
CLV-Setup displays "Connected" in the status bar on the bottom, right-hand side.
3. Confirm the AUTO DETECT dialog box with "OK".
CLV-Setup displays the detected ICR840-2 type in a separate dialog box and asks you whether you want to upload the current parameter set from the ICR840-2.
4. Confirm the dialog box with "Yes".
CLV-Setup then copies the current parameter set from the RAM of the ICR840-2 to its database and displays the values on the tabs.
You can edit the current parameter set on the tabs.

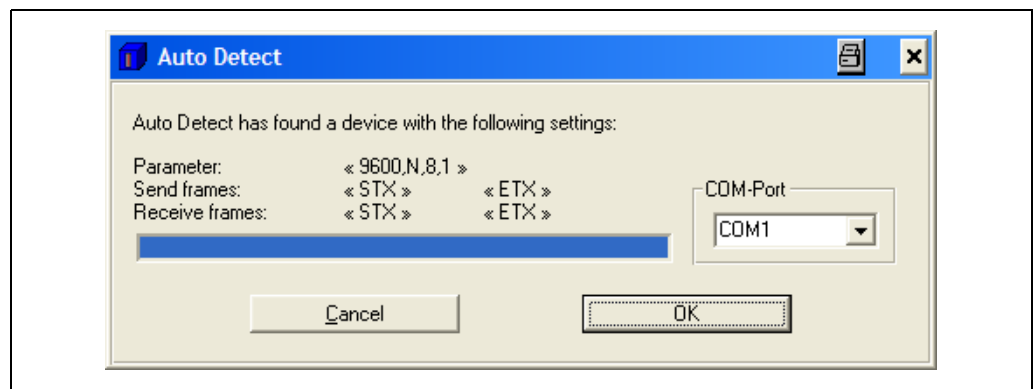



Fig. 10-14: CLV-Setup: Results of the AutoBaud detect function

– or –

2. Select the menu item SERIAL INTERFACE under OPTIONS in the menu bar.
CLV-Setup shows the current settings of the communication parameters of the PC in the COM PARAMETERS dialog box.
3. Ensure that the communication parameters of the PC and ICR840-2 are identical (**connected COM port, 9,600 bd, 8 data bits, 1 stop bit, no parity**)
4. Confirm the dialog box with "OK".
CLV-Setup attempts to communicate with the ICR840-2 again.
If it is successful, it displays "Connected" in the status bar on the bottom, right-hand side.
5. Click  in the toolbar.
CLV-Setup then copies the current parameter set from the RAM of the ICR840-2 to its database and displays the values on the tabs.

You can edit the current parameter set on the tabs.

Data communication via the Ethernet interface:

1. Connect the PC with the Ethernet interface of the ICR840-2.
The green "Ready" LED at the RJ45 socket of the ICR840-2 lights up when the physical connection has finished successful.

See also [Chapter 5.5.5 Connecting the Ethernet interface, Page 40](#)

2. Enable TCP/IP communication.

Configure the IP addresses of the ICR840-2 and the PC.

See [Chapter 6.3.3 Configuring and starting the Ethernet communication with the Assistant, Page 50](#).

10.4.4 CLV-Setup user interface

The graphical user interface (GUI) of CLV-Setup is largely self explanatory. The online CLV-Setup Help function provides a description of how to use the program under the menu item HELP TO CLV-SETUP in the navigation tree. [Fig. 10-15](#) shows the user interface.

The programm window of the user interface comprises the following elements:

- Title bar that displays the program name, current configuration file and status (e.g. "No File")
- Menu bar with pull-down menus
- Toolbar with buttons for triggering various functions
- Drop-down list (top right) for selecting the device type
- Frame for displaying the navigation tree of the tabs (on left-hand side)
- Frame for displaying the tabs for ICR840-2 (Reading Configuration, Device Configuration etc.) on right-hand side. The numbers of displayed tabs depends on the selected items in the navigation tree on the left side. The parameters on the tabs are grouped according to their function. Some of these parameters open further dialog boxes.
- A status bar (at the bottom of the window) with two display fields for the communication activities between CLV-Setup and the ICR840-2, display of interface parameters of the PC, error display field (system errors) of the ICR840-2, device specification field and status display for the connection to the ICR840-2.

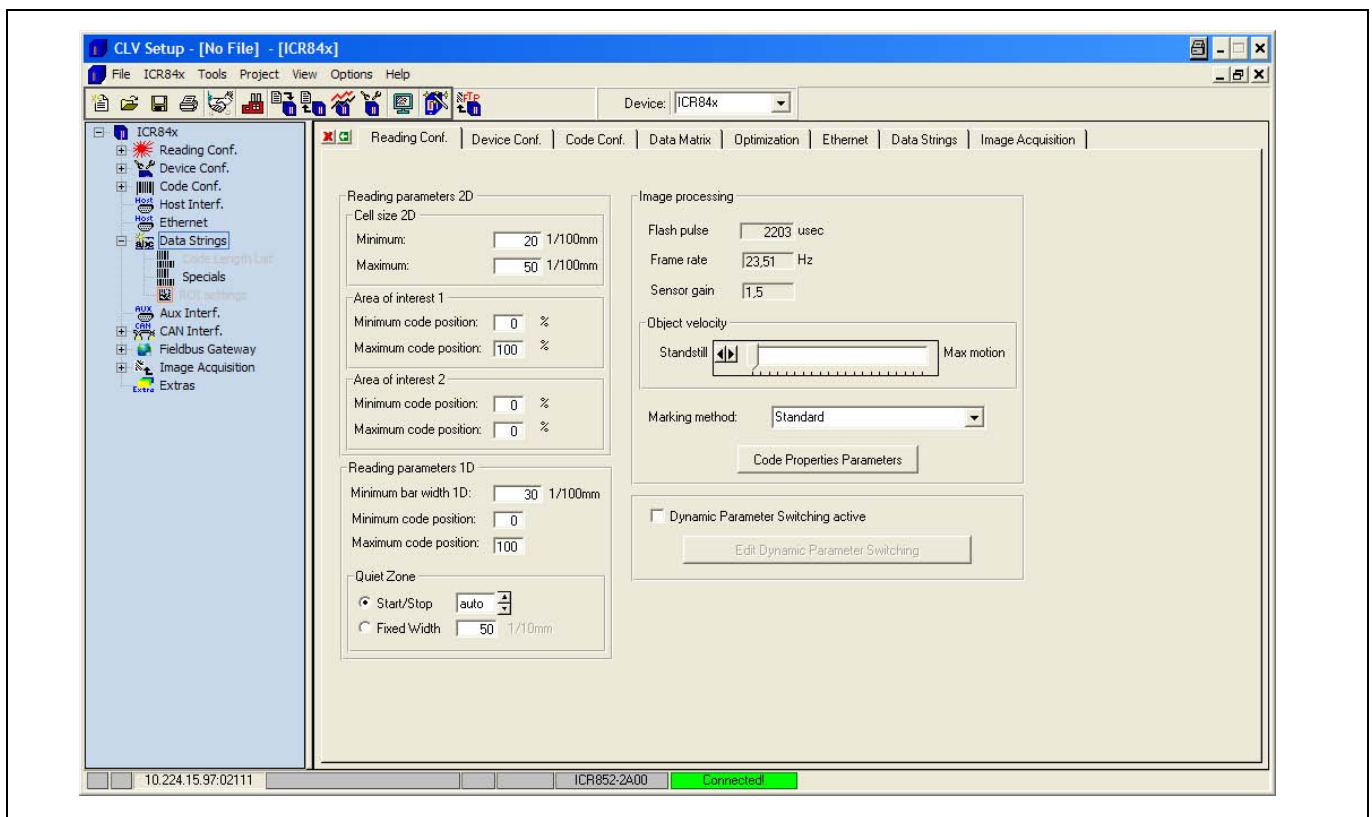


Fig. 10-15: User interface of the "CLV-Setup" configuration software

10.4.5 Functions of CLV-Setup

The CLV-Setup program (from V. 4.1) features functions to carry out the following:

Group	Function
Communcation	<ul style="list-style-type: none"> • Automatic communication attempt with the ICR840-2 when the program is started • AutoBaud detect for automatic serial communication establishment with the ICR840-2 • Selecting the COM port of the PC for adapting the data transfer parameters • Automatic software compatibility check in the ICR840-2
Display	<ul style="list-style-type: none"> • Selecting the display language • Selecting the units of measure • Displaying the last 10 configuration files that were processed • Image output of the read code via the Ethernet interface (ICR840-2 only) • Monitor the data communication of the ICR840-2 host interface
Operation	<ul style="list-style-type: none"> • Changing the parameter/parameter values on the tabs • Online access to the ICR840-2 via a Terminal Emulator (selecting operating mode, starting operating functions, logging file for communication between the ICR840-2 and CLV-Setup, extended terminal mode, e.g. for displaying ICR840-2 messages) • Hot keys [F keys] for essential functions (program operation without a mouse) • Macro player for recording and playing a macro file • Context-sensitive help via the [F1] key
Assistants	<ul style="list-style-type: none"> • CLV Assistant for simplified parameterization • Wizards for individual functions
Upload/Download	<ul style="list-style-type: none"> • Uploading and displaying parameter set stored in the ICR840-2 • Downloading the changes to the parameter set in the ICR840-2
Administration	<ul style="list-style-type: none"> • Loading the default setting of the parameter set from the database of CLV-Setup • Saving the changes to the parameter set as a configuration file "*.scl" • Automatic storage confirmation prompt when changes are made to the configuration file • Organizing serveal devices logically by projects • Saving the device type that was selected last • Setting switches in the "CLVmain.ini" file for starting the program • Starting program with SCL file as argument • Clearing the optional CMC600 parameter memory in the connection module CDB/CDM
Export	<ul style="list-style-type: none"> • Exporting the configuration files in RTF format • Exporting the command strings contained in the profile bar codes in ASCII format
Printing	<ul style="list-style-type: none"> • Printing the configuration files • Printing the parameter set in the form of profile bar codes (not for ICR840-2)

Tab. 10-3: Functions of the CLV-Setup configuration software (overview)

10.4.6 Hot keys

- [F1] Start "CLV-Setup Help" online
- [F2] Open dialog box to execute device functions
- [F3] Upload complete set of parameters from ICR840-2
- [F4] Download complete set of parameters to ICR840-2
- [F5] Open configuration file
- [F6] Save configuration file
- [F7] Load default setting of ICR840-2 from CLV-Setup database
- [F8] Start AutoBaud Detect
- [F9] Load operating data from ICR840-2 to be displayed and reset
- [F10] Open Terminal Emulator

10.4.7 Opening and closing tabs

After starting the user interface, CLV-Setup displays those tabs in the frame on right-hand side whose names are framed in the navigation tree on left-hand side. The first tab covers the other tabs in the sequence but their marks are still visible on the top of the tabs. If you click some buttons on a tab in the fore-ground, several sub dialogs will also be opened as tabs and added to the first tab. In the frame, all tabs on the right will then be shifted more to the right side. To scroll the tabs, use the sliding control elements at the left corner on top of the frame which are displayed by CLV-Setup.

You can open and close the tabs in the following way:

In the navigation tree:

- **Opening:**
Double-click the desired entry or put the mouse cursor on the entry and select "Show dialog" in the context menu using the right mouse button.
To display several entries under a branch, click the corresponding "+" symbol.
To hide displayed sub entries, click the corresponding "-" symbol.
- **Closing:**
Put the mouse cursor on the desired entry and select "Hide dialog" in the context menu using the right mouse button.

In the frame for displaying tabs:

- **Opening:**
Click on the desired mark on the top of the tab. If necessary, scroll the tabs.
- **Closing:**
To close the tab in the fore-ground, click on the red cross at the left corner on the top.

Pressing the left mouse button, the left frame with the navigation tree can be move from the program window to a seperate position on the screen. If the navigation tree has been closed, it can be reopened using the VIEW menu.



10.4.8 Online help program "CLV-Setup Help"

The online help program "CLV-Setup Help" assists you in operating the CLV-Setup software. The help program runs in an HTML browser (e.g. Microsoft Internet Explorer™). You can call up context-sensitive help on each parameter as well as a description of its function.

1. Press the [F1] key.
The browser is launched automatically and displays the help topic.
2. If the program cannot find a browser, it asks you to specify the storage location on the hard disk.
Enter the name of the executable file and the path in the dialog box.
3. Use the [Alt]+[Tab] keys to switch between the CLV-Setup and CLV-Setup Help applications and prevent several browser windows from being opened.
4. To display an overview of the help function, select HELP, CONTENTS from the CLV-Setup menu bar.
5. In the left frame click on the desired entry in the navigation tree.
CLV-Setup Help then displays the associated help text in the right-hand frame and jumps to the parameter heading.

10.4.9 Transferring parameter sets between CLV-Setup and the ICR840-2

See [Chapter 6.8 Configuring the ICR840-2, Page 71](#).

10.4.10 Unknown parameters



Upload vom ICR840-2





Uploading from ICR840-2

If the "CLV-Setup" program does not recognize the parameters or parameter values of the ICR840-2 transferred during the upload, it outputs a warning message. Causes for unknown parameters/values are e.g.: The ICR840-2 is a special device or the version of CLV-Setup is older than the software of the ICR840-2. CLV-Setup displays the unknown parameters in the window on the EXTRAS tab. The parameters are displayed in the form of command strings and can be edited using the command string conventions. In this way, upward compatibility with the ICR840-2 is ensured. When the parameter set is saved as a configuration file in CLV-Setup, these parameters/values are also taken into account as with a download to the ICR840-2.

Downloading to the ICR840-2

If the ICR840-2 does not accept individual parameters or parameter values in the parameter set downloaded with CLV-Setup, it outputs a separate warning for each parameter on the screen. This is due to the fact that one of the CLV-Setup software versions is newer than the software in the ICR840-2, and it contains new parameters/values arising from the continued development of this ICR840-2 type. The effected ICR840-2 contains an older software version which does not recognize these parameters/values, however.

We recommend that you check the effects of warnings in the ICR840-2 as follows:

1. Check whether the ICR840-2 functions correctly after the parameter set is downloaded.
2. Click  in the toolbar.
CLV-Setup loads the default settings from the database.
3. Click  in the toolbar.
CLV-Setup uploads the problem parameter set from the ICR840-2.
4. Click  in the toolbar.
CLV-Setup prints out the problem parameter set when you confirm the dialog box.
5. Open the previous configuration file "*.scl" for the ICR840-2.
6. Click  in the toolbar.
CLV-Setup prints out the problem parameter set when you confirm the dialog box.
7. Compare the two parameter sets.
To restore the previous status, correct individual parameters in the problem parameter set if necessary and download them to the ICR840-2 again.

Opening configuration files "*.scl"

Every time it loads configuration files, CLV-Setup checks whether it recognizes all the parameters/values.


If the program detects an error, it outputs a warning and enters the problem parameter/value in the window on the "EXTRAS" tab.

10.4.11 Logging file in Terminal Emulator



The Terminal Emulator can log the communication between CLV-Setup and ICR840-2. CLV-Setup stores the data transmitted in both directions with the following identifiers:

CLV -->: ICR840-2 sending to CLV-Setup
--> CLV: ICR840-2 receiving from CLV-Setup

1. Click  in the toolbar.
The Terminal Emulator window is then displayed.
2. Click the empty checkbox in front of the WRITE LOGFILE option on the right.
The SAVE LOG FILE AS... dialog box is then displayed.
3. Enter a file name with the extension ".log" and exit the window with SAVE.
CLV-Setup saves the file in the "data" subdirectory and records communication in the log file.
4. To terminate logging, click the checkbox in front of the WRITE LOGFILE radio button again or close the Terminal Emulator.

10.4.12 Starting CLV-Setup with an INI file as an argument

When the program is started, CLV-Setup can also be transferred the name of an INI file as a parameter. To do so, enter "/INI" in front of the file.

Example:

```
"CLVmain32.exe\data\Set 1_ICR84x.scl /INI user.ini"
```

CLV-Setup is launched with the initialization data contained in the "user.ini" file and loads the configuration file "Set1_ICR84x.scl" from the "data" directory straight away.

The "user.ini" file must be stored in the same directory as "CLVmain32.exe".

You can use this method to link CLV-Setup to several different configurations on your Windows desktop.

In this way, for example, you can prevent CLV-Setup from attempting to establish a connection when an ICR840-2 is not connected.

10.4.13 The CLV Assistant

For the ICR840-2, the CLV Assistant provides one assistant:

- Connection Assistant

10.5 Configuring the ICR840-2 with command strings

As an alternative to the CLV-Setup configuration software, the ICR840-2 can also be configured with command strings via the auxiliary interface and the host interface. In the same way functions can be triggered in the ICR840-2.

The command strings can be separately displayed using the CLV-Setup configuration software as followed:

- For requesting a command string, click a parameter on a tab in the CLV-Setup configuration software using the right mouse button.
The command string is displayed at the last position on bottom of the context menu.
- If the parameter value offers a input field for an adjustable numerical value, first enter the value and then click into the input field using the the right mouse button to display the corresponding command string.

Important Both the command strings and the CLV-Setup user interface are based on a simple command language which directly accesses the command interpreter of the ICR840-2. It must be used carefully. The commands sent to the ICR840-2 are executed immediately. Parameter values that have been changed by commands are initially only active in the current parameter set in the RAM of the ICR840-2. Using the special command "3EEW", the modified parameter set must also be copied to the EEPROM so that it can be stored **permanently**. Otherwise, the changes will be lost when the power supply is switched off.


Parameters/parameter values that are not recognized by CLV-Setup can also be used by following the conventions for command strings. For example, this enables special devices or a ICR840-2 with higher firmware version to be configured when the CLV-Setup program is older than the software on the ICR840-2.

The online mode of the Terminal Emulator in CLV-Setup enables the ICR840-2 to be parameterized directly with command strings.

[Fig. 10-16, Page 149](#) shows the initial screen of the Terminal Emulator with the command field and output window which shows how the PC and ICR840-2 communicate with each other.

Enter commands into the Terminal Emulator of CLV-Setup



1. Click  in the toolbar.
The Terminal Emulator window is then displayed.
The ICR840-2 is in Reading mode.
2. Click PARAMETERIZE under DEVICE MODE.
The ICR840-2 cancels Reading mode.
CLV-Setup switches the ICR840-2 to the Parameterization mode by issuing an appropriate command.
In the Parameter mode, all commands begin with the number "3"
3. Enter the desired command in the command field ① and press the [Return] key.
The command is then sent to the ICR840-2.
With a few exceptions, the ICR840-2 replies to a command with correct syntax with an echo.

Example:

Entering "3?LT" causes the ICR840-2 to output the parameter values of the reading pulse in encoded form in the output window ②.

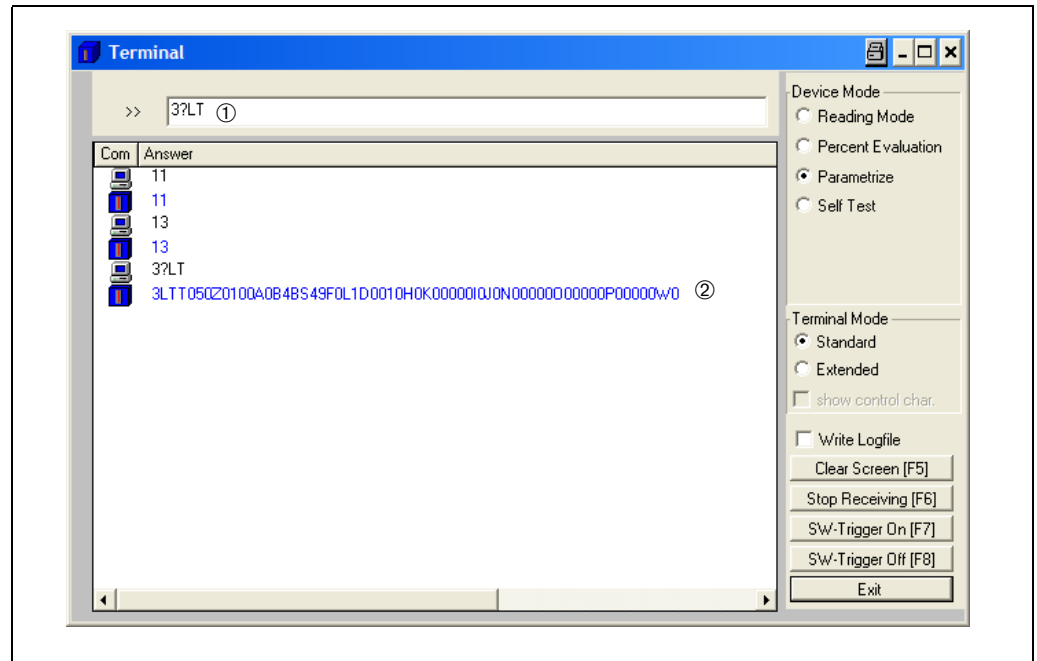


Fig. 10-16: CLV-Setup: Entering commands in the Terminal Emulator

- Click the Reading Mode radio button to return to the READING MODE.

Important Changes that are made directly to parameter values in the ICR840-2 using command strings are only registered and displayed in CLV-Setup after the current parameter set has been uploaded from the ICR840-2.

Outputting command strings for all the parameter settings:

You can output a list of all the parameter settings configured with CLV-Setup in ASCII format. To do so, proceed as follows:

- In the menu bar, choose EXPORT PARAMETERS under ICR840-2.
Starting from the default settings, CLV-Setup collects all the command strings required to parameterize the default configuration and customized settings.
The SELECT FILE NAME FOR PARAMETER EXPORT dialog box is displayed.
- Enter a file name and click the SAVE button.
CLV-Setup saves the data as a text file in the directory shown.

You can open this text file using any Windows text editor.

If the commands are sent from the host/PLC to the ICR840-2 for configuration, note that "3 EEW" has to be sent as the last command to ensure that they are permanently transferred to the ICR840-2 (EEPROM).

10.6 Auxiliary tables

10.6.1 Calculating code length of a bar code

The code length of a bar code is the number of used characters in the printed code including the check digit (if present). This code length must be specified in CLV-Setup

Due to the distance-dependent dimensions of the field of view, the recordable code length is reduced in respect of the decodable length (see examples in [Table 9-2, Page 122](#)).

If the code type of a bar code is known, the code length can be calculated by counting the bars and gaps. The relevant formulas are provided in [Table 10-4](#).

1. Count the bars and gaps as specified in [Table 10-4](#). Do not forget to include the start and stop characters
2. Calculate the code length using the formula in the table.
3. Enter the value in CLV-Setup as described in column 4 of the table.

Code type	Count	Calculation of code length ^{1) 2)}	Entry in CLV-Setup
Code 39	Number of bars	$l_{\text{Code}} = \frac{\text{Number} - 10}{5}$	Calculated code length
2/5 Interleaved	Number of wide elements (bars and gaps)	$l_{\text{Code}} = \frac{\text{Number} - 1}{2}$	Calculated code length
EAN	Not applicable	13 characters (normal version) 8 characters (short version)	Activate 13-digit Activate 8-digit
UPC	Not applicable	12 characters (UPC A, normal version) 6 characters (UPC E, short version)	Activate version A Activate version E
Codabar	Number of bars	$l_{\text{Code}} = \frac{\text{Number} - 8}{4}$	Calculated code length
Code 128 (character set A)	Number of bars	$l_{\text{Code}} = \frac{\text{Number} - 10}{3}$	Calculated code length
EAN 128	Number of bars	$l_{\text{Code}} = \frac{\text{Number} - 10}{3}$	Calculated code length
Pharmacode	Number of bars	Number	Number = code length
<p>1. Check digit optional with Code 39, 2/5 Interleaved, Codabar. Check digit always integrated in printed bar code with EAN, UPC, Code 128, Code 93, EAN 128 (suppressed automatically when the ICR840-2 reading result is output)</p> <p>2. With only a few exceptions, every printed character to be decoded corresponds to an ASCII character. With Code 39 extended, Code 93, Code 128 and EAN 128, the number of characters in the data string of the ICR840-2 can be larger than the number of characters in the printed code because it comprises several character sets.</p>			

Tab. 10-4: Formulas for calculating the code length of a bar code

10.7 Special applications and procedures

10.7.1 Triggering the Teach-in match code 1 and activating the code comparison via the "Sensor 2" switching input

Code comparison functions

In Reading mode, the ICR840-2 compares up to **two defined match codes** with the codes it recorded in the reading pulse. The result status of the code comparison is indicated by the corresponding functional assignment via the "Result 1" and "Result 2" ("Result" LED) switching outputs and the beeper, depending on configuration.

The match codes can also be used as output filters for the host interface on Good read:

- Without output filter the ICR840-2 outputs all recorded codes.
- With output filter, the ICR840-2 only outputs those codes that have the **same code type, code length, and data content** as the match code(s).

Definition of the match codes as base of the code comparison and activation of the code comparison can be done in different ways.

Table 10-5 lists an general overview about the functions of ICR840-2 which are interrelated to the code comparison for both match codes:

Function	Match code 1	Match code 2
Defining match code manually: Entry of code type, code length and code content (also wildcards: #) via CLV-Setup configuration software ¹⁾	yes	yes
Defining match code by reading the code (teach-in): Triggering the teach-in procedure via "Sensor 2" switching input	yes	no
Defining match code by reading the code (teach-in): Triggering the teach-in procedure via CLV-Setup configuration software ¹⁾	yes	no
Teach-in mode: Dynamic Teach-in	yes	no
Teach-in mode: Static Teach-in without Pharmacode	yes	no
Teach-in mode: Static Teach-in with Pharmacode	yes	no
Teach-in mode: Static Teach-in Resetting daily operating data when teaching-in the match code	yes	no
Code comparison: Using match code as output filter for the reading result of the host interface ²⁾	yes	yes
Activating code comparison temporarily using "Sensor 2" switching input	yes	no
Activating code comparison temporarily or permanently using CLV-Setup configuration software ¹⁾³⁾	yes	yes
Reading result status of code comparison: Indication of defined event(s) via switching outputs ²⁾	yes	yes
Reading result status of code comparison: Indication of defined event via beeper ²⁾	yes	yes
1) Alternatively also via command strings 2) Configuration via CLV-Setup or alternatively via command strings 3) For match code 1 higher priority than via "Sensor 2" switching input		

Tab. 10-5: Overview: Functions for the code comparison

a) Match code 1:

Defining match code: The match code 1 can either be taught-in via the optical interface (reading window) of the ICR840-2 using the CLV-Setup configuration software respectively command strings for triggering the reading, or be configured by entry. Alternatively the match code 1 can be taught-in using the "Sensor 2" switching input for triggering the reading.

Activating code comparison: Depending on the download option, code comparison for match code 1 can be activated either temporarily (until the ICR840-2 is switched off) or permanently (also activated after the ICR840-2 is switched on again) using the CLV-Setup configuration software or a command string. When teaching-in the match code 1 with the help of the "Sensor 2" switching input, the temporary code comparison will be automatically activated. After teaching-in in Static Teach-in mode via the "Sensor 2" switching input, only match code 1 will be compared even if two match codes are defined.

b) Match code 2:

Match code 2 can only be defined and activated using the CLV-Setup configuration software respectively command strings. Teach-in is not possible. Depending on the download option, code comparison for match code 2 can be either temporarily or permanently.

Conditions for match codes

A match code must be a code type which the ICR840-2 can evaluate and may contain a maximum of the following number of characters in the range 32 to 137 dec.:

- For 2D codes (Data Matrix ECC200), max. 1,556 data bytes
- For 1D codes (bar codes) max. 50 characters
(The length of readable code is reduced with respect to the decodable length as a result of the distance-dependent dimensions of the field of view (see examples in [Table 9-2, Page 122](#)).

Teach-in modes for match code 1

There are three modes for teaching in match code 1:

Mode	Functions/conditions	Remark
1. Dynamic Teach-in	<p>Purpose:</p> <ul style="list-style-type: none"> • Teaching in a moved code for match code 1 during operation using the reading pulse trigger installed on the conveyor system. • Code types: 2D codes (Data Matrix ECC200) and 1D codes (bar codes). <p>Teach-in:</p> <ul style="list-style-type: none"> • The code type which corresponds to the match code 1 must be configured and activated explicitly in the ICR840-2. • For reading match code 1, the ICR840-2 has to be triggered accordingly. • The ICR840-2 saves the code type, the code length, and the code content of the match code 1 permanently in its parameter memory (EEPROM). <p>Code comparison:</p> <ul style="list-style-type: none"> • After the teach-in procedure has been successfully completed, the ICR840-2 still continues to output codes of all the code types and code lengths that were previously enabled via the host interface, independent of match code 1. • With match code 1 for output filter, the ICR840-2 only outputs codes via the host interface which match the code type, the code length and the code content of match code 1. 	See Chapter 10.7.3 Dynamic Teach-in of match code 1 and code comparison, Page 155

Tab. 10-6: Teach-in modes for match code 1

ICR840-2

Mode	Functions/conditions	Remark
2a. Static Teach-in without Pharmacode	<p>Purpose:</p> <ul style="list-style-type: none"> Teaching in a not moved code for match code 1 using an automatic reading pulse trigger of the ICR840-2. Code types: 2D codes (Data Matrix ECC200) and 1D codes (bar codes, but not Pharmacode). <p>Teach-in:</p> <ul style="list-style-type: none"> The code type which corresponds to the match code 1 must not be configured and activated explicitly in the ICR840-2. The ICR840-2 temporarily enables all code types for evaluation without the Pharmacode. Exception: If a mirrored Data Matrix ECC200 is to be used as match code 1, the evaluation for the mirrored format is explicitly to configure. If the ICR840-2 does not read the match code, the previously code configuration (enabled code types etc.) remains unchanged. When starting the Teach-in, the ICR840-2 automatically starts the internal reading interval. After the successful teach-in, the ICR840-2 stops the reading interval. With static teach-in, the ICR840-2 can optionally reset the daily operating data for each newly taught-in match code 1. This includes the following counters: <ul style="list-style-type: none"> Daily operating hours No. of reading intervals No. of good reads Max. reading interval duration Min. reading interval duration No. of no reads No. of match 1 (match code 1) No. of match 2 (match code 2) No. of no matches (neither match code 1 nor 2) The ICR840-2 saves the code type, the code length and the code content of the match code 1 permanently in its parameter memory (EEPROM). <p>Code comparison:</p> <ul style="list-style-type: none"> After the teach-in procedure has been successfully completed, the ICR840-2 only outputs codes via the host interface which match the code type and the code length of match code 1, independent of the code content. If match code 1 e.g. is a bar code from Code 39 type, all others bar code types and also the Data Matrix code will be disabled. With match code 1 for output filter, the ICR840-2 only outputs codes via the host interface which additionally match also the code content of match code 1. 	See Chapter 10.7.4 Static Teach-in match code 1 and code comparison, Page 159
2b. Static Teach-in with Pharmacode	<p>Purpose:</p> <ul style="list-style-type: none"> As described for Static Teach-in without Pharmacode, but additionally with Pharmacode for code type. <p>Teach-in:</p> <ul style="list-style-type: none"> Since the ICR840-2 can essentially interpret every bar code as a Pharmacode, the "static with Pharmacode" variant should only be activated if this code is actually to be configured (teach-in) as a match code. The Pharmacode must comprise a minimum of 4 characters and a maximum of 20 characters. Check whether the configured Pharmacode is correct by uploading it from the ICR840-2 using CLV-Setup. 	See Chapter 10.7.4 Static Teach-in match code 1 and code comparison, Page 159

Tab. 10-6: Teach-in modes for match code 1 (contd.)

Meaning of the "Sensor 2" switching input for Teach-in/activation of code comparison

For teaching in match code 1 via the "Sensor 2" switching input, a switch must be connected (Fig. 10-17) and the functional assignment of the switching input, the teach-in mode and, if necessary, other settings must be done with the CLV-Setup configuration software.

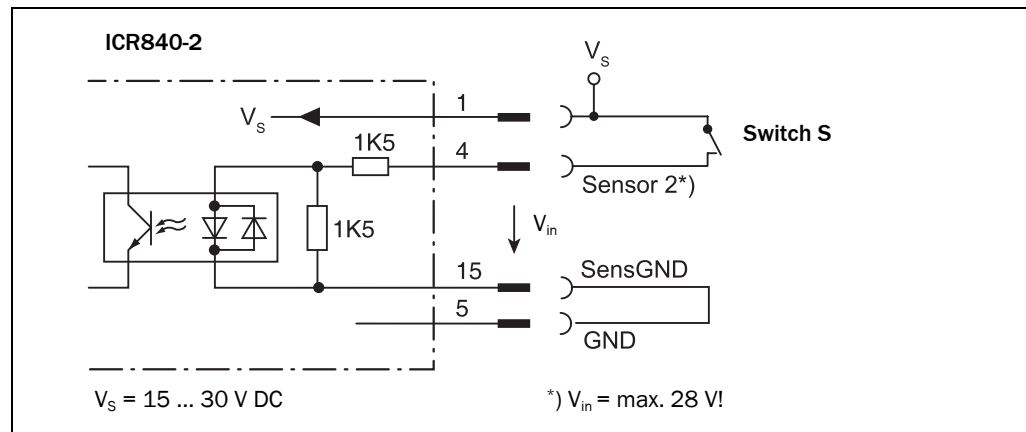


Fig. 10-17: Wiring the "Sensor 2" switching input for triggering the teach-in of match code 1 and for automatic activation of the code comparison

With the help of the switch on the "Sensor 2" switching input, the ICR840-2 triggers the teach-in for match code 1 and starts the code comparison as followed:

- After switching on the power supply while the switch has been closed, the ICR840-2 starts teaching-in the match code 1 via its optical interface (reading window) when the switch will be opened. When closing again the switch, the ICR840-2 saves the recorded match code 1 permanently in its parameter memory (code type, code length, and code content). To do so, the ICR840-2 overwrites an already existing match code 1. If the match code 1 is to be saved also permanently in an external parameter memory module CMC600 (for consistent parameter set in the ICR840-2 and in the external memory) you must set this option in the CLV-Setup configuration software. The option is only available in Static Teach-in mode.
- After the teach-in procedure for match code 1 has been successfully completed, the ICR840-2 automatically starts the code comparison for further readings. This temporary state will remain until the power supply is switched off or the switch on the "Sensor 2" switching input is opened again during operation. If the dynamic teach-in of match code 1 has not been successfully, the ICR840-2 will either use the last saved match code 1 or will not compare any code (depends on the setting in CLV-Setup).

General procedure for Teach-in/code comparison via "Sensor 2" switching input

- Configure the teach-in/code comparison using the CLV-Setup configuration software
- Trigger the teach-in/activate the code comparison via "Sensor 2" switching input



10.7.2 Preparing triggering of teach-in match code 1 via "Sensor 2" switching input

1. Switch off the power supply to the CDB620 or CDM420 Connection Module.
2. Connect the switch in the CDB620 or CDM420 Connection Module at the "Sensor 2" switching input of the ICR840-2 as shown in [Fig. 10-17, Page 154](#).
3. Link the "SensGND" and "GND" signals.
4. **Open the switch!** ("Sensor 2" switching input must be at zero current when switching on the power supply).
5. Switch on the power supply to the CDB620 or CDM420 Connection Module.
After the ICR840-2 has been started and has successfully completed the self-test, it outputs a tone and then two consecutive tones shortly afterwards when the Reading mode is initiated. The "Device Ready" LED lights up.
6. Start CLV-Setup on your PC (see [Chapter 10.4.3 Starting "CLV-Setup", Page 141](#)).
7. Upload the current parameter set from the ICR840-2.
CLV-Setup displays the values on the tabs of the user interface.
8. If you have not already done so, save the parameter set as a configuration file "*.scl" in CLV-Setup for backup.

10.7.3 Dynamic Teach-in of match code 1 and code comparison

For teaching in 1D codes, the ICR840-2 uses temporarily the SMART and standard decoders.

a) Configuring the Dynamic Teach-in

Overview of configuration steps

- Activate the code type to be read in the ICR840-2
- Select Dynamic Teach-in in the ICR840-2
- If necessary, activate match code 1 for output filter in the ICR840-2
- If necessary, delete an existing match code 1 in the ICR840-2 before teaching-in a new match code
- Configure "Sensor 2" switching input for triggering the Teach-in in the ICR840-2
- If necessary, configure the reading pulse trigger in the ICR840-2 (for this example)
- Configure the switching outputs in the ICR840-2 for indicating the result status
- Download the parameter values to the ICR840-2



Activating the code type to be read:

1. Select the CODE CONFIGURATION tab.
2. For reading 2D codes (Data Matrix ECC200), activate the DATA MATRIX checkbox in the 2D SYMBOLIGIES section.
3. Click the EDIT button.
The DATA MATRIX tab is then displayed.
4. In the SYMBOL SIZE section select the FREE option in the drop-down list.
5. For reading bar codes, activate the code type checkbox of the match code in the 1D SYMBOLIGIES section.
6. Click the corresponding EDIT button.
The tab of the selected code types is then displayed.
7. In the CODE LENGTH section, click the FREE radio button.

Selecting the Dynamic Teach-in:

1. Select the DEVICE CONFIGURATION tab.
2. Click the MATCH CODE PARAMETERS button.
The MATCH CODE PARAMETERS tab is then displayed.
3. Click the DYNAMIC radio button in the METHOD OF TEACH-IN section.

Configuring match code 1 for output filter (optional):

1. Select the MATCH CODE PARAMETERS tab.
2. Proceed as follows to activate the output filter in the CODE ACTIVE section:
 - Click the CODE #1 checkbox.
 - Click the FILTER FOR HOST OUTPUT checkbox.
 - Click the CODE #1 checkbox again.
The code comparison activated via the user interface is now no longer permanently activated. The output filter, however, remains active.

Important If two match codes have been defined and activated, the activation of one of the match codes for output filter determines that the ICR840-2 only outputs codes which match with the code for output filter via the host interface. If the ICR840-2 also reads codes which match with the other match code, the output of these codes will be suppressed.

Example:

Match code 1 = Code 39, content: 12345, output filter active

Match code 2 = 2/5 Interleaved, content: 777

ICR840-2 reads two codes, both codes match each one of the defined match codes.

ICR840-2 only outputs: 12345

Deleting an existing match code 1 (optional):

1. Select the MATCH CODE PARAMETERS tab.
2. Click the DELETE LAST MATCH CODE AT NEW TEACH-IN checkbox in the SPECIAL FUNCTION section.

Configuring "Sensor 2" switching input for teach-in trigger:

1. Select the DEVICE CONFIGURATION tab.
2. From the ASSIGNMENT drop-down list in the SENSOR 2 section, select the MATCHCODE TEACH-IN option.


Configuring reading pulse trigger (optional):

1. Select the DEVICE CONFIGURATION tab.
2. Click the READING TRIGGER PARAMETERS button.
3. Click the SERIAL INTERFACE radio button in the START OF READING INTERVAL section (for this example).

Configuring the switching outputs for indication of result status:

1. Select the DEVICE CONFIGURATION tab.
2. Click the RESULT OUTPUT PARAMETER button.
3. In the dialog box under RESULT FUNCTIONS, choose e.g. the MATCH 1 option for Result 2 (LED "Result") in the drop-down list.


Download the parameter values to the ICR840-2:

1. Perform a download to the ICR840-2.
This is done by clicking  in the toolbar.
The DOWNLOAD PARAMETER dialog box is displayed.
2. Confirm the dialog box by selecting the PERMANENT save option.

b) Carrying out the dynamic teach-in and activating the code comparison**Overview of action steps**

- Close the switch and switch the power supply off and on again to prepare the ICR840-2 for teach-in via the "Sensor 2" switching input
- Open the switch to start the teach-in
- Start reading
- Represent the match code
- Stop reading
- Close the switch to finish the teach-in, to save the match code permanently and to activate the code comparison
- Check the taught-in match code 1



1. Click on  in the toolbar.
The Terminal Emulator is launched. The ICR840-2 is in Reading mode.
2. **Close the switch** to connect the power supply to the "Sensor 2" switching input.
3. Click the PARAMETERIZE radio button under DEVICE MODE.
The ICR840-2 switches to Parametrize mode.
4. Click the READING MODE radio button under DEVICE MODE.
The ICR840-2 returns to Reading mode and polls the condition of the "Sensor 2" switching input. It also activates code comparison at this time.

– or –

As an alternative to steps 3 and 4, switch the power supply to the connection module (ICR840-2) off and on again. The ICR840-2 outputs two consecutive tones to indicate that it has switched to Reading mode.

5. **Open the switch** to interrupt the power supply to the "Sensor 2" switching input.
The ICR840-2 activates teach-in mode for match code 1.
6. **Click the SW-TRIGGER ON button or press the [F7] key.**
The ICR840-2 switches on the red illumination field (pulsed), starts the reading interval and waits for the match code.
7. Move the match code along the ICR840-2 using the conveyor system.
Keep the following reading distances:


ICR840-2A (High Density):	50 mm (1.97 in)
ICR840-2B (Standard Range):	80 mm (3.15 in)
ICR840-2C (Mid Range):	115 mm (4.53 in)
ICR840-2D (Long Range):	145 mm (5.71 in)
8. **Click the SW-TRIGGER OFF button or press the [F8] key.**
The ICR840-2 confirms that the read was successful by emitting a tone and then ends the reading interval. Match code 1 is now stored in the RAM.

9. **Close the switch** to reconnect the power supply to the "Sensor 2" switching input. The ICR840-2 saves match code 1 (code type, code length, and data content) permanently in the parameter set stored in the EEPROM. When switching on the ICR840-2 next time, the match code is available again without a new teach-in.
The ICR840-2 compares now every code it reads with match code 1. In doing so, it outputs the result of the comparison via the "Result 2" output and "Result" LED with the predefined pulse length.
If teach-in of match code 1 has not been successfully, the ICR840-2 will either use the last saved match code 1 or will not compare any code (depends on the settings above).
10. **Keep the switch closed.**
The ICR840-2 will activate teach-in mode again if you open the switch!

Replacing the match code:

To replace the current match code 1 with a new match code using the teach-in method, simply repeat Steps 5 to 9.

Checking the taught-in match code in the ICR840-2:

1. Perform an upload from the ICR840-2.
To do so, click on  in the toolbar.
2. Click the MATCH CODE PARAMETERS button on the DEVICE CONFIGURATION tab.
The MATCH CODE PARAMETERS tab is opened and shows the bar code type in the TYPE OF MATCH CODE section and the data content of match code 1 in the MATCH CODE section.

10.7.4 Static Teach-in match code 1 and code comparison

For teaching in 1D codes, the ICR840-2 uses temporarily the SMART and standard decoders. To ensure that the match code is read reliably, the ICR840-2 temporarily sets the number of multiple reads to 30.

Important If a match code 2 is already configured in the ICR840-2 when using the static teach-in for match code 1, afterwards the match code 2 remains inactive.

a) Configuring the Static Teach-in

Overview of configuration steps

- If necessary, configure the evaluation for mirrored Data Matrix codes in the ICR840-2
- Select the mode of Static Teach-in in the ICR840-2
- If necessary, activate match code 1 for output filter in the ICR840-2
- If necessary, delete an existing match code 1 in the ICR840-2 before teaching-in a new match code
- If necessary, save the taught-in match code also in the external parameter memory CMC600
- Configure "Sensor 2" switching input for triggering the Teach-in in the ICR840-2
- Configure the switching outputs in the ICR840-2 for indicating the result status
- Download the parameter values to the ICR840-2



Configuring the evaluation for mirrored Data Matrix codes (optional):

1. Select the CODE CONFIGURATION tab.
2. Click the EDIT button in the 2D SYMBOLIGIES section.
The DATA MATRIX tab is then displayed.
3. Click the MIRRORED radio button In der APPEARANCE section.

Selecting the mode of Static Teach-in:

1. Select the DEVICE CONFIGURATION tab.
2. Click the MATCH CODE PARAMETERS button.
The MATCH CODE PARAMETERS tab is then displayed.
3. Click the STATIC WITHOUT PHARMACODE radio button in the METHOD OF TEACH-IN section respectively when reading a Pharmacode the STATIC WITH PHARMACODE radio button. (see also „[Teach-in modes for match code 1](#)“, [Page 152](#)).
4. If necessary, click the WITH COUNTER RESET option in the TEACH-IN section.

Configuring match code 1 for output filter (optional):

1. Select the MATCH CODE PARAMETERS tab.
2. Proceed as follows to activate the output filter in the CODE ACTIVE section:
 - Click the CODE #1 checkbox.
 - Click the FILTER FOR HOST OUTPUT checkbox.
 - Click the CODE #1 checkbox again.
 The code comparison activated via the user interface is now no longer permanently activated. The output filter, however, remains active.

Important If two match codes have been defined and activated, the activation of one of the match codes for output filter determines that the ICR840-2 only outputs codes which match with the code for output filter via the host interface.

If the ICR840-2 also reads codes which match with the other match code, the output of these codes will be suppressed.

Example:

Match code 1 = Code 39, content: 12345, output filter active

Match code 2 = 2/5 Interleaved, content: 777

ICR840-2 reads two codes, both codes match each one of the defined match codes.

ICR840-2 only outputs: 12345

Deleting an existing match code 1 (optional):

1. Select the MATCH CODE PARAMETERS tab.
2. Click the DELETE LAST MATCH CODE AT NEW TEACH-IN checkbox in the SPECIAL FUNCTION section.

Saving the match code 1 also in the external parameter memory CMC600 (optional):

1. Select the MATCH CODE PARAMETERS tab.
2. Click the SAVE MATCH CODE IN THE CMC (ONLY FOR STATIC TEACH-IN) checkbox in the SPECIAL FUNCTION section.


Configuring "Sensor 2" switching input for teach-in trigger:

1. Select the DEVICE CONFIGURATION tab.
2. From the ASSIGNMENT drop-down list in the SENSOR 2 section, select the MATCHCODE TEACH-IN option.

Configuring the switching outputs for indication of result status:

1. Select the DEVICE CONFIGURATION tab.
2. Click the RESULT OUTPUT PARAMETER button.
3. In the dialog box under RESULT FUNCTIONS, choose e.g. the MATCH 1 option for Result 2 (LED "Result") in the drop-down list.

Download the parameter values to the ICR840-2:

1. Perform a download to the ICR840-2.
This is done by clicking  in the toolbar.
The DOWNLOAD PARAMETER dialog box is displayed.
2. Confirm the dialog box by selecting the PERMANENT save option


b) Carrying out the static teach-in and activating the code comparison

Overview of action steps

- Close the switch and switch the power supply off and on again to prepare the ICR840-2 for teach-in via the "Sensor 2" switching input
- Open the switch to start the teach-in
- Represent the match code
- Close the switch to save the match code permanently and to activate the code comparison
- Check the taught-in match code 1

ICR840-2



1. Click on  in the toolbar.
The Terminal Emulator is launched. The ICR840-2 is in Reading mode.
2. **Close the switch** to connect the power supply to the "Sensor 2" switching input.
3. Click the PARAMETERIZE radio button under DEVICE MODE.
The ICR840-2 switches to Parametrize mode.
4. Click the READING MODE radio button under DEVICE MODE.
The ICR840-2 returns to Reading mode and polls the condition of the "Sensor 2" switching input. It also activates code comparison at this time.

- or -
As an alternative to steps 3 and 4, switch the power supply to the connection module (ICR840-2) off and on again. The ICR840-2 outputs two consecutive tones to indicate that it has switched to Reading mode.
5. **Open the switch** to interrupt the power supply to the "Sensor 2" switching input.
The ICR840-2 activates teach-in mode for match code 1
The ICR840-2 switches on the red illumination field (pulsed) automatically, starts the reading interval and waits for the match code.
6. Represent the match code (not moved) in the following reading distance:

ICR840-2A (High Density):	50 mm (1.97 in)
ICR840-2B (Standard Range):	80 mm (3.15 in)
ICR840-2C (Mid Range):	115 mm (4.53 in)
ICR840-2D (Long Range):	145 mm (5.71 in)
7. The ICR840-2 confirms that the read was successful by emitting a tone and then ends the reading interval. Match code 1 is now stored in the RAM.
8. **Close the switch** to reconnect the power supply to the "Sensor 2" switching input.
The ICR840-2 saves match code 1 (code type, code length, and data content) permanently in the parameter set stored in the EEPROM. When switching on the ICR840-2 next time, the match code is available again without a new teach-in.
The ICR840-2 compares now every code it reads with match code 1. In doing so, it outputs the result of the comparison via the "Result 2" output and "Result" LED with the predefined pulse length.
If the ICR840-2 was not able to read the match code, the reading interval is terminated when the switch is closed. The previously set code configuration remains unchanged.
9. **Keep the switch closed.**
The ICR840-2 will activate teach-in mode again if you open the switch!

Replacing the match code:

To replace the current match code 1 with a new match code using the teach-in method, simply repeat Steps 5 to 8.

Checking the taught-in match code in the ICR840-2:

Proceed as described in Steps 1 to 3 „[Checking the taught-in match code in the ICR840-2:](#)“, [Page 158](#).

10.7.5 Auxiliary input via the auxiliary interface

If the ICR840-2 cannot read a 2D code/bar code in Reading mode (e.g. if there is no code on the object), the data content of the code can be sent subsequently to the host by using the AUXILIARY INPUT option. In this way, the sequence of reading results can be completed if necessary.

The auxiliary input function uses the auxiliary interface of the ICR840-2 exclusively and features two options:

- manual entry of the data content via the keyboard of a connected terminal or PC (Terminal Emulation function)
- entry of the bar code using a handheld reader. Forwarding to the ICR840-2 via an internal or external decoder of the device.

Fig. 10-18 shows the flow of auxiliary input.

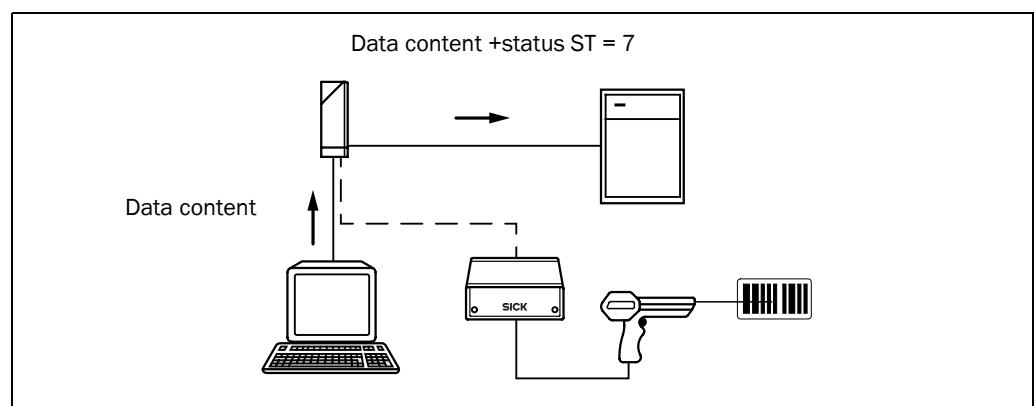


Fig. 10-18: Auxiliary input via the auxiliary interface of the ICR840-2

The ICR840-2 sends the data content of the code that it receives via the auxiliary interface to the host in the same format as the other reading results on the host interface.

Each data string can contain data content with the following length:

- for a 2D code (Data Matrix ECC200), max. 1,556 data bytes
- for a bar code, max. 50 characters.

The ICR840-2 automatically enters the status ST = 7 if the error status has been enabled for transmission. The values of the other reading diagnosis data in the data string are of no significance.

To enable the ICR840-2 to receive the data content of the code via the auxiliary interface, you must switch the operating mode of the interface to "Auxiliary Input".



1. Connect the PC to the serial **auxiliary interface** (port) of the ICR840-2 using a 3-core RS 232 data cable (null modem cable) (CDB620 or CDM420: connect the PC to the internal, 9-pin "Aux" plug). See [Chapter 5.5.3 Connecting the serial auxiliary interface, Page 39](#).

– or –

Connect the PC to the Ethernet interface of the ICR840-2.
See [Chapter 5.5.5 Connecting the Ethernet interface, Page 40](#).


2. Start "CLV-Setup" on your PC.
(see [Chapter 10.4.3 Starting "CLV-Setup", Page 141](#))
3. Choose the AUXILIARY INTERFACE tab.
4. Choose the AUXILIARY INPUT option from the drop-down list.
5. Perform a download to the ICR840-2.

To do so, click the AUXILIARY INPUT option again with the right mouse button and choose DOWNLOAD PARAMETER in the context menu.

CLV-Setup copies the parameter temporary to the ICR840-2.

The auxiliary interface is now temporarily set to the "Auxiliary Input" mode.

Entering a code using the Terminal Emulator in CLV-Setup:

1. Click  in the toolbar.
The Terminal Emulator window is then displayed.
The ICR840-2 is in Reading mode.
2. Click the EXTENDED radio button in the TERMINAL MODE section.
The start and stop characters used by the Terminal Emulator are displayed at the top of the screen, on the left and right of the text input field.
[Fig. 10-19](#) shows the Terminal Emulator window in extended mode.
3. Use the drop-down lists to set the start and stop characters to NUL.
4. Enter the data content of the code (character string) via the keyboard.
Use the backspace key to correct input errors.
The data content may not contain control characters.

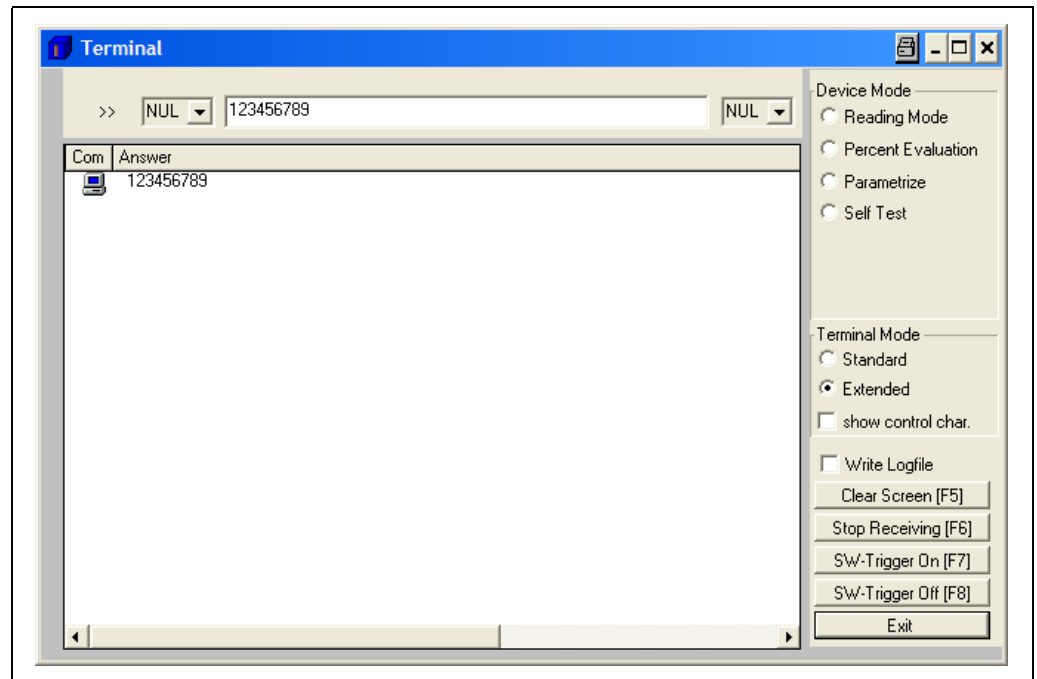


Fig. 10-19: CLV-Setup: Auxiliary input via the Terminal Emulator

5. Press the [RETURN] or [ENTER] key.
The ICR840-2 then interprets all additional characters as a new data string.
CLV-Setup transmits the character string to the ICR840-2 and deletes the entry in the text field. The ICR840-2 does not return an echo.
6. The ICR840-2 sends immediately the data received from the PC to the host via the host interface, independent of an active reading pulse.

Entering a code using a terminal/PC keyboard

1. Connect the terminal /PC with Terminal Emulation program to the serial auxiliary interface on the ICR840-2 (via CDB620 or CDM 420). For the pin assignment, see [Chapter 5.5.3 Connecting the serial auxiliary interface, Page 39](#).
2. Set the communication parameters and data output format as shown in [Table 10-7](#).

Parameter	Value
Data transmission rate	9,600 bd
Data bits	8
Parity	none
Stop bits	1
Data output format	Data terminator e.g. 1234 CR

Tab. 10-7: Communication parameter settings for the terminal/PC for the auxiliary input

- Enter the data content of the code via the keyboard.
The terminal transmits the individual characters to the ICR840-2 immediately.
Use the backspace key to correct input errors.
- Terminate the data content with the control character <CR>.
The ICR840-2 then interprets all further characters as a new data string.
The ICR840-2 ignores other control characters. The data content itself must not contain any control characters.
- The ICR840-2 sends immediately the data received from the PC to the host via the host interface, independent of an active reading pulse.

For bar codes only! Entering bar codes using a handheld scanner with integrated decoder

- Connect the handheld scanner with decoder to the serial auxiliary interface of the ICR840-2 (via CDB620 or CDM420). For the pin assignment, see [Chapter 5.4 Pin assignments, Page 36](#).
- Set the data format and communication parameters on the handheld scanner as shown in [Table 10-7](#).
- Read the code with the handheld scanner.
The ICR840-2 sends immediately the data received from the PC to the host via the host interface, independent of an active reading pulse.

If you connect a SICK Hand-held Scanner from the IT 38xx/46xx/48xx/58xx series, set the communication parameters and data output (data and terminator) as shown in [Table 10-8](#).

Parameter	Value
Data transmission rate	9,600 bd
Data bits	8
Parity	No
Stop bits	1
Data interface	RS 232
Prefix (Header)	Clear all Prefixes
Suffix (Terminator)	CR

Tab. 10-8: ECommunication parameter settings for the SICK Hand-held Scanner from the IT 38xx/46xx/48xx/58xx series

10.7.6 Connection to PROFIBUS-DP



See "CMF 400-1001 Field Bus Gateway for PROFIBUS-DP" Operating Instructions (no. 8010462, English version).

10.7.7 Connection to DeviceNet



See "CMF 400-2101 Field Bus Gateway for DeviceNet" Operating Instructions (order no. 8010464, English version).

10.7.8 Building up a CAN scanner network



See "Application of the CAN interface" Operating Instructions (order no. 8009180, English version).

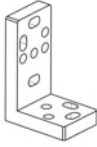

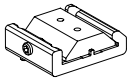
10.8 Ordering information for ICR840-2 and accessories

10.8.1 ICR840-2 Image Code Reader

Order no.	Type (red light)	Version	Type of host data interfaces	Reading window
1042896	ICR840-2A0020	High Density	RS 232/422/485, Ethernet	On front
1042897	ICR840-2A1020		RS 232/422/485, Ethernet	On side
1042277	ICR840-2B0020	Standard Range	RS 232/422/485, Ethernet	On front
1042338	ICR840-2B1020		RS 232/422/485, Ethernet	On side
1042279	ICR840-2C0020	Mid Range	RS 232/422/485, Ethernet	On front
1042885	ICR840-2C1020		RS 232/422/485, Ethernet	On side
1043547	ICR840-2D0020	Long Range	RS 232/422/485, Ethernet	On front
1043546	ICR840-2D1020		RS 232/422/485, Ethernet	On side


Tab. 10-9: Versions of the ICR840-2

10.8.2 Accessories: Holder

Order no.	Description	View
2025491	Mounting bracket, incl. installation material. For dimensions see Fig. 10-20, Page 171	
2039465	Mounting bracket, incl. installation material. For dimensions see Fig. 10-21, Page 171	
2042484	Quick release clamp, incl. installation material. For dimensions see Fig. 10-22, Page 172	

Tab. 10-10: In stock accessories: Holder

10.8.3 Accessories: External ring illuminations



Order no.	Description	View
2034076	External ring illumination for ICR840-2B0020/-2B1020 (Standard Range). The illumination is used to light homogeneously curved object surfaces. Application: Reading of 2D codes which are directly lasered on metal. Incl. installation material. For dimensions see "Ring illumination for ICR840" Fitting Instructions (no. 8011337)	
2040503	As no. 2034076, but for ICR840-2A0020/-2A1020 (High Density).	

Tab. 10-11: In stock accessories: External ring illuminations

Important For connection cables for the ring illuminations: see [Table 10-14, Page 169](#).

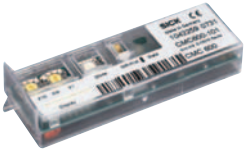




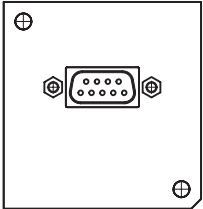
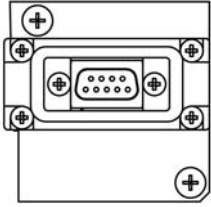
ICR840-2

10.8.4 Accessories: Connection modules

Order no.	Type	Description	View
1042256	CDB620-001	<p>Connection module for one ICR840-2, with:</p> <ul style="list-style-type: none"> • 1 x 15-pin D-Sub HD device socket • 4 x plastic cable grips M16 (clamp range 4.5 to 10 mm (0.18 to 0.39 in)) • Terminal strips (signal distributors) for wiring the data and functional interfaces (digital switching inputs and outputs) • 1 x internal 9-pin D Sub "Aux" plug • 9 x LED (status indicators) • Operating voltage 10 to 30 V DC • Polycarbonate housing, enclosure rating max. IP 65¹⁾ • Operating temperature -35²⁾ to +40 °C (-31 to +104 °F) • Dimensions 124.2 mm x 113.1 mm x 53.9 mm (4.89 in x 4.46 in x 2.12 in) • Weight approx. 260 g (9.17 oz) 	
1042257	CDB620-101	<p>As CDB620-001, but with:</p> <ul style="list-style-type: none"> • 4 x plastic cable grips M16 (clamp range 4.5 to 10 mm (0.18 to 0.39 in)) • 2 x 5-pin M12 circular connection (1 x plug, 1 x socket) 	-
1042258	CDB620-201	<p>As CDB620-001, but with:</p> <ul style="list-style-type: none"> • 4 x plastic cable grips M16 (clamp range 4.5 to 10 mm (0.18 to 0.39 in)) • 1 x plastic cable grips M12 (clamp range 4.5 to 7 mm (0.18 to 0.28 in)) 	-
1025362	CDM420-0001	<p>Connection module for one ICR840-2, with:</p> <ul style="list-style-type: none"> • 1 x 15-pin D-Sub HD device socket • 6 x plastic cable grips M16 (clamp range 4.5 to 10 mm (0.18 to 0.39 in)) • Terminal strips (signal distributors) for wiring the data and functional interfaces (digital switching inputs and outputs) • 1 x internal 9-pin D Sub "Aux" plug • 5 x LED (status indicators) • Operating voltage 10 to 30 V DC, power consumption 0.5 W without ICR840-2 • Polycarbonate housing, enclosure rating max. IP 65¹⁾ • Operating temperature -35²⁾ to +40 °C (-31 to +104 °F) • Dimensions 191.9 mm x 166.2 mm x 69.7 mm (7.56 in x 6.54 in x 2.74 in) • Weight approx. 800 g (28.22 oz) 	
<p>1) When using a SICK standard connection cable 2) Device not moved (without any installation or electrical installation work), otherwise down to -20 °C (-4 °F)</p>			

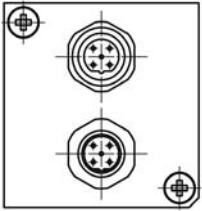
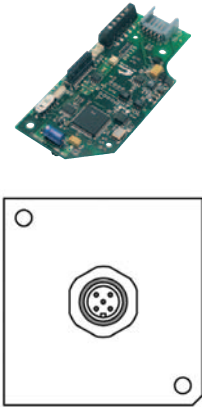
Tab. 10-12: In stock accessories: CDB620/CDM420 Connection Modules

10.8.5 Accessories: Extensions for connection modules

Order no.	Type	Description	View
1042259	CMC600-101	Parameter memory module (Connection Module Cloning) <ul style="list-style-type: none"> • Plug-in using connection module CDB620 or CDM420 • Storage of the parameter set for ICR840-2 (from Firmware V 3.00) • Rotary code switch for activating ICR840-2 network operation • Operating voltage 10 to 30 V DC via CDB620 or CDM420 • Power consumption 0.5 W • Operating temperature 0 ... +40 °C (+32 to +104 °F) 	
2029466	CMD400	Display module (Connection Display Module) <ul style="list-style-type: none"> • In the optional housing cover for the connection module CDM420 • Display of reading results and reading diagnosis data of ICR840-2 (from firmware V 3.00) • 4 x 20 digits (LCD) with keyboard (5 keys) • Connection to CDM420 via ribbon cable • Operating voltage 18 to 30 V DC via CDM420, power consumption 1 W • Operating temperature 0 to +40 °C (+32 to +104 °F) Prerequisite: CMC600-101 parameter memory for controlling the display.	 
2029468	CMP400	Power Supply Module (Connection Module Power) <ul style="list-style-type: none"> • For installation in connection module CDM420 • Power supply of ICR840-2 from an AC power line • Input voltage 100 to 250 V AC/ 50 to 60 Hz • Output voltage 24 V DC, max. 10.8 W (short-circuit proof) • Connection to CDM420 via ribbon cable • Operating temperature 0 to +40 °C (+32 to +104 °F) 	
1026241	CMF400-1001	Field bus gateway (Connection Module Fieldbus) <ul style="list-style-type: none"> • For installation in connection module CDM420 • For connecting one ICR840-2 (from Firmware V 3.00) to PROFIBUS-DP via RS 232 data interface (Slave) • Front panel: 9-pin D-Sub socket (bus), enclosure rating IP 20 • On the gateway in the device, 5-pin terminal strip for connecting 2 digital inputs and 2 digital outputs • Connection to CDM420 via connector • Operating voltage 18 to 30 V DC via CDM420, power consumption 2 W • Operating temperature 0 to +40 °C (+32 to +104 °F) 	 
1026643	CMF400-1101	As CMF400-1001, but: <ul style="list-style-type: none"> • Front panel: 9-pin D-Sub socket (bus), enclosure rating IP 65 	

Tab. 10-13: In stock accessories: Extensions for CDB620/CDM420 Connection Modules

ICR840-2





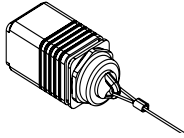
Order no.	Type	Description	View
1028663	CMF400-1201	As CMF400-1001, but: <ul style="list-style-type: none"> • Front panel: 2 x 5-pin M12 circular connection (1 x plug, 1 x socket) for bus, enclosure rating IP 65 	
1026242	CMF400-2101	Field bus gateway (Connection Module Fieldbus) <ul style="list-style-type: none"> • For installation in connection module CDM420 • For connecting one ICR840-2 (from Firmware V 3.00) to DeviceNet via RS 232 data interface (Slave) • Front panel: 5-pin M12 M12 circular connection (bus), enclosure rating IP 65 • On the gateway in the device, 5-pin terminal strip for connecting 2 digital inputs and 2 digital outputs • Connection to CDM420 via connector • Operating voltage 18 to 30 V DC via CDM420, power consumption 2 W • Operating temperature 0 to +40 °C (+32 to +104 °F) 	
6029030	-	PROFIBUS connector, IP 65, for CMF 400-1101	-

Tab. 10-13: In stock accessories: Extensions for CDB620/CDM420 Connection Modules (contd.)

10.8.6 Accessories: Cables and plug-in connections

Order no.	Description	Wires	Length	Connection/View
6010075	Extension cable for data and functional interfaces, dia. 6.5 mm (0.27 in), shielded, with 15-pin D-Sub HD socket and plug	15	2 m (6.56 ft)	ICR840-2 to CDB620/CDM420
6010137	Connection cable for data and functional interfaces, dia. 6.5 mm (0.27 in), with 15-pin D-Sub HD socket and one open end (stripped), shielded	15	2 m (6.56 ft)	ICR840-2 to non-SICK power supply
2014054	RS 232 data cable, dia. 5 mm (0.2 in), shielded, with two 9-pin D-Sub sockets (null modem cable, pin 2 (RxD) and pin 3 (TxD) crossed)	3	3 m (9.84 ft)	PC to CDB620/CDM420
6010088	Data cable, dia. 6.6 mm (0.27 in), shielded, for connections up to 3 m (9.84 ft)	15 x 0.09 mm ² (28 AWG)	Bought to size	Free wiring
6007508	Data cable, dia. 8.5 mm (0.33 in), twisted pair, shielded	2 x 2 x 0.23 mm ² (24 AWG)	Bought to size	SICK network (RS 485)
6026083	Ethernet data cable (patch cable), shielded, grey, with two RJ45 plugs (IP 20) for connecting the ICR840-2 to Ethernet	8	3 m (9.84 ft)	ICR840-2 to Ethernet (network)
2039986	Set, consisting of adapter frame incl. sealing and Ethernet data cable (patch cable), shielded, with RJ 45 plug (IP 65) in push & pull housing and RJ45 plug (IP 20) for connecting the ICR840-2 to Ethernet	4	1 m	ICR840-2 Ethernet (network)
6026084	Ethernet cable (crossover), shielded, red, with two RJ45 plugs (IP 20) for connecting the ICR840-2 to the network card of the PC	8	3 m (9.84 ft)	ICR840-2 to PC (peer-to-peer)

Tab. 10-14: In stock accessories: Cables and plug-in connections

Order no.	Description	Wires	Length	Connection/View
6025894	Connection cable for external ring illumination no. 2034076/no. 2040503, with 4-pin M8 socket and open end	4	2 m (6.56 ft)	External ring illumination to CDB620/CDM420
6025895	As 6025894, but longer	4	5 m (16.4 ft)	
6025896	As 6025894, but longer	4	10 m (32.8 ft)	
6009438	D-Sub connector housing (metal) for 9-pin or 15-pin HD inserts			
6007335	D-Sub connector insert, 9-pin female multipoint connector (socket)			-
6010019	D-Sub connector insert, 15-pin HD female multipoint connector (socket)			
6010020	D-Sub connector insert, 15-pin HD male multipoint connector (plug)			
4038847	Sealing rubber IP 65 for extension cables with 15-pin D-Sub plug-in connections	-		
6032800	IP 65 cover for installed adapter frame on the Ethernet connection of ICR840-2, with push & pull housing and fixing cord (prevention for loosening)	-		

Tab. 10-14: In stock accessories: Cables and plug-in connections (contd.)

10.8.7 Accessories: Reading pulse generators



The SICK catalog "SENSICK Industrial Sensors" (order no. 8006530, English version) contains a large selection of photoelectric switches and photoelectric proximity switches as well as the associated accessories (brackets, connection cables).

10.8.8 Accessories: Incremental encoder

Order no.	Description
2022714	Incremental encoder with friction wheel, resolution 10 mm (0.39 in) per pulse, max. 100 KHz, operating voltage 18 to 28 V DC, Operating temperature 0 to +70 °C (+32 to +158 °F). With mounting bracket and installation material, 10 m (32.8 ft) connection cable with M12 socket and open end

Tab. 10-15: In stock accessories: Incremental encoder

10.8.9 Accessories: Opto-coupler

Order no.	Description
6022514	DEK-OE-24DC opto-coupler, for converting the low-side switching output "Result 1" to a high side switching output, operating voltage 24 V DC, transmission frequency max. 100 kHz, input voltage 24 V DC ± 20%, output voltage: 4 to 30 V DC, terminal connection, operating temperature -20 to +60 °C (-4 to +140 °F)

Tab. 10-16: In stock accessories: Opto-coupler

ICR840-2

10.9 Dimensional drawings accessories

10.9.1 Mounting bracket no. 2025491

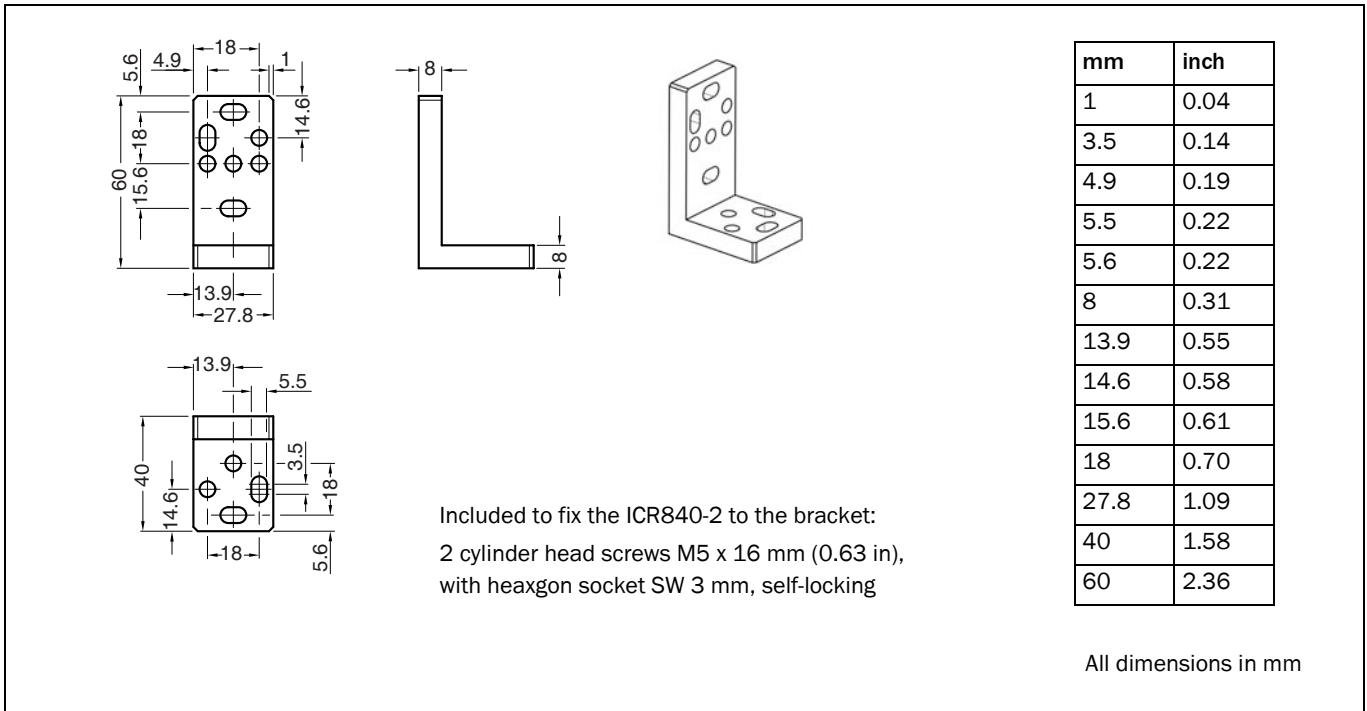


Fig. 10-20: Dimensions of the mounting bracket no. 2025491

10.9.2 Mounting bracket no. 2039465

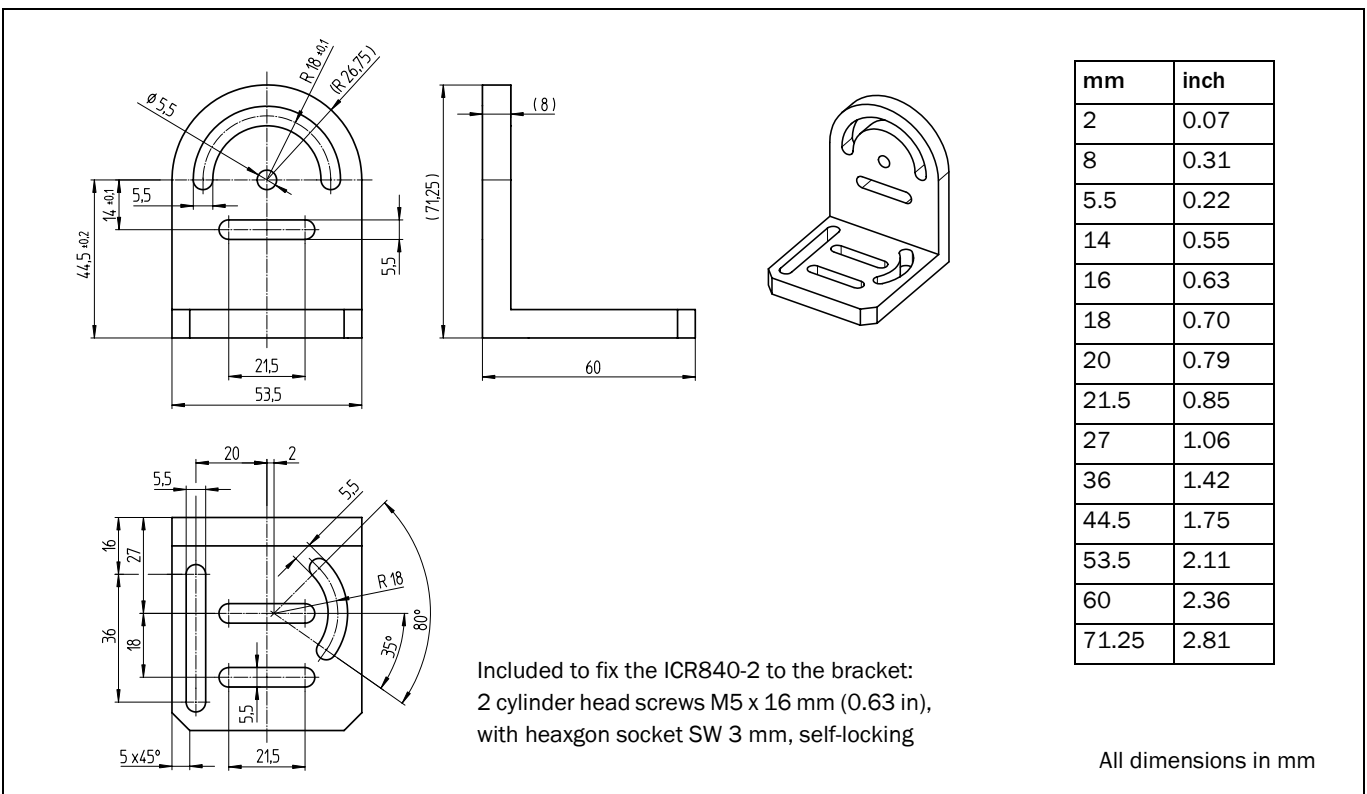


Fig. 10-21: Dimensions of the mounting bracket no. 2039465

ICR840-2

10.10 Supplementary documentation

Order no.	Title	Language	Contents
8012119	"CDB620 Connection Module" Operating Instructions	German/ English	Description for connecting the ICR840-2 to the host/PLC/sensor via the CDB620 Connection Module
8010004	"CDM420-0001 Connection Module" Operating Instructions	German/ English	Description for connecting the ICR840-2 to the host/PLC/sensor via the CDM420 Connection Module
8012120	"CMC600 Connection Module Cloning" Operating Instruction	German/ English	Description for setting up the module in the CDB620 or CDM420 Connection Module
8010372	"CMD400 Connection Display Module" Operating Instructions	German/ English	Description for setting up the module in the CDM420 Connection Module
8010365	"CMP400 Power Supply Module" Operating Instructions	German/ English	Beschreibung der Installation des Moduls im Anschlussmodul CDM420
8010462	"CMF400-1001 Field Bus Gateway for PROFIBUS-DP" Operating Instructions	English	Description for installing and setting up (configuration) the module in the CDM420 Connection Module
80104634	"CMF400-2101 Field Bus Gateway for DeviceNet" Operating Instructions	English	Description for installing and setting up (configuration) the module in the CDM420 Connection Module
8009180	"Application of the CAN interface" Operating Instructions	English	Description of building a CAN scanner network (electrical connection, configuration of the ICR840-2, functions) and the integration into a CANopen network
8011337	"Ring illumination for ICR840" Fitting Instructions	German/ English	Description of installation and electrical installation of the ring illumination

Tab. 10-17: Supplementary documentation

10.10.1 CLV-Connect (from version > 2.0)

Diagrams showing you how to connect the CDB620 and CDM420 Connection Modules are also available in the "CLV Connect" PC program. This software is available on the "Manuals & Software Bar Code Scanners" CD-ROM, which is included in the scope of delivery of the ICR840-2.

The software can also be downloaded from the SICK home page (www.sick.com) at "Service&Support/Downloadpool". It can be called up using a standard HTML browser (e.g. Internet Explorer™).

10.11 Glossary

For additional terms, see also *Online help "CLV-Setup Help"*.

1D code (bar code)

Field of parallel, dark bars and light gaps which can be applied to the medium (base) by any of several marking procedures following a certain specification. A corresponding number and combination of bars and gaps (elements), which can be read by a machine, result in an alphanumeric character which can be read by the user. Since all of the encoded information, framed by start and stop characters, is available in one dimension and is usually scanned line-by-line, these bar codes are called linear codes. The various types of bar code differ in their selection of characters which can be encoded, structure (number of elements per character, number of characters, start/stop characters, check character), the information density and the print tolerances. The length of the code bars and gaps is irrelevant in terms of the information content, but is relevant for scanability.

2D code

In a two-dimensional code, the information is arranged more densely, using dark and light cells (squares) in a matrix. The vertical and horizontal arrangement of the cells is determined using the data-content specification in reference to the middle and side edge reference points. For error-correction purposes when reading, a mathematical method provides the code with a redundancy feature (e.g. error-correction code words for Data Matrix ECC 200). The omnidirectional reading of 2D codes is done by image recording and processing.

Aspect ratio

For bar codes, ratio of the code height (bar length) to the code length (number of characters). The SMART decoder can read bar codes with extremely small aspect ratios.

Auxiliary input

Special function of the ⇨ auxiliary interface. Used to enter code data subsequently in order to complete reading results sent to the host.

Aux interface

Logical auxiliary interface of the ICR840-2 with a fixed data output format. Can be physically switched to the serial data interface (RS 232) or to the Ethernet interface (port 2111). With this interface, access to the ICR840-2 for configuration/diagnostics is always possible with the PC and the CLV-Setup configuration software. Also used to output ⇨ system and error messages. Can be assigned various functions.

CAN interface

Physical data interface. Used to establish a quick SICK-specific CAN scanner network with various functions (e.g. multiplexer, master/slave) or for integration into existing CAN networks in accordance with the CANopen protocol. In Remote mode, using the CLV-Setup configuration software, you also can access to the ICR840-2 for configuration/diagnostics via the CAN interface (network).

CLV-Setup

PC program which runs under Windows 95™/98™, Windows NT4.0™, Windows 2000™ and Windows XP™. Used for offline configuration (adjustment to the reading application at hand) and the online diagnostics of the ICR840-2. By ⇨ uploading and ⇨ downloading, the ⇨ parameter set to be processed is exchanged with the ICR840-2.

CLV-Setup Help

Online help function that provides support for using the CLV-Setup configuration software. The help function contains explanations of the ICR840-2 parameters and their valid entries. Can be launched directly from CLV-Setup in an HTML browser such as "Internet Explorer™".

Codegeometry

Length and height dimensions of the code.

Codeposition (CP value)

Position of the first dark bar in a detected bar code lengthwise the reading window. Calculated by the ICR840-2 in the image memory and can be used, for example, to separate bar codes with identical data contents. The active evaluation range in the reading window can be restricted for ⇒ decoding purposes by specifying the maximum and minimum CP values of max. two areas of interest for the application.

Command strings, commands

ICR840-2 user interface - alternative to the CLV-Setup configuration software. Basic, yet clearly structured command language for modifying the ICR840-2 parameter sets online. Accesses the ICR840-2 command interpreter directly. Special programming activities are required to use the command strings from the host. CLV-Setup is based on the command strings.

Configuration file

File in the CLV-Setup configuration software which archives the entire ⇒ parameter set of the ICR840-2. Can be printed out in the form of a table.

Data forwarding

Option of forwarding data transmitted by the host transparently to a terminal via the ICR840-2 using an identifier. Data can also be forwarded in the opposite direction. Furthermore, this function also allows data received on one of the serial interfaces to be output again straight away on one of the same interfaces (echo). Application: forwarding reading results or reading pulse commands in pass-through mode, e.g. in a master/slave network.

Data output string

Structured data telegram ⇒ in the reading result output by the ICR840-2 on the logical ⇒ main data interface (⇒ host interface). Can be physically switched to the serial interface (RS 232, RS 422/485), to the CAN interface or to Ethernet interface (port 2112). The output can also be suppressed. The structure of the data string is flexible and can be adapted to a large extent to the subsequent data processing task. The data output format of the ⇒ auxiliary interface, on the other hand, cannot be changed.

Decoder, decoding

Code-type-specific evaluation routine for reconstructing the read code in electronic form in order to decode its data content.

Download

Method of transferring the ⇒ parameter set that was modified with the user interface of the ⇒ CLV-Setup configuration software offline from the PC to the ICR840-2. CLV-Setup either always transfers a complete copy to the memory (RAM) of the ICR840-2 (DOWNLOAD TO DEVICE) or just the parameter previously processed using the context menu of the right mouse

button (DOWNLOAD PARAMETER) or all parameters of the displayed tab (DOWNLOAD PARAMETERS OF THIS VIEW). You can overwrite the existing parameter set in EEPROM of the ICR840-2 by choosing the "Permanent" save option

Error messages

Messages in ⇨ plain text or coded (4-digit alphanumerical character) that are used to identify a malfunction on the ICR840-2 in Reading mode. The messages are output via the auxiliary interface only. Exception: ST=3 (device error), which is also output on the host interface. The error messages can be displayed in the Terminal Emulator of the CLV-Setup configuration software if requested by the user.

Error status

Identifier output with the reading result by the ICR840-2 for errors that were diagnosed while the code was being read. The entry for the host interface is made in the "Reading data" field of the ⇨ data output string and must be enabled by configuration (disabled by default in the ICR840-2).

Ethernet interface

Physical data interface with high transmission rate (10/100 Mbps).

ICR840-2 uses this to output the content of a reading pulse stored in the image buffer memory via FTP for diagnostics if reading problems occur. It can also be used for parameterizing with CLV-Setup (TCP/IP) (port 2111) instead of using the serial auxiliary interface (RS-232) or to output the reading result (port 2112) instead of using the serial host interface (RS 232, RS 422/485)

Focus position

Distance of the ICR840-2's focal point in front of the reading window. Creates a distance-specific depth of field (DOF) via the optical components of the ICR840-2, in which the bar code can be scanned

Functional interfaces

Digital switching inputs and outputs on the ICR840-2.

Good Read

The ICR840-2 detected a code or the required number of codes specified by the evaluation parameters during the ⇨ reading pulse.

Header

Data block in the reading result on the ⇨ host interface. Used as a header in the ⇨ data output string for the subsequent data content of the bar codes. Contains up to 10 elements, consisting of reading diagnostics data and/or constants (control characters, letters, digits), depending on the configuration. The "Header" block is empty in the default setting of the ICR840-2.

Host interface

Logical main data interface on the ICR840-2 with configurable data output format. Used to output the ⇨ reading result in telegram form to the host/PLC. Can be physically switched to the serial data interface (RS 232, RS422/485), to the CAN interface or to the Ethernet interface (port 2112). Works as a gateway with the SICK-specific CAN scanner network. The host interface supports various transfer protocols. With this interface, access to the

ICR840-2 for configuration/diagnostics is also possible with the PC and the CLV-Setup configuration software.

Master/slave configuration

Special arrangement for connecting up to max. 10 readers to one reading station (e.g. left/right read) using the CAN interface. Thanks to the master, the entire network appears as one device to the host.

Multiple read

Variable number of reads which must provide identical reading results of the same bar code before the ICR840-2 outputs the result.

No Read

The ICR840-2 failed to detect a code or the required number of codes specified by the evaluation parameters during the ⇨ reading pulse.

No Read format

Special, parameterizable data block as a substitute for codes, which were expected but not detected, in the data output string on the host interface for ⇨ no reads. Comprised of the reading data with/without a defined error string or suppressed completely. In the default setting the ICR840-2 outputs the reading data with the "NOREAD" error string as the no read format.

Parameter set

Data record used to initialize and activate the functions implemented in the ICR840-2. With ⇨ downloading and ⇨ uploading, the parameter set is transferred from CLV-Setup to the ICR840-2 or from the ICR840-2 to CLV-Setup.

Percentage evaluation

Special operating mode in which the quality of the code reads (but not the codes) is assessed statistically. The codes must be stationary. The ICR840-2 carries out 100 reads and evaluates the reading quality. It then outputs the reading results on the ⇨ auxiliary interface every 2 sec. together with the ⇨ reading diagnosis data.

Plain text

Legible form of an ICR840-2 message. The ICR840-2 outputs special messages in coded form, e.g. the result of the self-test is represented as two digits.

Reading range (DOF)

Depth of field on both sides around the focal point of the red illumination line on the reading level. The extent of the reading range depends on the resolution and reading distance.

Reading data

Data block in the reading result of the ⇨ host interface, which presents the code content. Contains up to 10 elements, consisting of reading diagnosis data, reading data and/or constants (control characters, letters, digits), depending on the configuration. The reading diagnostics data and constants be grouped around the code content as desired. These are used as separators between the data contents of several codes. The "Reading data" field only contains the "code content" block in the ICR840-2 default setting.

Reading diagnosis data

Data directly derived from the reading procedure by the ICR840-2. This data enables the quality of the 2D code read to be assessed. The data is always output on the ⇒ auxiliary interface together with the reading result. Only output on the host, CAN or Ethernet interface (port 2112) if enabled on the DATA STRINGS tab in the CLV-Setup program (disabled by default for ICR840-2).

Reading interval

Timeslot in which the ICR840-2 activates the red illumination field and attempts to detect valid codes from the information read. The reading interval may be shorter than the external reading pulse, depending on the selected output mode for the reading result.

Reading pulse

Pulse applied externally to the ICR840-2 to trigger the internal ⇒ reading interval. Can be supplied by a photoelectric reflex switch or a command from the host on the data interface.

Reading result

Electronic representation of the data content of the read codes together with the ⇒ reading diagnosis data in one ⇒ data output string that is generated after the reading pulse has elapsed. The reading result on the auxiliary interface has a fixed format (content and output format); the reading result on the host interface can be configured separately for good reads and no reads. Special characters like reading diagnosis data, control characters and/or alphanumeric constants can also be added if necessary.

Result status output

Function of the "Result 1" and "Result 2" switching outputs and the beeper in Reading mode. Signals the status of the reading result without indicating its contents (e.g. "Good Read"). You can assign a status to each output/beeper on the DEVICE CONFIGURATION tab in the CLV-Setup configuration software. The "Result" LED is linked to the "Result 2" output.

Sending point

Point at which the reading result is output with respect to the start of the ⇒ reading pulse and the internal ⇒ reading interval.

SMART decoder

Specially developed ⇒ decoder for reading bar codes with an extremely small code height (⇒ aspect ratio > 1:3) and for poor-quality or contaminated code prints.

Storage in ICR840-2

The application-specific ⇒ parameter set can be stored temporarily or permanently in the ICR840-2. If it is stored temporarily in the RAM, it is lost as soon as the power supply is switched off. Parameter sets that are stored permanently are transferred to the EEPROM in the ICR840-2 and remain active as the current data record when the power supply is switched off. The default setting is not affected by this and is stored in a read-only memory (ROM).

Standard decoder

Tried-and-tested ⇒ decoder from the CLV and ICR840-2 product family. Suitable for applications with an adequate code height, limited tilt, and high-quality code prints.

System messages

Messages in ⇨ plain text used to output the operating status of the ICR840-2. The messages are output via the auxiliary interface only. The messages can be displayed in the Terminal Emulator of the CLV-Setup configuration software if requested by the user.

Teach-in

Method of programming the information required to adjust the ICR840-2 to the reading application in Parameter mode. Example: Teach-in of match code 1

Terminator

Data block in the reading result of the ⇨ host interface. Used to terminate the data content of the code. Contains up to 10 elements, consisting of reading diagnosis data and/or constants (control characters, letters, digits), depending on the configuration. The "Terminator" block is empty in the default setting of the ICR840-2.

Upload

Method of transferring the ⇨ parameter set from the ICR840-2 to the PC ⇨ using the CLV-Setup configuration software. CLV-Setup either transfers a complete copy of the current parameter set from the memory (RAM) of the ICR840-2 (UPLOAD FROM DEVICE) or just the parameter previously processed using the context menu of the right mouse button (UPLOAD PARAMETER) or all parameters of the displayed tab (UPLOAD PARAMETERS OF THIS VIEW). Displays the current parameter values on the tabs. Prerequisite for modifying the current parameter set

User interface

Windows-based input interface of the CLV-Setup configuration software used for operating and configuring the ICR840-2.

10.12 EC-Declaration of Conformity

Fig. 10-24 shows the scaled down copy of the EC Declaration of Conformity (page 1).

- The complete EC Declaration of Conformity and the list of device versions and the standards met can be requested from SICK AG.

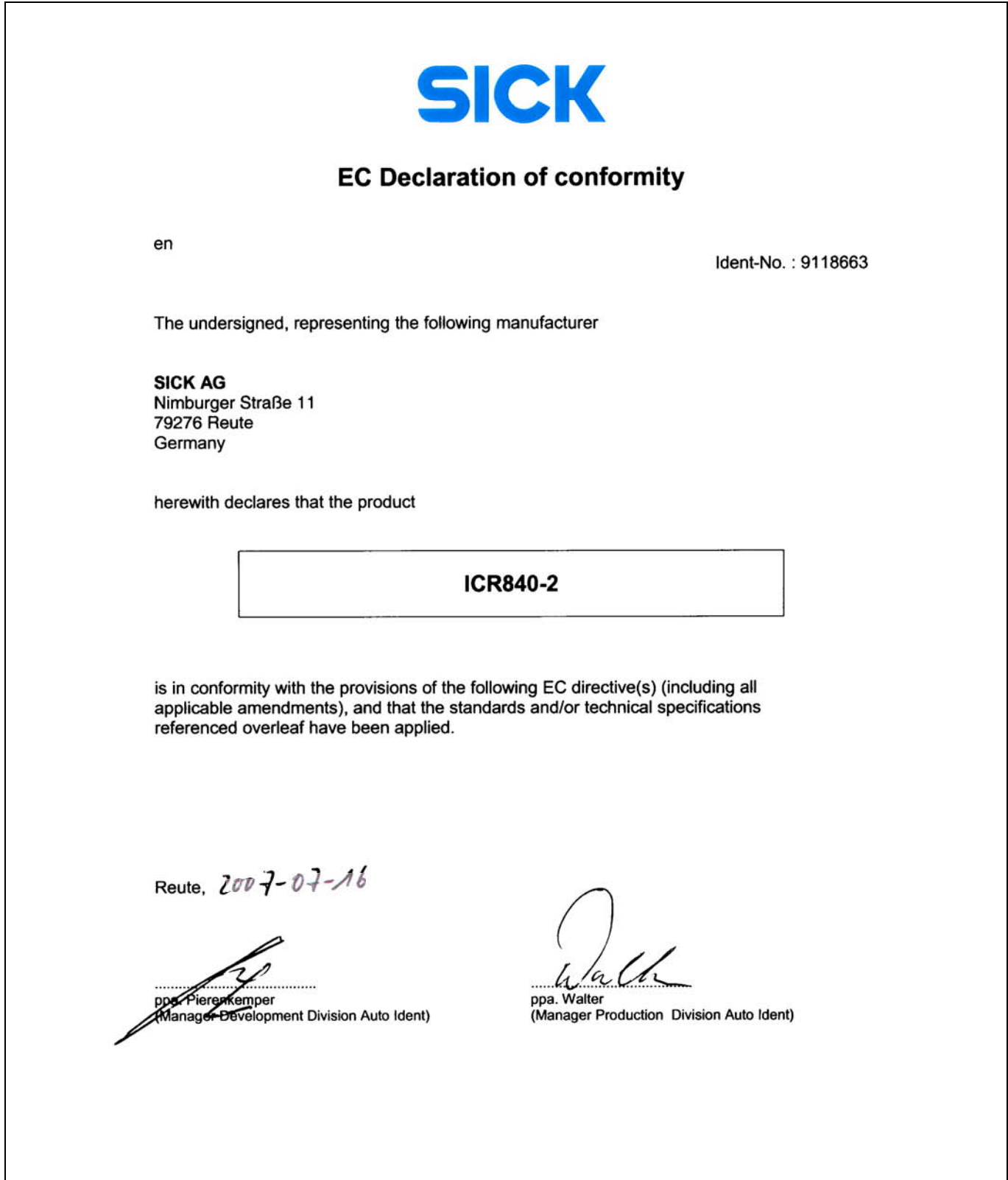


Fig. 10-24: Copy of the EC Declaration of Conformity (page 1, scaled down)

10.13 List of tables and figures

Tables

Tab. 1-1:	Target group	7
Tab. 2-1:	Required qualifications for starting up the ICR840-2	9
Tab. 3-1:	ICR840-2 delivery	15
Tab. 3-2:	Versions of the ICR840-2	15
Tab. 3-3:	Overview of the product features and functions	16
Tab. 3-4:	Meaning of the general LEDs.....	21
Tab. 3-5:	Meaning of the LEDs of the Ethernet interface	21
Tab. 3-6:	Beeper function	22
Tab. 4-1:	Reading distance and field of view dimensions (type-depended).....	26
Tab. 4-2:	Permissible reading angle between the field of view and the bar code/ 2D code when reading with omni-directional decoder.....	27
Tab. 4-3:	Permissible reading angles between the field of view and bar code when reading with standard/SMART decoderfor Standard Range	27
Tab. 5-1:	Required supply voltage if using further modules in combination with the connection module CDB620/CDM420	32
Tab. 5-2:	Pre-fabricated cables for connecting the ICR840-2.....	33
Tab. 5-3:	Connections modules for the ICR840-2.....	33
Tab. 5-4:	Functions of the additional modules for the ICR840-2 installed in the connection modules.....	35
Tab. 5-5:	Pin assignment of the 15-pin D-Sub HD plug	36
Tab. 5-6:	Pin assignment of the 8-pin RJ45 socket 10baseT	36
Tab. 5-7:	Recommended maximum cable lengths between ICR840-2 and host computer	38
Tab. 5-8:	Characteristic data of the switching inputs	41
Tab. 5-9:	Characteristic data of the "Result 1" switching output	43
Tab. 5-10:	Characteristic data of the "Result 2" switching output	44
Tab. 5-11:	Wiring colour assignment of cable no. 6010137 (open end))	45
Tab. 6-1:	Connection between PC with CLV-Setup configuration software and ICR840-2.....	48
Tab. 6-2:	ImageFTP: Function of the symbol buttons.....	61
Tab. 6-3:	ImageFTP: Description of the text boxes.....	61
Tab. 6-4:	ImageFTP: Graphical forms/colours for presentation of the reading diagnosis data	62
Tab. 6-5:	ImageFTP: Menu command functions	63
Tab. 6-6:	Default setting: In the ImageFTP for user account/in the ICR840-2 (ETHERNET tab).....	65
Tab. 6-7:	Example of user name/password/upload path for multi-user operation	67
Tab. 6-8:	ImageFTP: Default setting.....	67
Tab. 6-9:	"Monitor Host Interface" function	84
Tab. 6-10:	Extract: Default setting of the ICR840-2 parameter values	92
Tab. 6-11:	Guide: Parameterizing the reading trigger and output of reading result.....	95
Tab. 6-12:	Guide: Settings to be made for the evaluation of identical codes	98
Tab. 8-1:	Error message output to the auxiliary interface	106
Tab. 8-2:	Meaning of the ST error status in the reading result	107
Tab. 8-3:	Troubleshooting: Restoring operation (Reading mode)	109
Tab. 8-4:	Troubleshooting: Reading pulse errors in Reading mode.....	110
Tab. 8-5:	Troubleshooting: Result output errors in Reading mode (general malfunctions)	113
Tab. 8-6:	Troubleshooting: Result-status output errors in Reading mode (reading 2D codes)	115
Tab. 8-7:	Troubleshooting: Result-status output errors in Reading mode (reading bar codes).....	116
Tab. 8-8:	Troubleshooting: Errors in the result status output in Reading mode	117

Tab. 8-9:	Troubleshooting: Errors when using the image transfer via the Ethernet interface	118
Tab. 9-1:	Technical specifications of ICR840-2	121
Tab. 9-2:	Standard Range: Suitable bar code lengths at focus position (distance 80 mm (3.15 in), field of view 40 mm x 32 mm (1.58 in x 1.26 in))	122
Tab. 9-3:	Reading conditions for specification diagrams	124
Tab. 10-1:	System messages of the ICR840-2	137
Tab. 10-2:	Default settings in CLV-Setup (extract)	141
Tab. 10-3:	Functions of the CLV-Setup configuration software (overview)	144
Tab. 10-4:	Formulas for calculating the code length of a bar code	150
Tab. 10-5:	Overview: Functions for the code comparison	151
Tab. 10-6:	Teach-in modes for match code 1	152
Tab. 10-7:	Communication parameter settings for the terminal/PC for the auxiliary input	164
Tab. 10-8:	ECommunication parameter settings for the SICK Hand-held Scanner from the IT 38xx/46xx/48xx/58xx series	164
Tab. 10-9:	Versions of the ICR840-2	166
Tab. 10-10:	In stock accessories: Holder	166
Tab. 10-11:	In stock accessories: External ring illuminations	166
Tab. 10-12:	In stock accessories: CDB620/CDM420 Connection Modules	167
Tab. 10-13:	In stock accessories: Extensions for CDB620/CDM420 Connection Modules	168
Tab. 10-14:	In stock accessories: Cables and plug-in connections	169
Tab. 10-15:	In stock accessories: Incremental encoder	170
Tab. 10-16:	In stock accessories: Opto-coupler	170
Tab. 10-17:	Supplementary documentation	173

Figures

Fig. 2-1:	Outlet opening of the LED radiation at the ICR840-2	11
Fig. 2-2:	Black-yellow signed warning labels found on the ICR840-2	11
Fig. 3-1:	Design of the ICR840-2	14
Fig. 3-2:	ICR840-2: Direct marking methods for 2D codes	17
Fig. 3-3:	Block diagram: functions of the ICR840-2	18
Fig. 3-4:	Field of view of the ICR840-2 in the focus position (Standard Range)	18
Fig. 3-5:	LEDs	20
Fig. 4-1:	Installation accessories	24
Fig. 4-2:	Example: Fixing the ICR840-2 with the mounting bracket no. 2025491	24
Fig. 4-3:	ICR840-2: Allocation of the field of view to the code	25
Fig. 4-4:	Definition of the reading distance and the field of view	26
Fig. 4-5:	Reading angle that can occur between the field of view and the code	26
Fig. 4-6:	Avoiding surface reflection: Angle between emitting light and code (tilted away from the plumb line)	27
Fig. 4-7:	Count direction of the code position CP for bar codes along the reading window	28
Fig. 4-8:	Installation example for the external reading pulse sensor	30
Fig. 5-1:	Block diagram for startup and configuration	31
Fig. 5-2:	Block diagram: Connection of the ICR840-2 to the CDB620 or CDM420 Connection Module	34
Fig. 5-3:	Connecting the serial host interface	38
Fig. 5-4:	Connecting the serial auxiliary interface	39
Fig. 5-5:	Block diagram: Function of the Ethernet interface	40
Fig. 5-6:	Connecting the "Sensor 1" switching input	41
Fig. 5-7:	Connecting the "Sensor 2" switching input	41
Fig. 5-8:	Connecting the "Result 1" switching output for triggering the external illumination	42

Fig. 5-9:	Connecting the "Result 1" switching output for indicating the result status when the load (e.g. PLC) is directly connected, using a series resistor.....	43
Fig. 5-10:	Connecting the "Result 1" switching output for indicating the result status when the load (e.g. PLC) is connected via optocoupler to create a high side switching function	43
Fig. 5-11:	Connecting the "Result 2" switching output.....	44
Fig. 6-1:	CLV Assistant: Starting up window	49
Fig. 6-2:	CLV Assistant: Connection Assistant dialog box.....	50
Fig. 6-3:	CLV Assistant: Ethernet Assistant dialog box after an ICR840-2 has been detected in the network (here: IP address in the default setting of the ICR840-2)	51
Fig. 6-4:	CLV Assistant: Ethernet Assistant dialog box after a new IP address/mask has been assigned to the ICR840-2 (here: 010.224.015.097/255.255.248.000)	52
Fig. 6-5:	CLV Assistant: Dialog box confirming that communication with the ICR840-2 via Ethernet (TCP/IP) is successful	52
Fig. 6-6:	CLV Assistant: Dialog box confirming that communication with the ICR840-2 via RS 232 is successful	54
Fig. 6-7:	CLV-Setup: "Image Acquisition" tab	55
Fig. 6-8:	CLV-Setup: "Ethernet" tab.....	56
Fig. 6-9:	ImageFTP: Image output	57
Fig. 6-10:	Image output of the ICR840-2 and image transfer to the PC.....	58
Fig. 6-11:	Multi-user operation: Image output of several ICR840-2 devices to the ImageFTP at one PC.....	58
Fig. 6-12:	ImageFTP: Program window.....	60
Fig. 6-13:	ImageFTP: Image presentation mode, here with reading diagnosis data for the code	60
Fig. 6-14:	ImageFTP: Examples for presentation of reading diagnosis data of diagnosis levels 0 to 2.....	62
Fig. 6-15:	ImageFTP: "User Accounts" dialog box	65
Fig. 6-16:	ImageFTP: "DIRECTORY" dialog box.....	66
Fig. 6-17:	Configuration with CLV-Setup and storage of the parameter set.....	69
Fig. 6-18:	2D code sample: Data Matrix ECC200; cell size 0.3 mm (11.8 mil)	75
Fig. 6-19:	Bar code sample (code 39; module width 0.35 mm (13.8 mil); print ratio 2:1)	76
Fig. 6-20:	CLV-Setup: Output of the reading result for 2D codes on the auxiliary interface, displayed in the Terminal Emulator	76
Fig. 6-21:	Position of the symbol in the image field of the image memory	78
Fig. 6-22:	CLV-Setup: Output of the reading result for bar codes on the auxiliary interface, displayed in the Terminal Emulator	78
Fig. 6-23:	CLV-Setup: Display of the percentage evaluation for 2D codes on the auxiliary interface, displayed in the Terminal Emulator	82
Fig. 6-24:	CLV-Setup: "Operating Data" dialog box.....	83
Fig. 6-25:	CLV-Setup: Output of the reading result of the host interface on the auxiliary interface, displayed in the Terminal Emulator (in this case: 0 = Output).....	85
Fig. 6-26:	CLV-Setup: Displaying the self-test result in the Terminal Emulator.....	87
Fig. 6-27:	CLV-Setup: Dialog box for executing Matchcode 1 Teach-in	88
Fig. 6-28:	CLV-Setup: Displaying the system messages in the Terminal Emulator when starting the ICR840-2.....	89
Fig. 7-1:	Cleaning the reading window.....	102
Fig. 7-2:	Cleaning the external optical sensor (reading pulse generator)	102
Fig. 9-1:	Dimensions of the ICR840-2 with reading distance (Z) and resulting field of view (X,Y)	123
Fig. 9-2:	ICR840-2A0020/-2A1020 (High Density): Reading ranges and dimensions of the field of view	124

Fig. 9-3:	ICR840-2B0020/-2B1020 (Standard Range): Reading ranges and dimensions of the field of view	124
Fig. 9-4:	ICR840-2C0020/-2C1020 (Mid Range): Reading ranges and dimensions of the field of view.....	125
Fig. 9-5:	ICR840-2D0020/-2D1020 (Long Range): Reading ranges and dimensions of the field of view	125
Fig. 10-1:	CLV-Setup: "Reading Configuration" tab	129
Fig. 10-2:	CLV-Setup: "Code Properties Parameters" tab	129
Fig. 10-3:	CLV-Setup: using the "Deviation of dot size" slider	130
Fig. 10-4:	CLV-Setup: "Code Properties Parameters" tab	131
Fig. 10-5:	CLV-Setup: "Reading Configuration" tab	131
Fig. 10-6:	CLV-Setup: "Code configuration" tab.....	132
Fig. 10-7:	CLV-Setup: "Data Matrix" tab	132
Abb. 10-8:	CLV-Setup: "Code configuration" tab.....	133
Fig. 10-9:	CLV-Setup: "Data Matrix" tab	133
Fig. 10-10:	CLV-Setup: "Optimisation" tab	134
Fig. 10-11:	CLV-Setup: "Code Properties Parameters" tab	135
Fig. 10-12:	Limiting the active image recording area of the matrix sensor.....	135
Fig. 10-13:	CLV-Setup: "Code Properties Parameters" tab	136
Fig. 10-14:	CLV-Setup: Results of the AutoBaud detect function	142
Fig. 10-15:	User interface of the "CLV-Setup" configuration software	143
Fig. 10-16:	CLV-Setup: Entering commands in the Terminal Emulator	149
Fig. 10-17:	Wiring the "Sensor 2" switching input for triggering the teach-in of match code 1 and for automatic activation of the code comparison.....	154
Fig. 10-18:	Auxiliary input via the auxiliary interface of the ICR840-2	162
Fig. 10-19:	CLV-Setup: Auxiliary input via the Terminal Emulator.....	163
Fig. 10-20:	Dimensions of the mounting bracket no. 2025491.....	171
Fig. 10-21:	Dimensions of the mounting bracket no. 2039465	171
Fig. 10-22:	Dimensions of the clamping section for the quick release clamp no. 2042484	172
Fig. 10-23:	Dimensions of the ring illumination no. 2034076/ no.2040503 (here shown without holder)	172
Fig. 10-24:	Copy of the EC Declaration of Conformity (page 1, scaled down)	180
Fig. 10-25:	Scannable 1D codes with various module widths (print ratio 2:1)/ 2D code.....	189

10.14 Index

Numerics

2D code	
- SICK information on the Internet.....	7

A

Abbreviations.....	5
Accessories.....	166
Aux. interface	
- Connecting.....	70
- Data format.....	48, 141
- Function.....	19
- Operating modes.....	83
- Routing via Ethernet interface.....	40

Auxiliary input

- Activation.....	162
- Function.....	86

Azimuth angle (Tilt)

- Definition.....	26
- Limit.....	27

B

Bar code	
- Entry of unknown lengths.....	150
- Scannable lengths.....	122

Beeper

- Function.....	22
- Parameterizing.....	22
- Position.....	22

Browser.....	47
--------------	----

Bus connection module

- Ordering information.....	168
-----------------------------	-----

C

Cables	
- Overview.....	33, 169
- Wiring color assignment.....	45

CAN interface.....	165
--------------------	-----

Care.....	101
-----------	-----

CDB620/CDM420 Connection Modules

- Accessories.....	168
- Block diagram.....	34
- Cables.....	33
- Function.....	34
- In stock types.....	167
- Installation.....	29
- Overview.....	33

CD-ROM.....	15
-------------	----

Cleaning.....	101
---------------	-----

CLV-Setup

- Default setting.....	141
- Function keys.....	144
- Functions (overview).....	144
- Installation on a PC.....	138
- Log file serial communication.....	147
- Unknown parameters.....	146
- User interface.....	143

CLV-Setup Help.....	145
---------------------	-----

Code

- Sample (scannable).....	189
---------------------------	-----

Code position CP

- Count direction along the field of view.....	27
------------------------------------------------	----

Command strings

- Entry in Terminal Emulator.....	148
- Function.....	148
- Outputting in a file.....	149

Configuration (Parameterizing).....	94
-------------------------------------	----

Connection diagram.....	34
-------------------------	----

Conventions (typographic).....	8
--------------------------------	---

D

Data Matrix ECC200

- Improving the image quality.....	129
- Optimization reading characteristics.....	131
- Quality assessment of reading.....	82
- Reading.....	75

Declaration of Conformity.....	180
--------------------------------	-----

Decoder

- SMART decoder.....	19
- Standard decoder.....	19

Default setting

- CLV-Setup.....	141
- of the ICR84x-2 (extract).....	92
- of the ICR84x-2, printing.....	91

Device functions

- Perform in dialog box.....	88
------------------------------	----

DeviceNet.....	165
----------------	-----

Disposal.....	104
---------------	-----

Documentation (supplementary).....	173
------------------------------------	-----

Download

- Function.....	71
-----------------	----

E

Electrical installation.....	31
------------------------------	----

EMC.....	122
----------	-----

Enclosure rating.....	122
-----------------------	-----

Error messages

- Display in Terminal Emulator.....	106
- Error status in read result.....	107
- Function.....	19

Ethernet interface

- Assistant.....	50
- Cables.....	169
- Connection.....	40
- Function of the LEDs.....	21
- Pin assignment.....	36
- Routing the aux. interface.....	40

Evaluation

- Decoder types.....	19
- Parameterizing.....	98

F

Field of view.....	18
--------------------	----

Firmware.....	2
---------------	---

G

Glossary.....	174
---------------	-----

Good Read.....	76
----------------	----

H

Header (data string).....	85
---------------------------	----

ICR840-2

Host Interface	
- Data output string	85
- Default setting	39
- Function	19
- Hardware selection	38
- Monitoring in the Terminal-Emulator	84
I	
Illumination field	
- External illumination	32, 42
- Flashing duration	19
- Function	18
- Parameterizing	130
- Timeout	11
- Wave length	10
Image output	
- Reading diagnosis data	56, 62
- Troubleshooting	118
ImageFTP	
- Function	61, 63
Inclination angle (Pitch)	
- Definition	26
- Limit	27
Incremental encoder	
- Application	32
- Connection	41
- Function	19
- Installation	30
- Purpose	30
Indication (optical)	20
Installation	
- Accessories	23
- Electrical installation	31
- Mounting	23
- Preparations	23
- Reading pulse sensor	30
Interfaces	
- Overview	33
- Pin assignment	36
L	
LEDs	
- Function	20
- Parameterizing	99
- Position	14
M	
Maintenance	101
Malfunctions	
- Error messages	106
- Troubleshooting	109
Matrix sensor	
- Function	18
- Limitations	19
Messages (aux. interface)	89
Method of operation	
- Block diagram	18
- Description	18
Monitor host interface	
- Activation	84
- Function	84
Mounting bracket	
- Dimensions	171
N	
No Read	76, 79
O	
Online help	145
Operating data	
- Display	83
- Reset	83
Operating modes	
- Overview	74
- Percentage Evaluation	81
- Reading mode	74
- Teach-in match code 1	151
Operation	
- Function of the LEDs	20
- With CLV-Setup	74
- With command strings	148
P	
Parameterizing	
- Calculation of parameter values	150
- Guide	93
- Replacing an ICR84x-2	103
- With command strings	148
Percentage Evaluation	
- Activation	81
- Function	81
- Output of reading result	82
Pin assignment plug/Ethernet socket	36
Power consumption	12
Product features	16
PROFIBUS-DP	165
Protection class	122
R	
Reading data	
- in the data output string of host interface	99
Reading diagnosis	
- Activation	83
- Function	83
Reading diagnosis data	
- in the data output string of host interface	99
Reading distance	
- Definition	25
Reading field diagrams	124
Reading mode	
- Function	74
- Output of reading result	75
- Troubleshooting	113
Reading pulse	
- Parameterizing	95
- Purpose	19
- Trigger modes	19
- Troubleshooting	110
- via Terminal Emulator	79
Reading pulse sensor	
- Connecting to switching input	41

- Installation.....	30	System messages	
Reading result		- Display in Terminal Emulator.....	89, 137
- 1D code (bar code).....	78	- Function	19
- 2D code (Data Matrix ECC200).....	76	System requirements	
- Host interface.....	85	- Cables.....	47
- in Terminal Emulator, displaying	75	- PC	47
- Troubleshooting.....	113	- Sensors	32
Reading window		T	
- Cleaning.....	101	Table of figures	182
- Design	14	Table of tables	181
Removing		Tapped blind hole	
- Disposal.....	104	- Dimensions.....	123
- Procedure	30	- Position.....	14
Repair.....	119	Teach-in match code 1	
Rotation angle (Skew)		- Dynamic Teach-in.....	152
- Definition.....	26	- Function	151
- Limit	27	- Static Teach-in with Pharmacode	153
S		- Static Teach-in without Pharmacode.....	153
Safety		Technical data.....	121
- Authorized personnel	9	Terminal Emulator	75
- Features	16	Terminator (data string)	85
- Intended use.....	9	Troubleshooting	
- Notes on devices.....	15	- Error messages	106
- Power of illumination LEDs.....	10	- Error status in read result.....	107
- Silicone	12	- Troubleshooting.....	109
Self-test		U	
- Calling up	86	Upload	
- Error messages.....	106	- Function	72
- Function.....	86	User interface.....	143
Separation of identical codes		V	
- Function of CP value.....	27	Variants.....	15
- Parameterization.....	98	W	
SICK Homepage.....	7	Warranty	9
SICK Support.....	119	Windows	47
Software versions.....	2		
Specification diagrams.....	124		
Supply voltage			
- Connecting	37		
Switching input "Sensor 1"			
- Connecting	41		
- Function.....	19		
- Parameterizing.....	95		
Switching input "Sensor 2"			
- Characteristic data	41		
- Function.....	19		
- Parameterizing.....	95		
- Triggering Teach-In match code 1.....	151		
Switching off the device.....	91		
Switching output "Result 1"			
- Characteristic data	43		
- Connecting	42		
- Function.....	19		
Switching output "Result 2"			
- Characteristic data	44		
- Connecting	44		
- Function.....	19		
Symbolic (typographic).....	8		

10.15 Code samples (selection)

10.15.1 1D and 2D Codes for ICR840-2B (Standard-Range)

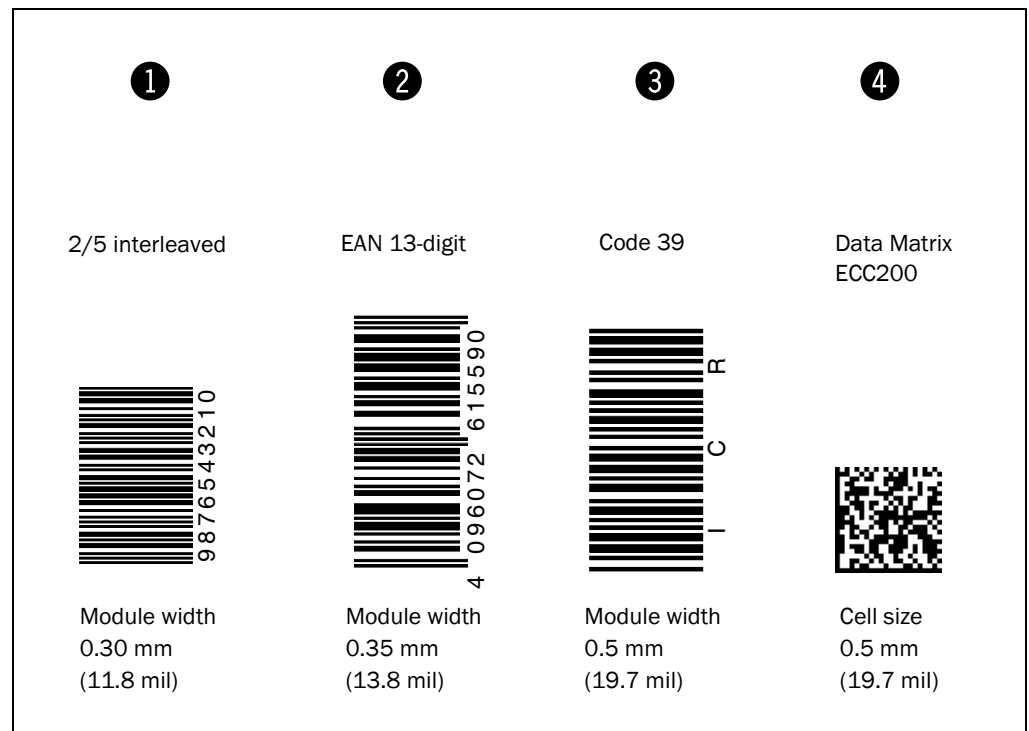


Fig. 10-25: Scannable 1D codes with various module widths (print ratio 2:1)/ 2D code

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