

# Lector63x / Lector64x / Lector65x

Image-based code readers

SOPAS Parameter Overview



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## About this document

This document contains the online help for the sensor parameters that can be set in SOPAS ET. The information can be displayed in the SOPAS ET configuration software when setting the parameters. They are also listed alphabetically in this document.

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### CAUTION

This document does not replace the operating instructions. The operating instructions must have been read and understood prior to the commencement of any work.

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### NOTE

You can obtain the operating instructions and further documentation online.

- See: [www.sick.com](http://www.sick.com) Select your country and language.
  - Enter the sensor's type designation or order number into the search field.
  - Select the required sensor.
  - All documentation and other downloadable content relating to the sensor can be found under Downloads. The SOPAS configuration software can be downloaded under Software.
-

## SOPAS Parameter Overview

### 1 1D Increase Performance

It is possible to optimize the decoding process for 1D codes via the parameters in the [1D Increase Performance](#) group. The parameters can be used to eliminate interference, thereby increasing device performance.

Adapting the settings to suit the application reduces the decoding time and increases both reading reliability and the readability of low-contrast, 1D codes.

### 2 1D Symbologies

The [1D Symbologies](#) group contains all of the parameters for configuring the 1D symbologies (bar codes).

### 3 2/5 Interleaved

If the [2/5 Interleaved](#) parameter is activated, decoding is activated for the corresponding code type. The configuration tab for the corresponding code type can be seen and opened in SOPAS ET.



#### NOTE

As only activated code types are processed, you can increase the processing speed by deactivating the code types that are not being used.

---



- Code name: [2/5 Interleaved](#) or ITF (2-value)
- Character set: Numeric characters
- Structure: 5 code elements per character, 2 of which wide and 3 narrow (characters at odd positions are represented by bars. Characters at even positions are represented by gaps.)
- Intrinsic safety: Low
- Spatial requirements: Low (up to 18 characters)
- Standard: ISO/IEC 16390
- Areas of application: Parcel and postal service

## 4 2/5 Interleaved

If the [2/5 Interleaved](#) parameter is activated, decoding is activated for the corresponding code type. The configuration tab for the corresponding code type can be seen and opened in SOPAS ET.



### NOTE

As only activated code types are processed, you can increase the processing speed by deactivating the code types that are not being used.



- Code name: [2/5 Interleaved](#) or ITF (2-value)
- Character set: Numeric characters
- Structure: 5 code elements per character, 2 of which wide and 3 narrow (characters at odd positions are represented by bars. Characters at even positions are represented by gaps.)
- Intrinsic safety: Low
- Spatial requirements: Low (up to 18 characters)
- Standard: ISO/IEC 16390
- Areas of application: Parcel and postal service

## 5 2D Increase Performance

It is possible to optimize the decoding process for 2D codes via the parameters in the [2D Increase Performance](#) group. The parameters can be used to eliminate interference, thereby increasing device performance.

Adapting the settings to suit the application reduces the decoding time and increases both reading reliability and the readability of low-contrast, 2D codes.

## 6 2D Symbologies

The [2D Symbologies](#) group contains all of the parameters for configuring the 2D code.



### NOTE

The fewer code types are activated in parallel, the faster the decoding process.

## 7 Activate Calculation

Code evaluation based on various standards can be activated in the [Activate Calculation](#) group.



### NOTE

The results of the code evaluation sensor are not ISO standardized values. As the sensor is not a standardized verifier, the process is deemed 'code evaluation' rather than verification.

## 8 Activate ISO15415 verification

If the [Activate ISO15415 verification](#) parameter is activated, the codes are verified for conformity to the ISO/IEC 15415 standard. During this process, values are calculated from the code content and can be output in data strings if the output formats are configured accordingly.



### NOTE

Given that the process of calculating the values increases the decoding time, this function should only be activated if necessary.

---

## 9 Activate teach-in mode

Depending on how the [Start teach-in](#) parameter has been configured, the [Activate teach-in mode](#) parameter is used to define the signal for preparing or starting the teach-in process for the match code.

The signal can, for example, originate from a key switch at one of the digital inputs or be triggered via a command.

- **Not defined:** The match code is not taught in.
- **Sensor 1:** The match-code teach-in process is prepared and started via a signal at digital input 1 (e.g., a key switch).
- **Sensor 2:** The match-code teach-in process is prepared and started via a signal at digital input 2.
- **External input 1** (see note): The match-code teach-in process is prepared and started via a signal at digital external input 1.
- **External input 2** (see note): The match code teach-in process is prepared and started via a signal on the digital external input 2.
- **SOPAS command:** The match-code read-in process is prepared and started via a corresponding command.



### NOTE

The number of available digital inputs can be expanded by using the CDB620/CDM420 connection module in conjunction with the CMC600 parameter memory module. The purpose of the CMC parameter memory module is to act as an input expansion module and convert a digital signal into a command. External digital inputs generally respond more slowly than the internal digital inputs of the sensor.

---

### Teach-in stop by

Depending on how the [Start teach-in](#) parameter has been configured, the [Teach-in stop by](#) parameter is used to define which signal or condition should terminate the match-code teach-in process.

- **Teach-in trigger source:** The teach-in process is terminated by a signal (e.g., a key switch) at one of the sensor's digital inputs.
- **Object Trigger:** The teach-in process is terminated as soon as the reading gate closes.
- **Valid code taught in:** The teach-in process is terminated as soon as a match code has been successfully read.

### Teach-in Condition

The **Teach-in Condition** parameter defines the condition that must apply when the newly taught-in match code content is stored. The selected condition is used as a basis when the target/actual comparison is activated. Each code that is read is compared to the code content that was read in for the target condition.

The **Teach-in Condition** parameter is used to assign the items of code content that are to be compared to a condition. The taught-in match codes can be retrieved and activated at a later time, subject to the condition being met.

## 10 Activate teach-in mode

Depending on how the **Start teach-in** parameter has been configured, the **Activate teach-in mode** parameter is used to define the signal for preparing or starting the teach-in process for the match code.

The signal can, for example, originate from a key switch at one of the digital inputs or be triggered via a command.

- **Not defined:** The match code is not taught in.
- **Sensor 1:** The match-code teach-in process is prepared and started via a signal at digital input 1 (e.g., a key switch).
- **Sensor 2:** The match-code teach-in process is prepared and started via a signal at digital input 2.
- **External input 1** (see note): The match-code teach-in process is prepared and started via a signal at digital external input 1.
- **External input 2** (see note): The match code teach-in process is prepared and started via a signal on the digital external input 2.
- **SOPAS command:** The match-code read-in process is prepared and started via a corresponding command.



### NOTE

The number of available digital inputs can be expanded by using the CDB620/CDM420 connection module in conjunction with the CMC600 parameter memory module. The purpose of the CMC parameter memory module is to act as an input expansion module and convert a digital signal into a command. External digital inputs generally respond more slowly than the internal digital inputs of the sensor.

### Teach-in stop by

Depending on how the **Start teach-in** parameter has been configured, the **Teach-in stop by** parameter is used to define which signal or condition should terminate the match-code teach-in process.

- **Teach-in trigger source:** The teach-in process is terminated by a signal (e.g., a key switch) at one of the sensor's digital inputs.
- **Object Trigger:** The teach-in process is terminated as soon as the reading gate closes.
- **Valid code taught in:** The teach-in process is terminated as soon as a match code has been successfully read.

**Teach-in Condition**

The **Teach-in Condition** parameter defines the condition that must apply when the newly taught-in match code content is stored. The selected condition is used as a basis when the target/actual comparison is activated. Each code that is read is compared to the code content that was read in for the target condition.

The **Teach-in Condition** parameter is used to assign the items of code content that are to be compared to a condition. The taught-in match codes can be retrieved and activated at a later time, subject to the condition being met.

**11 Active**

The data output of the SICK Visualization Platform can be activated via the **Active** parameter.

**NOTE**

The device time must be set to operate the SVP.

---

**12 Active**

The event that activates the digital output is selected via the **Active** parameter.

- **SOPAS command:** The output can be activated via a command. This allows defined statuses to be displayed by a connected indicator lamp when a corresponding command is issued by the control (PLC).
- **Device Ready:** The output is activated as soon as the sensor is ready for use.
- **Good Read:** The output is activated if the read operation was successful.
- **No Read:** The output is activated if the read operation was unsuccessful.
- **Teach-IN 1 OK:** The output is activated if the **match code teach-in 1** has been successfully taught in.
- **Teach-IN 1 NOK:** The output is activated if the **match code teach-in 1** could not be successfully taught in.
- **Teach-IN 2 OK:** The output is activated if the **match code teach-in 2** has been successfully taught in.
- **Teach-IN 2 NOK:** The output is activated if the **match code teach-in 2** could not be successfully taught in.
- **Match 1 condition:** The output is activated if the code that has been read corresponds to the **Match 1 condition** match code.
- **Multicodes1 condition:** The output is activated if the number of codes that have been read corresponds to the number specified by the **Multicodes1 condition**.
- **Teach-in1 condition:** The output is activated if the code that has been read corresponds to the **Teach-in1 condition** match code.
- **Teach-in2 condition:** The output is activated if the code that has been read corresponds to the **Teach-in2 condition** match code.

**13 Active Script**

Scripts can be activated in the **Active Script** group.

**14 Active Script**

A script in a sensor can be activated via **Active Script**.

## 15 Add-on

The [Add-on](#) parameter allows you to adjust how the extended code structure is handled (additional information generally found on magazines).



- **None:** There is no extended code structure available within the code.
- **Active:** There is an extended code structure available within the code.
- **Required:** Only codes with an extended code structure are read.

## 16 Add-on length

The [Add-on length](#) parameter is used to define the length of the extended code structure.

- **2 characters:** A 1
- **5 characters:** A 1 B 2 C
- **2 or 5 characters:** A 1 or A 1 B 2 C

## 17 Address

The address of the image server to which the images for the SICK Visualization Platform are to be sent is specified under the [Address](#) parameter.

## 18 Address

The address of the SVP server to which the data is to be sent is specified under the [Address](#) parameter.

## 19 Addressing mode

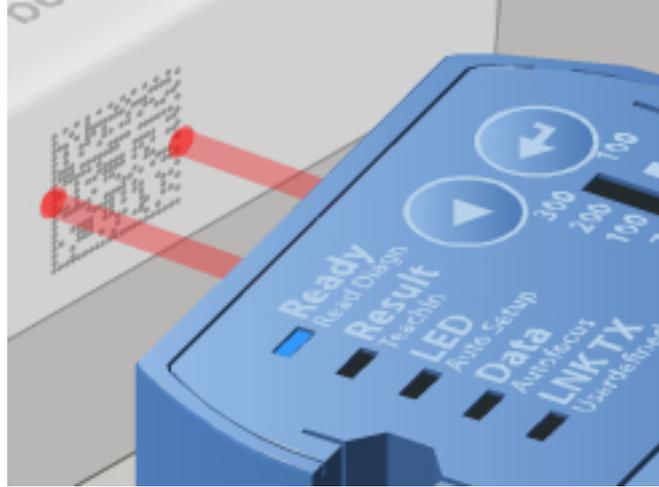
The [Addressing mode](#) parameter is used to specify whether the IP address of the sensor should be defined manually (**statically**) or assigned by a server (**DHCP**).

## 20 Add Time Stamp

If the [Add Time Stamp](#) parameter is activated, a time stamp is added to the received data.

## 21 Aiming laser

The **Aiming laser** parameter can be used to mark the optimum position for the codes in different operational statuses directly on the object by using the integrated laser pointer to ensure that the code is in the center of the reading field.



This makes it easy to position the codes manually and to align them perfectly.

- **Off:** The aiming laser is switched off.
- **Live image, Auto-Setup:** The aiming laser is only switched on for the purpose of editing the sensor.
- **Trigger, Live image, Auto-Setup:** The aiming laser remains switched on until the reading gate opens.



### NOTE

To prevent the aiming laser from causing interference, you can deactivate it (**Off**). For manual reading or if the code position changes frequently, we recommend using the **Trigger, Live image, Auto-Setup** setting.



### NOTE

If you want to be able to switch the aiming laser on/off with the sensor pushbuttons, you must set the **Function** parameter to the **Trigger and aiming laser** value.

## 22 Allowed Character 1

This parameter is used to define allowed characters for a character position by setting a character filter in the field at the desired position.

Character filter:

- **? - All Characters:** All characters are expected and detected by the sensor at this position.
- **\$ - Only A-Z:** Only upper-case letters of the Latin alphabet are expected and detected by the sensor at this position.
- **\* - Only a-z:** Only lower-case letters of the Latin alphabet are expected and detected by the sensor at this position.
- **# - Only Numbers:** Only numbers are expected and detected by the sensor at this position.
- **% - Only Special Characters:** Only special characters are expected and detected by the sensor at this position.
- **& - Only A-Z + Numbers:** Only upper-case letters of the Latin alphabet and numbers are expected and detected by the sensor at this position.
- **A - Character to be read (e.g., A):** The sensor only expects and detects the character specified in the field at this position.



### NOTE

If a filter is only set for numbers, for example, letters will not be accepted when teaching in is subsequently carried out.

## 23 Allowed Characters / Scoring

A character filter can be used to limit the number of characters to be read and a scoring system activated in the [Allowed Characters / Scoring](#) group.

Setting the character filter limits the number of characters to be detected for the selected character position. When the filter is set, the stability and accuracy of the reading is increased and the reading time is reduced. Depending on the font used, the character “1” is similar to the characters “l” and “J”. “F” is similar to “P” and “C” is similar to “G”.

The scoring system specifies how identical the detected character is to the taught-in - or ideal - character. The maximum value is 100.

## 24 Allowed code types

You can use the [Allowed code types](#) parameter to define which code types should be read in as a match code.

Any code could be interpreted as a Pharmacode, even if it actually had a different code type. Therefore, the Pharmacode type must be selected exclusively.

- **Activated code types:** All the activated code types are accepted for the purpose of teaching in the match code in accordance with the code configuration. To ensure that the required code type can be read, the code configuration must first be checked.
- **All (except Pharmacode):** All code types are accepted for the purpose of teaching in the match code, apart from the Pharmacode type.
- **Pharma only:** Only codes of the Pharmacode type are accepted for the purpose of teaching in the match code.

## 25 Allow rectangular data fields

If the [Symbol size](#) parameter is set to the **Free** value and the [Allow rectangular data fields](#) parameter is also activated, the system can identify symbols that are square (e.g., 16 x 16) or rectangular (e.g., 8 x 18) in size.



## 26 Alpha

The device's Alpha angle in relation to the code and trigger position is defined under the [Alpha](#) parameter.

Example: Angle set to 90° or 270°. The reading is taken perpendicular to the conveying direction.

## 27 Alternate Score

If the [Alternate Score](#) parameter is activated, the calculation of the score value is optimized.

This parameter is used to increase the score values of the Alternate Classifier.



### NOTE

The optimization option is only available for the Alternate Classifier.

## 28 Angle

The three-dimensional position of the camera is defined in the [Angle](#) group.

## 29 Application Counters

Events such as successful (**Good Read**) and unsuccessful (**No Read**) read operations can be counted and saved in the [Application Counters](#) group.

Depending on the setting, the device stores the data temporarily in the RAM or permanently in the flash memory.

Quantitative conditions are defined using counters and can be used for output formatting, for example. Counting functions can be used to control processes, e.g., object bundling is initiated when a defined counter value is reached.

## 30 Application Counters

Events such as successful (**Good Read**) and unsuccessful (**No Read**) read operations can be counted and saved on the [Application Counters](#) tab.

Depending on the setting, the device stores the data temporarily in the RAM or permanently in the flash memory.

Quantitative conditions are defined using counters and can be used for output formatting, for example. Counting functions can be used to control processes, e.g., object bundling is initiated when a defined counter value is reached.

## 31 Application Identifier Marking

If the [Application Identifier Marking](#) parameter is activated, the **Application Identifiers** appear in parentheses in the output format.

On the basis of the **Application Identifiers**, the subsequent values of the code content are assigned to a defined property. This means that the data contained within a code (e.g., use-by date, batch number, date of manufacture, etc.) can be represented in a standardized format.

## 32 Apply Standard Parameters

Pressing the **Apply Standard Parameters** button applies the parameter settings saved under the **Camera and Illumination** tab.

The [Apply Standard Parameters](#) button is particularly helpful when using the Auto-Setup wizard. Configurations for different requirements and reading conditions can be set with the help of the Auto-Setup wizard and applied to the respective parameter sets.

## 33 APS/EPS 1

Camera and illumination settings that are used cyclically in the event of automatic or event-controlled parameter switchover can be made in the [APS/EPS 1](#) to [APS/EPS 4](#) groups.

Pressing the **Apply Standard Parameters** button applies the parameter settings saved under the **Camera and Illumination** tab.

## 34 APS/EPS 2

Camera and illumination settings that are used cyclically in the event of automatic or event-controlled parameter switchover can be made in the [APS/EPS 1](#) to [APS/EPS 4](#) groups.

Pressing the **Apply Standard Parameters** button applies the parameter settings saved under the **Camera and Illumination** tab.

## 35 APS/EPS 3

Camera and illumination settings that are used cyclically in the event of automatic or event-controlled parameter switchover can be made in the [APS/EPS 1](#) to [APS/EPS 4](#) groups.

Pressing the **Apply Standard Parameters** button applies the parameter settings saved under the **Camera and Illumination** tab.

## 36 APS/EPS 4

Camera and illumination settings that are used cyclically in the event of automatic or event-controlled parameter switchover can be made in the [APS/EPS 1](#) to [APS/EPS 4](#) groups.

Pressing the **Apply Standard Parameters** button applies the parameter settings saved under the **Camera and Illumination** tab.

### 37 Auto

Pressing the [Auto](#) button starts the Auto-Setup wizard for automatic adjustment of the reading distance.

In order for the reading distance to be adjusted automatically, a suitable object with contrast variations or edges (e.g., code, text, or other structures) must be placed in the reading area.



#### NOTE

The reading distance can only be adjusted automatically if there is a certain background brightness to ensure the structures in the image are visible.

---

### 38 Auto

Pressing the [Auto](#) button starts the Auto-Setup wizard for automatic adjustment of the reading distance.

In order for the reading distance to be adjusted automatically, a suitable object with contrast variations or edges (e.g., code, text, or other structures) must be placed in the reading area.



#### NOTE

The reading distance can only be adjusted automatically if there is a certain background brightness to ensure the structures in the image are visible.

---

### 39 Automatic code configuration

Pressing the [Auto \(Automatic code configuration\)](#) button starts the Auto-Setup wizard for automatic code-type configuration.

In order for code configuration to be performed automatically, a suitable code must be placed in the reading area.

### 40 Automatic Release

If the [Automatic Release](#) parameter is activated, the reading results are automatically released by the SDO client after the upload.

If the reading results are transmitted via a service data object (SDO), the reading results are stored in the object directory and downloaded by the SDO client. In order for the subsequent reading result to be entered, a release process must take place after the SDO upload. If release is automatic, the SDO client does not require an application for release purposes. Data transmission is relatively insecure, as the process after automatic release does not enable a repeated data request by the SDO client.

### 41 Automatic Tuning / Parameter Switchover

The parameter switchover switches over the saved parameter sets during the reading interval. A maximum of four different parameter sets can be saved in the parameter switchover.

If codes are to be read on different background materials or under different application conditions, the parameter switchover can be used. The individual parameter sets can be adapted individually and optimally to the respective code or the application. This increases the flexibility and stability of the sensor.

## 42 Automatic Tuning

Image optimization can be activated and configured in the [Automatic Tuning](#) group during operation.

The brightness tuning is ideally used if code contrasts fluctuate or ambient lighting conditions change slightly. It is recommended that brightness tuning is only carried out when the system is stationary due to the time required for the brightness measurement and adjustment.

## 43 Auto-Setup via function button menu

The [Auto-Setup via function button menu](#) group contains the parameters for adjusting the Auto-Setup wizards.

The **Auto-Setup** function is divided into three individual modules:

- **Reading distance**
- **Image settings** (brightness and contrast)
- **Code settings** (only available for **Data Matrix** for the time being)

The **Auto-Setup** function can be started in different ways:

- Via wizard
- Via pushbuttons on sensor
- By pressing the **Auto** buttons
- Via command (SOPAS command)

Commands for starting the **Auto-Setup** function:

- **sMN mASStart**: The Auto-Setup process is started.
- **sMN mASFinish**: The Auto-Setup process is stopped and the result is applied. To return to reading mode, you must end the Auto-Setup process with a stop command.
- **sMN mASCancel**: The Auto-Setup process is stopped. This does, however, cause the result to be discarded. To return to reading mode, you must end the Auto-Setup process with a stop command.



### NOTE

Even if you start the **Auto-Setup** function via a command, the settings for the wizard (standard or advanced) are still taken into consideration. The settings can also be configured using commands. A detailed list of commands can be obtained from SICK on request.

---

## 44 Auxiliary Input / Auxiliary Read Result

This option can be used if you want data from an external device (such as a hand-held scanner) to be output **instead of** the internal sensor reading. The auxiliary input must be made when the sensor's reading gate is closed.

The external device data is entered in the sensor's database and output immediately at **all configured interfaces** – including the fieldbus interfaces – in the same way as an internal reading result.

**The same format** is generated as for an internal reading result. The data is interpreted by the sensor and can also control the digital outputs and, if necessary, the beeper. The data can also be checked using **Evaluation Conditions** (e.g., at Match 1).

## 45 Background

The structure of the text background is determined via the [Background](#) parameter.

- **Remains the same:** The structure of the background is homogeneous.
- **Linearly variable:** In the text background there is a linear transition, e.g., from light to dark.
- **Not linearly variable:** In the text background there are individual areas in which the background structure varies.

## 46 Barcode Symbology

The [Barcode Symbology](#) parameter determines which barcode symbology is used to enter the received data in the sensor. The selected barcode symbology must also be enabled in the sensor.

For the **Use first character for identification** setting, the first character after the [Rx Header](#) must correspond to the code ID for the required bar code.

Examples:

- **STX > e 123456 ETX:** Input via code ID "e" as 2/5 Interleaved, content = 123456
- **STX > b abcdef ETX:** Input via code ID "b" as code 39, content = abcdef



### NOTE

For a list of valid bar code IDs, see [Code-IDs für Barcodes](#)

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#### Code IDs for bar codes

- a, CODABAR
- b, CODE39
- c, UPC
- d, EAN
- e, INTERLEAVED25
- g, MSI CODE
- i, CODE93
- j, CODE128
- l, PLESSY
- n, EAN 128
- o, PHARMA
- p, GS1 DataBar Expanded
- r, PDF417
- s, QR CODE
- t, TELEPEN
- u, GS1 DataBar Limited
- w, MAXICODE
- y, GS1\_DATABAR
- z, AZTEC
- <, CODE32 (6 digit C39 decodes as C32)

## 47 Base COB-ID for ReadResult PDOs

The [Base COB-ID for ReadResult PDOs](#) parameter defines the CAN identifier of the first transmit process data object (TPDO), which used to transmit the reading result.

When reading results are transmitted via process data objects (PDOs), the reading result is distributed across several PDOs that are sent to the PLC one after the other. The identifier for the first PDO must be configured; subsequent PDOs have consecutive identifiers.

## 48 Baud rate

The maximum transmission rate for data sent by the sensor to the host can be adjusted via the [Baud rate](#) parameter.

The value is specified in baud. This value defines the number of signal changes that can take place via the interface per second. Depending on the protocol, up to four bits can be transmitted per signal change (e.g., with 2,400 baud: up to 9,600 bits/second).

## 49 Baud rate

The maximum transmission rate can be adjusted via the [Baud rate](#) parameter.

The value is specified in bits/s.

## 50 Baud rate

The maximum transmission rate can be adjusted via the [Baud rate](#) parameter.

The value is specified in bits/s.



### NOTE

All devices on the CAN network must run at the same data baud rate. The maximum length of cable for the network is dependent on the baud rate.

## 51 Beeper

The [Beeper](#) group contains the parameters for adjusting the acoustic signal.

As with the digital outputs, it is possible to select an event that activates the beeper. As soon as this event occurs, it is fed back acoustically by the beeper.

## 52 Beeper

The event that activates the beeper is selected via the [Beeper](#) parameter.

- **Good Read:** The beeper sounds if the read operation was successful.
- **No Read:** The beeper sounds if the read operation was unsuccessful.
- **Teach-IN 1 OK:** The beeper sounds if the **match code teach-in 1** has been successfully taught in.
- **Teach-IN 1 NOK:** The beeper sounds if the **match code teach-in 1** could not be successfully taught in.
- **Teach-IN 2 OK:** The beeper sounds if the **match code teach-in 2** has been successfully taught in.
- **Teach-IN 2 NOK:** The beeper sounds if the **match code teach-in 2** could not be successfully taught in.
- **Match 1 conditions:** The beeper sounds if the code that has been read corresponds to the **Match 1 condition** match code.
- **Multicodes1 condition:** The beeper sounds if the number of codes that have been read corresponds to the number specified by the **Multicodes1 condition**.
- **Teach-in1 conditions:** The beeper sounds if the code that has been read corresponds to the **Teach-in1 condition** match code.
- **Teach-in2 conditions:** The beeper sounds if the code that has been read corresponds to the **Teach-in2 condition** match code.

## 53 Beta

The device's Beta angle in relation to the trigger position is defined under the [Beta](#) parameter.

## 54 Brightness

The amplification of the signal is set via the [Brightness](#) parameter. The signal amplification can be set using the slide control.

The image brightness can be adjusted by amplifying the signal in order to achieve better visibility and decodability. When setting the signal amplification, it should be noted that an overly high setting causes significant image noise and therefore makes it difficult to read the code.



### NOTE

To avoid this, the value should be increased in stages until the code can be read successfully.

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## 55 Brightness Range

The minimum and maximum brightness values can be set using the slide control of the [Brightness Range](#) parameter.

## 56 Brightness Tuning

The image brightness optimization can be activated via the [Brightness Tuning](#) parameter during operation.

## 57 C32 conversion

If the [C32 conversion](#) parameter is activated, decoding is enabled for the relevant code type.



### NOTE

As only activated code types are processed, the processing speed can be increased by specifically activating/deactivating the necessary code types.

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- Code name: [C32 conversion](#) (two-value)
- Character set: 32 alphanumeric characters (upper-case letters A to Z, digits 0 to 9, no special characters)
- Structure: Leading quiet zone, start character, useful character, check character, stop character, trailing quiet zone (13 to 16 modules per character)
- Intrinsic safety: High
- Spatial requirements: Variable symbol length
- Standard: ISO/IEC 16388, ANSI/AIM BC5 1995
- Areas of application: Part numbers for pharmaceutical products (Italian Pharmacode), packaging for human medicines

## 58 Calculated Speed

The current speed is indicated in the [Calculated Speed](#) display field.

For this to happen, a connection must be established between the sensor and the PC.

## 59 Calibration

Pressing the [Calibration](#) button starts the image brightness calibration for the AIM DPM code evaluation.

## 60 Camera and Illumination

The [Camera and Illumination](#) tab contains all the parameters that affect the quality of the captured images.

By optimizing the camera and illumination settings, you can improve the contrast, sharpness, and lighting level. This results in better code identification, thereby increasing the reading reliability.



### NOTE

A high image quality increases the time required to save the captured images. The save times can be lowered by reducing the image quality.

---

## 61 CAN

The CAN interface is configured on the [CAN](#) tab.

## 62 CAN Open Heartbeat Time / ms

The [see "CAN Open Heartbeat Time / ms", page 29](#) parameter defines the time interval between the CANopen heartbeat objects in ms.

The heartbeat protocol is used on CANopen networks to check the CAN nodes. The CANopen heartbeat protocol stipulates that every CAN node must send out heartbeat objects at cyclical intervals and receive them from other bus participants. The transmission cycle must be configured.

## 63 CANopen Receive PDOs 1 .. 4

The process data objects (PDOs) received by the device are configured in the [CANopen Receive PDOs 1 .. 4](#) group. The values entered must correspond to the CANopen specification.

- **Predef. conn.:** A Yes value indicates that the Predefined Connection Set identifiers defined by the CANopen specification should be used. The configured COB identifiers are ignored.
- **Map Obj. 1-8:** Up to eight objects can be mapped for each TPDO. If the number of mapping objects specified is lower, the last entries in the table are ignored.



### NOTE

The values entered are not validated via the SOPAS ET user interface. If invalid or inconsistent values have been entered, an incorrect entry is created during PDO initialization.

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## 64 CANopen Transmit PDOs 1 .. 4

The process data objects (PDOs) sent by the device are configured in the [CANopen Transmit PDOs 1 .. 4](#) group. The values entered must correspond to the CANopen specification.

- **Predef. conn.:** A Yes value indicates that the Predefined Connection Set identifiers defined by the CANopen specification should be used. The configured COB identifiers are ignored.
- **Map Obj.1-8:** Up to eight objects can be mapped for each TPDO. If the number of mapping objects specified is lower, the last entries in the table are ignored.



### NOTE

The values entered are not validated via the SOPAS ET user interface. If invalid or inconsistent values have been entered, an incorrect entry is created during PDO initialization.

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## 65 certain numb. of new labels

If the value **New code** is selected for the [Data transmission point](#) parameter, the [certain numb. of new labels](#) parameter can be used to define the minimum number of codes that must be read before a code is output again. This prevents the same object from being read multiple times.

## 66 Change camera settings

If the [Change camera settings](#) parameter is activated, the brightness and contrast are adjusted via the **Auto-Setup** function. This function is accessed by pressing the pushbuttons on the sensor.

## 67 Change code settings

If the [Change code settings](#) parameter is activated, the code settings for the **Data Matrix** code type are adjusted via the **Auto-Setup** function. This function is accessed by pressing the pushbuttons on the sensor.

## 68 Change reading distance

If the [Change reading distance](#) parameter is activated, the reading distance is adjusted via the **Auto-Setup** function. This function is accessed by pressing the pushbuttons on the sensor.

## 69 Check digit test

The see ["Check digit test", page 31](#) parameter is used to define the calculation method for checking the plausibility of the code content. During this check, a check digit is calculated from the code content and compared with the check digit within the code. The method that you select must be the same as the one used during code creation. The read operation is only classed as "good" (**Good Read**) if the calculated check digit matches the one in the code.



### NOTE

Check digits prevent codes from being misinterpreted and increase the reading reliability.

## 70 Check digit test

The see ["Check digit test", page 31](#) parameter is used to define the calculation method for checking the plausibility of the code content. During this check, a check digit is calculated from the code content and compared with the check digit within the code. The method that you select must be the same as the one used during code creation. The read operation is only classed as "good" (**Good Read**) if the calculated check digit matches the one in the code.



### NOTE

Check digits prevent codes from being misinterpreted and increase the reading reliability.

## 71 Check max. number of valid codes

If the [Check max. number of valid codes](#) parameter is activated, the system calculates how many different codes there are and compares this number with a specified maximum (**Maximum**).

This can be used, for example, to ensure that only the required codes are present on an object.

## 72 Check min. number of valid codes

If the [Check min. number of valid codes](#) parameter is activated, the system calculates how many different codes there are and compares this number with a specified minimum (**Minimum**).

This can be used, for example, to check whether all the required codes are present on an object.

**73 Check SD card**

You can check whether the memory card is in working order by pressing the [Check SD card](#) button.

**74 Classifier**

The [Classifier](#) parameter determines which algorithm the sensor uses to optimize recognition. The Classifier algorithm defines the type of character recognition and character comparison with the taught-in characters.

- **Alternate:** The Alternate algorithm is an optimized algorithm that improves the reading rate but reduces the score value.
- **Standard:** The Standard algorithm is suitable for applications in which the print quality is paramount. Stricter criteria are used to determine the score values output.

**NOTE**

It is recommended to use the Alternate Classifier to ensure a more stable reading.

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**75 COB-ID Emergency Obj.**

The [COB-ID Emergency Obj.](#) parameter defines the CAN identifier for emergency objects in the CANopen protocol.

The CANopen protocol requires emergency objects to transmit error codes. The error codes are defined in communication profile DS-301 and in device profile DSP-40x.

**76 COB-ID RPDO Dig. Input**

The [COB-ID RPDO Dig. Input](#) parameter defines the CAN identifier for the receive process data objects (RPDOs) received on the reading device.

**77 COB-ID RPDO user Dig. Input**

The [COB-ID RPDO user Dig. Input](#) parameter defines the CAN identifier for the user-defined receive process data objects (RPDOs) received on the reading device.

For the first four receive process data objects (RPDOs), communication and mapping can be configured by accessing objects 0x1400 to 0x1403 and 0x1600 to 0x1603. The configuration is saved in the device's parameter set. The other RPDOs cannot be configured.

## 78 COB-ID TPDO Dig. Output

The [COB-ID TPDO Dig. Output](#) parameter defines the CAN identifier for the transmit process data objects (TPDOs) sent by the reading device.

For the first four transmit process data objects (TPDOs), communication and mapping can be configured by accessing objects 0x1800 to 0x1803 and 0x1A00 to 0x1A03. This task is normally performed by a CANopen control. The configuration is saved in the device's parameter set.

Objects TPDO6 to TPDO12 are used to output the reading result and cannot be configured.



### NOTE

It is recommended to use TPDO2 to TPDO4 for user-defined applications. Object TPDO1 is used for synchronization. TPDO1 is used to signal the availability of data that can be retrieved by the service data object client (SDO client) via an SDO upload access.

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## 79 COB-ID TPDO user Dig. Output

The [COB-ID TPDO user Dig. Output](#) parameter defines the CAN identifier for the user-defined transmit process data objects (TPDOs) sent by the reading device.

## 80 Codabar

If the [Codabar](#) parameter is activated, decoding is activated for the corresponding code type. The configuration tab for the corresponding code type can be seen and opened in SOPAS ET.



### NOTE

As only activated code types are processed, you can increase the processing speed by deactivating the code types that are not being used.

---



- Code name: [Codabar](#) (two-value)
- Character set: 16 alphanumeric characters (10 digits, 6 special characters)
- Structure: 7 code elements (4 bars, 3 gaps); start character (A, B, C, or D), code content, stop character (A, B, C, or D)
- Intrinsic safety: Low
- Spatial requirements: Variable
- Areas of application: Parcel and postal service
- Standard: EN 798 bar coding

## 81 Codabar

If the [Codabar](#) parameter is activated, decoding is activated for the corresponding code type. The configuration tab for the corresponding code type can be seen and opened in SOPAS ET.



### NOTE

As only activated code types are processed, you can increase the processing speed by deactivating the code types that are not being used.



Codabar

- Code name: [Codabar](#) (two-value)
- Character set: 16 alphanumeric characters (10 digits, 6 special characters)
- Structure: 7 code elements (4 bars, 3 gaps); start character (A, B, C, or D), code content, stop character (A, B, C, or D)
- Intrinsic safety: Low
- Spatial requirements: Variable
- Areas of application: Parcel and postal service
- Standard: EN 798 bar coding

## 82 Code 128

If the [Code 128](#) parameter is activated, decoding is enabled for the relevant code type. (This requires the [Code 128](#) code type to be deactivated.)



### NOTE

As only activated code types are processed, the processing speed can be increased by specifically activating/deactivating the necessary code types.



Code128

- Code name: [Code 128](#) (4-value)
- Character set: Alphanumeric (ASCII) with three switchable character sets and one check digit
  - Character set A: Digits, upper-case letters, special characters, and ASCII control characters
  - Character set B: Digits, upper-case and lower-case letters, special characters, and escape characters
  - Character set C: 100 pairs of digits (00 to 99) and FNC1 special character
- Structure: Start symbol, useful information, check digit, stop symbol (11 modules per symbol, each with 3 bars and 3 gaps)
- Intrinsic safety: Very high (self-checking: even number of bars, uneven number of gaps)
- Spatial requirements: Largest possible number of characters per centimeter
- Standard: ISO/IEC 15420
- Areas of application: All areas, as UCC 128/EAN 128 in retail

## 83 Code 128 Family

If the [Code 128 Family](#) parameter is activated, decoding is enabled for the activated [Code 128](#) and [EAN 128](#) code types at the same time. (This requires the [Pharmacode](#) code type to be deactivated.) The configuration tab for the corresponding code types can be seen and opened in SOPAS ET.



### NOTE

As only activated code types are processed, you can increase the processing speed by deactivating the code types that are not being used.

## 84 Code 128 Family

If the [Code 128 Family](#) parameter is activated, decoding is enabled for the activated [Code 128](#) and [EAN 128](#) code types at the same time. (This requires the [Pharmacode](#) code type to be deactivated.) The configuration tab for the corresponding code types can be seen and opened in SOPAS ET.



### NOTE

As only activated code types are processed, you can increase the processing speed by deactivating the code types that are not being used.

## 85 Code 39

If the [Code 39](#) parameter is activated, decoding is enabled for the relevant code type.



### NOTE

As only activated code types are processed, the processing speed can be increased by specifically activating/deactivating the necessary code types.



CODE39

- Code name: [Code 39](#) (two-value)
- Character set: 43 alphanumeric characters (10 digits, 26 letters, 7 special characters)
- Structure: 9 code elements (5 bars, 4 gaps) – 3 wide and 6 narrow
- Intrinsic safety: Average
- Spatial requirements: High
- Standard: ISO/IEC 16388
- Areas of application: Parcel and postal service

## 86 Code 39

If the [Code 39](#) parameter is activated, decoding is enabled for the relevant code type.



### NOTE

As only activated code types are processed, the processing speed can be increased by specifically activating/deactivating the necessary code types.



- Code name: [Code 39](#) (two-value)
- Character set: 43 alphanumeric characters (10 digits, 26 letters, 7 special characters)
- Structure: 9 code elements (5 bars, 4 gaps) – 3 wide and 6 narrow
- Intrinsic safety: Average
- Spatial requirements: High
- Standard: ISO/IEC 16388
- Areas of application: Parcel and postal service

## 87 Code 93

If the [Code 93](#) parameter is activated, decoding is enabled for the relevant code type.



### NOTE

As only activated code types are processed, the processing speed can be increased by specifically activating/deactivating the necessary code types.



- Code name: [Code 93](#) (4-value)
- Character set: 43 alphanumeric characters (10 digits, 26 upper-case letters, 7 special characters: space, -, ., \$, /, +, and %)
- Intrinsic safety: Average
- Spatial requirements: Low
- Standard: ISO/IEC 16388
- Areas of application: Parcel and postal service

## 88 Code 93

If the [Code 93](#) parameter is activated, decoding is enabled for the relevant code type.



### NOTE

As only activated code types are processed, the processing speed can be increased by specifically activating/deactivating the necessary code types.



C o d e 9 3

- Code name: [Code 93](#) (4-value)
- Character set: 43 alphanumeric characters (10 digits, 26 upper-case letters, 7 special characters: space, -, ., \$, /, +, and %)
- Intrinsic safety: Average
- Spatial requirements: Low
- Standard: ISO/IEC 16388
- Areas of application: Parcel and postal service

## 89 Code appearance

The decoding process can be limited to mirrored or non-mirrored codes using the [Code appearance](#) parameter, which reduces the decoding time.

- **Normal:** Only non-mirrored codes can be decoded correctly.
- **Mirrored:** Only mirrored codes that have been captured from below through a glass pane, for example, can be decoded correctly. This involves reversing the images that have been captured by mirroring them again before they are decoded.
- **Both:** Both mirrored and non-mirrored codes are read.

## 90 Code background

The decoding process can be limited to codes with a light or dark background color using the [Code background](#) parameter, which reduces the decoding time.

- **White:** Only dark codes on a light background are read.
- **Black:** Only light codes on a dark background (inverted codes) are read.
- **Both:** Both dark codes on a light background and light codes on a dark background (inverted codes) are read.

## 91 Code configuration

The parameters on the [Code configuration](#) tab allow you to make decoding settings for individual code types. The code types are each assigned to a code structure.



### NOTE

As only activated code types are processed, you can increase the processing speed by deactivating the code types that are not being used.

## 92 Code configuration

The [Code configuration](#) parameter allows you to specify whether the teach-in process for a match code should affect the current code configuration, and if so, how.

- **Do not change:** The process of teaching in a match code does not change the current code configuration. The system can carry on reading all the configured code types.
- **Limit to the code last taught in:** The code configuration is adjusted in line with the match code that has been taught in. This means that the parameters for the code type, the code length, and the code content are restricted to the match code properties. As a result, the system can only read codes that conform to the match code.
- **Expand with the code last taught in:** The code configuration is adjusted in line with the match code that has been taught in by activating the parameters for this new match code as well. As all the other code settings remain unchanged, the system can carry on reading all the configured code types.

## 93 Code contrast

To find the codes in the reading field, the captured image is searched thoroughly for structures with sufficiently large contrast variations. A code pattern is only expected within these structures.

A minimum value for these contrast variations is defined in % via the [Code contrast](#) parameter. The system does not search for code patterns in areas where the contrast is below the defined value.

- So that low-contrast codes can still be read reliably, a low value (e.g., 10%) must be set. This does, however, increase the decoding time, as it involves searching a larger image area.
- For high-contrast codes, the value can be increased accordingly. In this case, a correspondingly smaller image area is searched, which reduces the decoding time.

## 94 Code contrast

To find the codes in the reading field, the captured image is searched thoroughly for structures with sufficiently large contrast variations. A code pattern is only expected within these structures.

A minimum value for these contrast variations is defined in % via the [Code contrast](#) parameter. The system does not search for code patterns in areas where the contrast is below the defined value.

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- For high-contrast codes, the value can be increased accordingly. In this case, a correspondingly smaller image area is searched, which reduces the decoding time.

## 95 Code distance

The [Code distance](#) parameter is used to define the minimum distance for distinguishing between identical codes.



In this case, the system only distinguishes between codes of the same type and with identical content if the distance between them on the object is equal to or greater than the specified [Code distance](#).

## 96 Code format

The [Code format](#) parameter is used to select the format (Data Matrix code symbology) for outputting data:

- **ECC200:** The data is output in the standard data format.
- **GS1:** The data is output in the special GS1 data format. User-specific characters can be defined for the FNC1 character (control character at the start of the code) and for the separator (control character within the code). This means, for example, that a line break (CR, LF) can be inserted in the data string after each **Application Identifier**.

## 97 Code length

The [Code length](#) parameter can be used to restrict the number of characters allowed within a code.



- **Free:** Codes of any code length are read.
- **Interval:** The [Interval](#) parameter can be used to define the minimum and maximum code length. Codes are only read if their length falls between these two values.
- **Fixed:** The [Fixed Codelengths](#) parameter can be used to define several fixed code lengths. Codes are only read if they feature one of these defined code lengths.

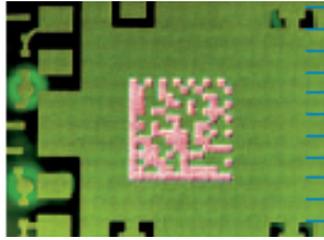
## 98 Code summarization

Using the parameters in the [Code summarization](#) group, the system can distinguish between codes of the same type and with identical content depending on where they are positioned on the object.

For this to take place, there must be a definable minimum distance (code distance) between the identical codes on the object.

## 99 Code surrounded by patterns

If the [Code surrounded by patterns](#) parameter is activated, any lines (e.g., printed conductors on a PCB) around the code are disregarded during evaluation.



This keeps the reading operation focused on the code elements and reduces the decoding time.

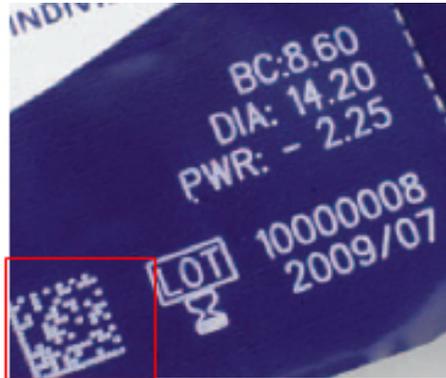


### NOTE

When the function is activated, poor quality codes tend to be ignored.

## 100 Code surrounded by text

If the [see "Code surrounded by text", page 40](#) parameter is activated, any text (e.g., on packaging) around the code is disregarded during evaluation.



This keeps the reading operation focused on the code elements and reduces the decoding time.



### NOTE

When the function is activated, poor quality codes tend to be ignored.

## 101 Collection of data

Data is assigned to an object in the [Collection of data](#) group. Using the parameters in the [Collection of data](#) group, object data can be uniquely set in relation to a particular object and the code content can be uniquely assigned to an object.

### Timeout

The [Timeout](#) parameter defines how much time has to elapse before data processing is started or stopped.

## 102 Communication Mode

The **Communication Mode** parameter is used to select a communication mode for exchanging data between the reading device and host.

- **Without handshake:** The protocol type outputs the telegram directly. This mode does not use handshakes. A repeat request is not processed.
- **With handshake:** The protocol type outputs the telegram directly. This mode does use handshakes. A repeat request is processed.



### NOTE

If several data telegrams are sent at the same time, the "With handshake" mode should be used to prevent data loss.

## 103 Communication Mode

The **Communication Mode** parameter is used to select communication modes for exchanging data between the reading device and the fieldbus master.

- **Operating mode BMV10:** This mode is compatible with the data communication concept of the SICK BMV10/BMH10 bus connection module. This means that the reading device is connected to a CDF600 Profibus proxy while other fieldbus nodes communicate via the BMV10 bus connection module. No output states are transferred. The fieldbus module's digital switching inputs and outputs can be used for the reading device regardless of this.
- **CMF400 operating mode without handshake:** This mode is compatible with the data communication concept of the CMF400-1x01 fieldbus module. This means that the reading device is connected to a CDF600 Profibus proxy while other fieldbus nodes communicate via the CMF400 fieldbus module. This mode operates without byte handshakes and is used for testing data transmission. The handshake timeout is deactivated.
- **CMF400 operating mode:** This mode is compatible with the data communication concept of the CMF400-1x01 fieldbus module. It is used for exchanging data during normal operation in the context of existing systems. This means that the reading device is connected to a CDF600 Profibus proxy while other fieldbus nodes communicate via the CMF400 fieldbus module.
- **Operating mode CDF600:** This mode is used for exchanging data during normal operation in new reading device installations. The fieldbus module operates as a proxy.
- **Operating mode CDF600 without handshake:** This mode operates without byte handshakes and is used for testing data transmission. The handshake timeout is deactivated.



### NOTE

Some parameter values are not supported by all device types.

The communication modes without handshake are used when the application does not require monitoring.

## 104 Comparison with Ideal Character

If the **Comparison with Ideal Character** parameter is activated, the score values are calculated based on a comparison with the selected ideal characters.

All the characters that have been taught in using the OCR wizard are displayed in a character table. Well-printed characters can be highlighted as ideal characters in the table. If the **Comparison with Ideal Character** parameter is activated, the score values are calculated based on a comparison with this ideal character.

## 105 Condition for Good Read

The [Condition for Good Read](#) list box is used to define the condition that must be met in order for a read operation to be evaluated as "good" (**Good Read**).

- **Use min./max. number of codes:** Depending on how the [Check min. number of valid codes](#) and [Check max. number of valid codes](#) parameters are configured, a read operation is evaluated as "good" (**Good Read**) if the number of codes read falls between the minimum and maximum values specified.
- **Match1 condition:** The read operation is evaluated as "good" (**Good Read**) if the code that has been read corresponds to **match code Match 1**.
- **Multicodes1 condition:** The read operation is evaluated as "good" (**Good Read**) if the number of codes that have been read corresponds to the specified number.
- **Teach-in1 condition:** The read operation is evaluated as "good" (**Good Read**) if the code that has been read corresponds to **match code teach-In 1**.
- **Teach-in2 condition:** The read operation is evaluated as "good" (**Good Read**) if the code that has been read corresponds to **match code teach-In 2**.

## 106 Condition for image storing

The [Condition for image storing](#) parameter is used to select the condition that must be met for images to be stored for diagnostic purposes.

- **Good Read:** Only images resulting from a successful code reading operation are stored.
- **No Read:** Only images resulting from an unsuccessful code reading operation are stored.
- **All:** All captured images are stored.
- **Match 1 condition:** The captured images are only stored if the code that has been read corresponds to the **Match 1 condition** match code.
- **Multicodes1 condition:** The captured images are only stored if the number of codes that have been read corresponds to the number specified by the **Multicodes1 condition**.
- **Teach-in1 condition:** The captured images are only stored if the [Match-code teach-in 1](#) condition is met.
- **Teach-in2 condition:** The captured images are only stored if the [Match-code teach-in 2 \(Additional\)](#) condition is met.

## 107 Condition Timeout

If the [Data transmission point](#) parameter is set to the value **As soon as possible**, the [Condition Timeout](#) parameter can be used to define how much time must elapse before the data is output again. After this time, the data is output again, provided that the data output condition ([Output Condition](#)) is met.

The unit can be selected via the [Output delay](#) parameter.

## 108 Connection timeout

The [Connection timeout](#) parameter is used to define a timeout in ms for establishing the connection between the device and the time server. After a connection interruption or restart, the device attempts to establish a connection to the server at the predefined intervals.

## 109 Contrast

The **Contrast** parameter is used to set the gamma correction in % and adapt it to the code contrast. The gamma correction can be set via the slide control.

If the optical difference between black and white code elements is minimal, the parameter should be set to a high value until the code elements can be clearly distinguished.



### NOTE

To check the contrast, you can evaluate the data in the **Codeinfo** (Contrast):

- 100%: Max. contrast
- 10%: Code can already be identified

## 110 Control system

The **Control system** parameter allows you to choose between a configuration based on length units and a configuration based on time units.

- **Distance-controlled:** The configuration is based on distance increments in mm. These are either generated by the configuration software (SOPAS)/CAN interface or via a rotary encoder at the digital input.
- **Time-controlled:** The configuration is based on times entered in ms.

## 111 Control system

The **Control system** parameter allows you to choose between a configuration based on length units and a configuration based on time units.

- **Distance-controlled:** The values for the **Length** parameter are entered in mm.
- **Time-controlled:** The values for the **Length** parameter are entered in ms.

## 112 Coordinates

The **Coordinates** group defines the position of the device above the conveying system in relation to a zero point. Establishing the device position makes it easier to map the position of an identified object at a later stage.

Looking in the conveying direction, the zero point is usually located on the bottom right-hand edge of the conveying system.

## 113 Counter

The **Counter** parameter is permanently set to the **Trigger no.** value and cannot be changed.

The stored images are numbered consecutively. The number is increased by 1 as soon as the reading gate opens. When the device is restarted, the numbering starts again from 1. Once the memory is full, no more images can be stored.

## 114 DataBar 14

If the [DataBar 14](#) parameter is activated, decoding is enabled for the relevant code type.



### NOTE

As only activated code types are processed, you can increase the processing speed by deactivating the code types that are not being used.



- Code name: [DataBar 14](#)
- Character set: 14 fixed digits
- Structure: 94 modules divided into 46 elements; code words consist of 15 or 16 modules and are represented by 4 gaps and 4 lines; the finder pattern has 14 modules; the lines and gaps are shown with 8 different module widths, i.e., the elements can be between 1X and 8X wide
- Intrinsic safety: High
- Standard: ISO/IEC 2427
- Areas of application: Trade

## 115 DataBar Expanded

If the [DataBar Expanded](#) parameter is activated, decoding is enabled for the relevant code type.



### NOTE

As only activated code types are processed, you can increase the processing speed by deactivating the code types that are not being used.



- Code name: GS1 DataBar Expanded (GDBE)
- Character set: Max. 74 digits, max. 41 characters
- Structure: 2 guard patterns: 2 modules each, both containing 1 bar and 1 gap; 4-22 data characters: 17 modules each, all containing 4 bars and 4 gaps; 2-11 finder patterns and 1 check digit
- Intrinsic safety: High
- Spatial requirements: Variable
- Standard: ISO/IEC 646
- Areas of application: Variable-measure foods, coupons

## 116 DataBar Limited

If the [DataBar Limited](#) parameter is activated, decoding is enabled for the relevant code type.



### NOTE

As only activated code types are processed, you can increase the processing speed by deactivating the code types that are not being used.



- Code name: GS1 DataBar Limited (GDBL)
- Character set: 14 fixed digits
- Structure: No quiet zone, the separator consists of a gap (1X) and a line (1X)
- Intrinsic safety: High
- Spatial requirements: Low
- Standard: ISO/IEC 24727
- Areas of application: Trade and industry (pharmaceuticals industry and electronics sector)

## 117 Data bits / parity

The [Data bits / parity](#) parameter is used to define the number of data bits (8 or 7) and the corresponding parity. The setting must match the one on the host.

## 118 Data Matrix

If the [Data Matrix](#) parameter is activated, decoding is activated for the corresponding code type. The configuration tab for the corresponding code type can be seen and opened in SOPAS ET.

As only activated code types are processed, you can increase the processing speed by deactivating the code types that are not being used.



- Code name: [Data Matrix](#)
- Max. number of numeric characters: 3,116
- Max. number of alphanumeric characters: 2,335
- Max. number of ASCII characters: 1,982
- Max. number of ISO characters: 1,556
- Structure: Symbol with L-pattern, rectangular symbols also possible
- Standard: ISO/IEC 16022
- Areas of application: Electronics, automotive, aviation, pharmaceuticals, and food packaging

## 119 Data output mode

The [Data output mode](#) parameter is used to define how often data is output.

- **Single:** The reading results are output once.
- **Multiple:** Initially, the reading results are output once. On expiry of a specific period ([Label Timeout](#) or [Condition Timeout](#)), the data is output again. If the appropriate setting is made, it is possible to distinguish between different objects with identical codes.

## 120 Data processing

The [Data processing](#) tab contains the parameters for defining the two output formats, as well as for filtering, sorting, and controlling data output.

These parameters are used to define what data is output on the communication interfaces, as well as when, under what conditions, and in what order.

## 121 Data Source

Select an interface to be recorded in the [Data Source](#) group.

## 122 Data String Forwarding

This option can be used if you intend to send data from an external device such as a hand-held scanner to a host **in addition to** the reading result. In this case, the data is not interpreted by the sensor, but is also output at the specified interface. The digital outputs are **not controlled** and the data is not processed according to evaluation conditions.

Possible destinations are:

- Serial aux interface
- Serial host interface
- Ethernet aux interface
- Ethernet host interface

## 123 Data transmission point

You can use the [Data transmission point](#) parameter to define when the reading results are to be output.

- **End of read cycle:** The reading results of all codes are output as soon as the reading gate is closed. As a result, the data is output at a definable point in time.
- **As soon as possible:** The reading results of a code are output as soon as the code has been identified (even if the reading gate is still open). This means that data can undergo further processing immediately.
- **New code:** The reading results of a code are output as soon as a code has been identified. However, before the same code can be output again, another code must first be identified. As a result, you can prevent a code from being identified multiple times and the data being output again (e.g., during manual reading).
- **End of label:** The reading results of a code are output as soon as a code leaves the reading area of the sensor.

In operating mode, image transmission and diagnosis are only available for the **End of read cycle** setting.

## 124 Date (YYYY-MM-DD)

The [Date \(YYYY-MM-DD\)](#) parameter is used to enter the date that the reading device should apply when setting its device time. Device time synchronization is triggered by the user via the **Set device time** button.

## 125 Date

If the [Date](#) parameter is activated, a subfolder is created with the creation date.

## 126 Debouncing

Depending on how the [Control system](#) parameter is configured, the [Debouncing](#) parameter specifies the minimum distance in mm or the minimum time in ms for the signal at the external input. If the value is not achieved, the signal is not detected.

Depending on the application, this value may have to be adapted in line with the read cycle rates required.

## 127 Decoding

The [Decoding](#) parameter defines whether the read operation should be time-optimized or whether it is more important to adopt an aggressive decoding approach.

- **Fast:** Fast decoding is recommended if the code is of high quality and it is important to achieve a short decoding time.
- **Aggressive:** The Aggressive option should be selected when the decoding time is less relevant, e.g., when reading a stationary object, but the code is of lower quality (e.g., low levels of contrast or when the code contains an error).
- **Balanced:** The Balanced option accommodates applications that fall between the two extremes.

## 128 Default Data String

The [Default Data String](#) parameter is used to define a default text for the EDS variable. The default text is output for EDS whenever no valid data has been received during the reading interval.

The EDS variable is described using the default data string at the start of the reading interval. During the reading interval, the EDS variable can be overwritten by an external device with the required data – several times, if necessary. At the end, the most recently assigned value or the default data string is output.

In order for data to be output, the EDS variable (object-related, EDS = external data string) must be inserted in the output format. By double-clicking, you have the option to format the EDS variable, e.g., by setting a fixed length.

## 129 Delay

If the [Data transmission point](#) parameter is set to the **End of read cycle** value, the [Delay](#) parameter can be used to hold back the data for a certain period after the reading gate has closed. This allows the timings to be adapted to the control (PLC).

The unit can be selected via the [Output delay](#) parameter.



### NOTE

Setting a long delay time slows down the process of outputting images. You can speed up the image output process by setting low values for the delay.

## 130 Destination Interface

The [Destination Interface](#) parameter determines which interface is used to **output the data**.

The following sensor interfaces can be used as a data output for data string forwarding:

- Serial aux interface
- Serial host interface
- Ethernet aux interface
- Ethernet host interface

## 131 Device ID

The [Device ID](#) parameter assigns the device a unique number on the network. The assigned ID is used as a CAN node for the CAN bus.



### NOTE

If the device is connected to a SICK network via CAN, device IDs 1 to 63 can be assigned. If the device is connected to a CANopen fieldbus, device IDs 1 to 127 can be assigned. Duplicate IDs must not be assigned.

---

The device must be uniquely identified on the network to enable communication via CAN bus and so that reading results can be correctly attributed to devices.

## 132 Device Information

The parameters in the [Device Information](#) group display sensor identification data. This data is important in the context of servicing.

### Manufacturer

The [Manufacturer](#) display field shows the sensor manufacturer.

### Device type

The [Gerätetyp](#) display field shows the sensor device type.

### Software version

The [Software version](#) display field shows the version of the firmware installed.

### Order number

The [Bestellnummer](#) display field shows the sensor order number.

### Serial number

The [Serial number](#) display field shows the sensor serial number.

## 133 Device Name

A name is assigned to the device via the [Device Name](#) parameter. The device name appears in SOPAS in the project tree.

It is not compulsory to assign a device name, but it can offer a better overview of all devices in the system during the configuration process.

## 134 DeviceNet-Gateway

The [DeviceNet-Gateway](#) group contains the parameters for DeviceNet settings.

## 135 Device Time

Synchronization of the device time is defined on the [Device Time](#) tab.

By entering a time source that the device can use to synchronize itself, it is possible to analyze the reading results exactly at the end of the recording period.

## 136 Device Time

Synchronization of the device time is defined via the parameters in the [Device Time](#) group.

By entering a time source that the device can use to synchronize itself, it is possible to analyze the reading results exactly at the end of the recording period.

The current time on the connected reading device can be retrieved via the **Get current time** button.

## 137 DHCP Fallback Mode

The [DHCP Fallback Mode](#) parameter is used to select an action that is performed if automatic IP assignment was not possible.

- **Static IP:** A static IP value is set as soon as it is established that DHCP was not possible.
- **Repeat DHCP:** The process is repeated until an IP is assigned via DHCP.

## 138 Digital Inputs

The [Digital Inputs](#) tab contains all of the parameters for configuring the digital inputs.

These parameters define the signal that causes the input to respond, along with the associated time delay.



### NOTE

The required input signal function must be configured accordingly in another area. If, for example, you want to use input signals as object triggers, you must make the relevant settings on the [Object Trigger Control](#) tab.

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## 139 Digital Outputs / Beeper

The [Digital Outputs / Beeper](#) tab contains all of the parameters for configuring the digital outputs.

These parameters define which events cause an output signal to be sent.



### NOTE

The required output signal function must be configured accordingly in another area. If, for example, you want to use output signals as application counters, you must make the relevant settings on the [Application Counters](#) tab.

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## 140 Display Score Values in the Image

If the [Display Score Values in the Image](#) parameter is activated, the determined score values are shown in the image.

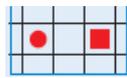
## 141 Distribute on

Trigger signal communication is activated/deactivated and assigned to a communication network via the [Distribute on](#) parameter.

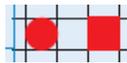
- **Deactivated:** The trigger is not distributed to other network nodes.
- **CAN:** In a group of devices that communicate with each other via the CAN network, the signal for opening the reading gate can be distributed. This involves an appropriate trigger signal being received by one of the devices – usually the master – and distributed to the remaining devices on the CAN network.

## 142 Dot size

The [Dot size](#) parameter expands the code elements optically so that the sensor can be adjusted to cope with poorly legible codes (e.g., codes with gaps between the dots of the L-pattern).



: Poorly legible



: Perfectly legible

If the codes have been produced using ink-jet printers, dot peening machines, or lasers (for example), the code elements may not be joined together seamlessly. In this case, the readability of the codes can be improved by expanding the code elements.



### NOTE

The value should be increased in stages until the code can be read successfully.

## 143 Duration

The [Duration](#) parameter is used to define the time frame for the optical feedback ([Green feedback spot](#)).

**144 EAN 128**

If the [EAN 128](#) parameter is activated, decoding is enabled for the relevant code type. (This requires the [Pharmacode](#) code type to be deactivated.)

**NOTE**

As only activated code types are processed, the processing speed can be increased by specifically activating/deactivating the necessary code types.



- Code name: [EAN 128](#) (4-value)
- Character set: Alphanumeric (ASCII) with three switchable character sets
  - Character set A: Digits, upper-case letters, and special characters
  - Character set B: Digits, upper-case and lower-case letters
  - Character set C: Double-density digits
- Structure: FNC1, characters, check digit
- Intrinsic safety: High
- Spatial requirements: Low
- Standard: ISO/IEC 15417
- Areas of application: Identification of durable consumer goods

**Multiread**

The [Multiread](#) parameter is used to define the minimum number of successful read operations (**Good Reads**) required in order for the **Good Read** result to be output.

Defining a minimum number of read operations reduces the likelihood of codes being misinterpreted if the print quality is poor or the contrast is low. At the same time, it increases the reading reliability.

**145 EAN**

The [GTIN 8 / EAN 8](#) and [GTIN 13 / EAN 13](#) code types can be activated or deactivated under the [EAN](#) group.

**146 EDS Text Element in Output Format / Assign Element EDS of Output Format**

You can use this option if you want data from an external device such as a **weighing scale** to be **combined** with the sensor data. This allows the reading result and the external data to be sent to the host **in one string**.

For this to take place, the external data must be received by the sensor **while the reading gate is open**. If the sensor does not receive any data during the reading gate interval, a default text is sent so that the host is aware that no data has been received. It makes the most sense to use this option when data is output at the end of the cycle.

The EDS text element can be positioned freely as a variable in the output format and can be set to a fixed length by double-clicking.

Data is output on **all configured interfaces**, including the fieldbus interfaces.

**147 Emcy Inhibit Time**

The [Emcy Inhibit Time](#) parameter defines the interval that must elapse between the repeated transmission of emergency objects in ms.

**148 Enable Command Response**

If the [Enable Command Response](#) parameter is activated, the reading device responds to the SOPAS commands sent by the PLC.

SOPAS commands from the control are entered into object 0x2200/0. The reading device responds via an entry in object 0x2020/4 and sends a process data object (PDO) with identifier 0x180 and the CAN node number to the PLC. The PLC loads the command response entered in the object directory via the SDO domain.

SOPAS commands constitute a command language that can be used to control the functions of the reading device and the object trigger control. A detailed list of the commands can be obtained from SICK on request.

**149 Enable Diagnosis Output**

If the [Enable Diagnosis Output](#) parameter is activated, the device's reading diagnosis data is monitored by the control via the CANopen interface. The reading device initiates monitoring via process data objects (PDOs). The device sends a PDO with identifier 0x180 and details of the CAN node to indicate that the control should load an entry.

**150 Enable heartbeat**

If the [Enable heartbeat](#) parameter is activated, a signal is output via the interface at regular intervals ([Heartbeat interval](#)). In this way, the availability of the sensor can be checked via the interface.

**151 Enable user I/O PDOs**

If the [Enable user I/O PDOs](#) parameter is activated, user-defined process data objects (PDOs) can be sent and received by a script program.

The user-defined PDOs are entries in the object directory that are reserved for scripts and configured in the object directory. The reserved PDOs allow the script to receive status changes from the CAN input modules and control CAN output modules by sending a PDO. This is how the communication bandwidth of the device is extended in terms of its software. The reading device can use the extended communication bandwidth for control tasks within its surrounding area, even if the required number of switching inputs and outputs for the control process is not available.

**152 Enable webserver at boot-up of device**

The device web server is activated and deactivated via the [Enable webserver at boot-up of device](#) parameter. Once the web server is activated, it starts automatically every time the device is restarted. The device must be restarted when the web server is activated for the first time.

**153 EPS Source**

Specify the interface at which an event-based parameter switchover is triggered under the [EPS Source](#) parameter.

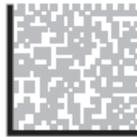
## 154 Error Score 1

The [see "Error Score 1", page 53](#) parameter is used to define a value that serves as the definition of a correctly read character. This specified value must be achieved for the character to be detected. If the value is not achieved, a “?” is output in the output format for this character.

The parameter can also be used as a quality mark to detect poorly printed characters/text, for example. The [see "Error Score 1", page 53](#) parameter can also be used to generate an event, e.g., an output signal.

## 155 Errors in L-pattern

According to the ISO/IEC 16022 standard, the code structure (L pattern) is not allowed to have any gaps in it and must extend across the entire code height and width. If the [Errors in L-pattern](#) parameter is activated, codes can still be read even if they contain defective code structures.



This means that any gaps in the code structure are ignored during decoding. So that the code can still be read, there must be a quiet zone around the code that is at least five times as big as the cell size. This may increase the decoding time.

## 156 EtherNet/IP

Device communication via Ethernet/IP can be activated and configured on the [EtherNet/IP](#) tab.

## 157 EtherNet/IP

Device communication via Ethernet/IP can be activated and configured in the [EtherNet/IP](#) group.

## 158 EtherNet/IP enabled

Device communication via Ethernet/IP is activated/deactivated via the [EtherNet/IP enabled](#) parameter. Once Ethernet/IP has been activated, the reading device must be restarted.

## 159 Ethernet

The [Ethernet](#) tab contains all of the parameters for configuring the Ethernet interface. The device address and the configuration data for the host and aux ports can be entered on the tab.

## 160 Ethernet Aux

If the [Ethernet Aux](#) parameter is activated, the results from the Ethernet aux interface are written to the save destination.

## 161 Ethernet Aux Port

The [Ethernet Aux Port](#) group contains the parameters for configuring the Ethernet aux interface. The Ethernet aux interface is typically used for configuring and analyzing the sensor.

### Output Format

The [Output Format](#) parameter is used to select the output format for the interface.

- **No output:** No data is output via this interface.
- **Reading diagnosis:** This interface is used to output a diagnosis string for each reading gate.
- **Output Format 1:** Data that is output via this interface is formatted in line with the configuration in the [Output Format 1](#) group.
- **Output Format 2:** Data that is output via this interface is formatted in line with the configuration in the [Output Format 2](#) group.

For the reading diagnosis, the following information is combined in a diagnosis string for each reading gate:

- TT: Reading gate duration in ms
- OTL: Trigger length in mm
- CC: No. of codes per reading gate
- FC: Focal position in mm
- Code content
- Code type

For 1D Symbologies

- CL: Code length
- RSD1DV: Ratio of scans to decoded scans (reading reliability) in %

For 2D Symbologies

- SZ: Symbol size
- RES: Cell resolution in pixels
- CTV: Symbol contrast in %
- UECV: Decodability (unused error correction) in %
- MC: Number of multireads per code

### Server / Client

The [Server / Client](#) parameter is permanently set to the **Client** value and cannot be changed.

### IP port

The [IP-Port](#) parameter can be used to adjust the port number for the Ethernet aux interface (default value: 2111) in line with the connected PC or control (PLC).

## 162 Ethernet General

The [Ethernet General](#) group contains general parameters for configuring the Ethernet interfaces (host and aux).

## 163 Ethernet Host

If the [Ethernet Host](#) parameter is activated, the results from the Ethernet host interface are written to the save destination.

## 164 Ethernet Host Port

The [Ethernet Host Port](#) group contains the parameters for configuring the Ethernet host interface. The Ethernet host interface is typically used for communication with the control.

### Output Format

The [Output Format](#) parameter is used to select the output format for the interface.

- **No output:** No data is output via this interface.
- **Output Format 1:** Data that is output via this interface is formatted in line with the configuration in the [Output Format 1](#) group.
- **Output Format 2:** Data that is output via this interface is formatted in line with the configuration in the [Output Format 2](#) group.

## 165 Evaluation Conditions

Conditions that are checked by the device at each reading gate are defined on the [Evaluation Conditions](#) tab. If defined conditions are fulfilled, specific actions can be performed by the device – for example, setting an output signal, ending a reading gate, or outputting an image or a particular data string.

Evaluation conditions can be used to define situations that serve as reference points in the device software for flexible process control and data processing. The use of evaluation conditions shifts the complexity of control tasks from the external controls (PLCs) into the code reader, meaning costs are reduced.

Conditions that have already been created can be edited via the  button. A dialog box opens which specifies the condition in detail.

Conditions that have been taught in can be deleted via the  button.

Another new condition can be created via the  button. A dialog box opens which allows you to specify the condition precisely. The condition type and name are precisely defined in the dialog box along with the condition itself.

## 166 Evaluation Conditions

Conditions that are checked by the device at each reading gate are defined in the [Evaluation Conditions](#) group. If defined conditions are fulfilled, specific actions can be performed by the device – for example, setting an output signal, ending a reading gate, or outputting an image or a particular data string.

Evaluation conditions can be used to define situations that serve as reference points in the device software for flexible process control and data processing. The use of evaluation conditions shifts the complexity of control tasks from the external controls (PLCs) into the code reader, meaning costs are reduced.

**General operation**

Conditions that have already been created can be edited via the  button. A dialog box opens which specifies the condition in detail.

Conditions that have been taught in can be deleted via the  button.

Another new condition can be created via the  button. A dialog box opens which allows you to specify the condition precisely. The condition type and name are precisely defined in the dialog box along with the condition itself.

**167 Event Monitor**

Input signals and output signals are represented graphically in the [Event Monitor](#) group. The signal visualization function allows you to test events such as output triggering or switching and to check the logic and function of signal sequences.

**168 Event Monitor**

Input signals and output signals are represented graphically on the [Event Monitor](#) tab.

**169 Expected Number of Characters 1**

This parameter can be used to determine the number of expected characters in a line. The number of expected characters must be specified. The algorithm uses this value to optimize the search for characters.

**170 External Input 1**

The number of available digital inputs can be expanded by using the CDB620/CDM420 connection module in conjunction with the CMC600 parameter memory module. The purpose of the CMC parameter memory module is to act as an input expansion module and convert a digital signal into a command. External digital inputs generally respond more slowly than the internal digital inputs of the sensor.

The [External Input 1](#) group contains the parameters for adjusting external digital input 1.

**Control system**

The [Control system](#) parameter allows you to choose between a configuration based on length units and a configuration based on time units.

- **Distance-controlled:** The configuration is based on distance increments in mm. These are either generated by the configuration software (SOPAS)/CAN interface or via a rotary encoder at the digital input.
- **Time-controlled:** The configuration is based on times entered in ms.

**Sensitivity**

The [Sensitivity](#) parameter allows you to choose between edge control and level control.

- **Edge:** The digital input responds to the switch between Low (0) and High (1) according to how the [Logic](#) parameter is configured. Any signal that is permanently present is ignored.
- **Level:** The digital input responds to a permanently present signal according to how the [Logic](#) parameter is configured.

**Logic**

The **Logic** parameter is used to select the polarity for the **Sensitivity** parameter.

- **Not inverted:** The digital input responds to a rising edge, i.e., to a switch from Low (0) to High (1), or to a High signal (1) that is permanently present.
- **Inverted:** The digital input responds to a falling signal edge, i.e., to a switch from High (1) to Low (0), or to a Low signal (0) that is permanently present.

**Debouncing**

Depending on how the **Control system** parameter is configured, the **Debouncing** parameter specifies the minimum distance in mm or the minimum time in ms for the signal at the external input. If the value is not achieved, the signal is not detected.

Depending on the application, this value may have to be adapted in line with the read cycle rates required.

**171 External Input 2**

The number of available digital inputs can be expanded by using the CDB620/CDM420 connection module in conjunction with the CMC600 parameter memory module. The purpose of the CMC parameter memory module is to act as an input expansion module and convert a digital signal into a command. External digital inputs generally respond more slowly than the internal digital inputs of the sensor.

The **External Input 2** group contains the parameters for adjusting external digital input 2.

**Control system**

The **Control system** parameter allows you to choose between a configuration based on length units and a configuration based on time units.

- **Distance-controlled:** The configuration is based on distance increments in mm. These are either generated by the configuration software (SOPAS)/CAN interface or via a rotary encoder at the digital input.
- **Time-controlled:** The configuration is based on times entered in ms.

**Sensitivity**

The **Sensitivity** parameter allows you to choose between edge control and level control.

- **Edge:** The digital input responds to the switch between Low (0) and High (1) according to how the **Logic** parameter is configured. Any signal that is permanently present is ignored.
- **Level:** The digital input responds to a permanently present signal according to how the **Logic** parameter is configured.

**Logic**

The **Logic** parameter is used to select the polarity for the **Sensitivity** parameter.

- **Not inverted:** The digital input responds to a rising edge, i.e., to a switch from Low (0) to High (1), or to a High signal (1) that is permanently present.
- **Inverted:** The digital input responds to a falling signal edge, i.e., to a switch from High (1) to Low (0), or to a Low signal (0) that is permanently present.

### Debouncing

Depending on how the [Control system](#) parameter is configured, the [Debouncing](#) parameter specifies the minimum distance in mm or the minimum time in ms for the signal at the external input. If the value is not achieved, the signal is not detected.

Depending on the application, this value may have to be adapted in line with the read cycle rates required.

## 172 External Input Data

The [External Input Data](#) tab contains parameters for the usage of input data. The following options are available for the usage of input data from the serial aux and serial host interfaces:

- **Data String Forwarding**
- **Auxiliary input**
- **EDS text element in output format**

The data can be transferred to the sensor via the serial aux/serial host interfaces.

It is essential that the telegram identifier be distinct from the SOPAS STX and ETX commands, as SOPAS commands may continue to be sent to the sensor. It is recommended to use the default values for the headers ([Rx Header](#)) and terminators ([Rx Terminator](#)) of the received data.

## 173 External Output 1

The number of available digital outputs can be expanded by using the CDB620/CDM420 connection module in conjunction with the CMC600 parameter memory module. The purpose of the CMC parameter memory module is to act as an output expansion module and convert a digital signal into a command. External digital outputs generally respond more slowly than the internal digital outputs of the sensor.

The [External Output 1](#) group contains the parameters for adjusting external digital output 1.

### Active

The **Active** parameter is used to select the event that activates the digital output.

- **SOPAS command:** The output can be activated via a command. This allows defined statuses to be displayed by a connected indicator lamp when a corresponding command is issued by the control (PLC).
- **Device Ready:** The output is activated as soon as the sensor is ready for use.
- **Good Read:** The output is activated if the read operation was successful.
- **No Read:** The output is activated if the read operation was unsuccessful.
- **Teach-IN 1 OK:** The output is activated if the **match code teach-in 1** has been successfully taught in.
- **Teach-IN 1 NOK:** The output is activated if the **match code teach-in 1** could not be successfully taught in.
- **Teach-IN 2 OK:** The output is activated if the **match code teach-in 2** has been successfully taught in.
- **Teach-IN 2 NOK:** The output is activated if the **match code teach-in 2** could not be successfully taught in.
- **Match 1 condition:** The output is activated if the code that has been read corresponds to the **Match 1 condition** match code.
- **Multicodes1 condition:** The output is activated if the number of codes that have been read corresponds to the number specified by the **Multicodes1 condition**.
- **Teach-in1 condition:** The output is activated if the code that has been read corresponds to the **Teach-in1 condition** match code.
- **Teach-in2 condition:** The output is activated if the code that has been read corresponds to the **Teach-in2 condition** match code.

### Inactive

The **Inactive** parameter is used to select the event that leads to the digital output being deactivated.

- **Timer/Tracking:** The output is deactivated on expiry of a specific period (**Length**).
- **Next object trigger:** The output is deactivated as soon as the next reading gate opens.
- **SOPAS command:** The output can be deactivated via a command. This allows defined statuses to be displayed by a connected indicator lamp when a corresponding command is issued by the control (PLC).
- **Good Read:** The output is deactivated if the read operation was successful.
- **No Read:** The output is deactivated if the read operation was unsuccessful.
- **Teach-IN 1start:** The output is deactivated as soon as the **match code teach-in 1** teach-in process commences.
- **Teach-IN 2start:** The output is deactivated as soon as the **match code teach-in 2** teach-in process commences.
- **Match 1 condition:** The output is deactivated if the code that has been read corresponds to the **Match 1 condition** match code.
- **Multicodes1 condition:** The output is deactivated if the number of codes that have been read corresponds to the number specified by the **Multicodes1 condition**.
- **Teach-in1 condition:** The output is deactivated if the code that has been read corresponds to the **Teach-in1 condition** match code.
- **Teach-in2 condition:** The output is deactivated if the code that has been read corresponds to the **Teach-in2 condition** match code.

**or**

The **or** parameter can be used to select a second condition for deactivating the digital output.

In order for the digital output to be deactivated, one of the conditions must be met.

- ---: No second condition selected
- **Match 1 condition:** The output is deactivated if the code that has been read corresponds to the **Match 1 condition** match code.
- **Multicodes1 condition:** The output is deactivated if the number of codes that have been read corresponds to the number specified by the **Multicodes1 condition**.
- **Teach-in1 condition:** The output is deactivated if the code that has been read corresponds to the **Teach-in1 condition** match code.
- **Teach-in2 condition:** The output is deactivated if the code that has been read corresponds to the **Teach-in2 condition** match code.

**Logic**

The **Logic** parameter is used to select the polarity of the digital output.

- **Not inverted:** If this option is activated, the digital output switches from Low (0) to High (1).
- **Inverted:** If this option is activated, the digital output switches from High (1) to Low (0).

**Control system**

The **Control system** parameter allows you to choose between a configuration based on length units and a configuration based on time units.

- **Distance-controlled:** The values for the **Length** parameter are entered in mm.
- **Time-controlled:** The values for the **Length** parameter are entered in ms.

**Length**

If the **Inactive** parameter is set to the **Timer/Tracking** condition, the **Length** parameter can be used to specify how long the digital output should remain activated. The unit can be selected via the **Control system** parameter.

## 174 External Output 2

The number of available digital outputs can be expanded by using the CDB620/CDM420 connection module in conjunction with the CMC600 parameter memory module. The purpose of the CMC parameter memory module is to act as an output expansion module and convert a digital signal into a command. External digital outputs generally respond more slowly than the internal digital outputs of the sensor.

The **External Output 2** group contains the parameters for adjusting external digital output 2.

### Active

The **Active** parameter is used to select the event that activates the digital output.

- **SOPAS command:** The output can be activated via a command. This allows defined statuses to be displayed by a connected indicator lamp when a corresponding command is issued by the control (PLC).
- **Device Ready:** The output is activated as soon as the sensor is ready for use.
- **Good Read:** The output is activated if the read operation was successful.
- **No Read:** The output is activated if the read operation was unsuccessful.
- **Teach-IN 1 OK:** The output is activated if the **match code teach-in 1** has been successfully taught in.
- **Teach-IN 1 NOK:** The output is activated if the **match code teach-in 1** could not be successfully taught in.
- **Teach-IN 2 OK:** The output is activated if the **match code teach-in 2** has been successfully taught in.
- **Teach-IN 2 NOK:** The output is activated if the **match code teach-in 2** could not be successfully taught in.
- **Match 1 condition:** The output is activated if the code that has been read corresponds to the **Match 1 condition** match code.
- **Multicodes1 condition:** The output is activated if the number of codes that have been read corresponds to the number specified by the **Multicodes1 condition**.
- **Teach-in1 condition:** The output is activated if the code that has been read corresponds to the **Teach-in1 condition** match code.
- **Teach-in2 condition:** The output is activated if the code that has been read corresponds to the **Teach-in2 condition** match code.

### Inactive

The **Inactive** parameter is used to select the event that leads to the digital output being deactivated.

- **Timer/Tracking:** The output is deactivated on expiry of a specific period (**Length**).
- **Next object trigger:** The output is deactivated as soon as the next reading gate opens.
- **SOPAS command:** The output can be deactivated via a command. This allows defined statuses to be displayed by a connected indicator lamp when a corresponding command is issued by the control (PLC).
- **Good Read:** The output is deactivated if the read operation was successful.
- **No Read:** The output is deactivated if the read operation was unsuccessful.
- **Teach-IN 1start:** The output is deactivated as soon as the **match code teach-in 1** teach-in process commences.
- **Teach-IN 2start:** The output is deactivated as soon as the **match code teach-in 2** teach-in process commences.
- **Match 1 condition:** The output is deactivated if the code that has been read corresponds to the **Match 1 condition** match code.
- **Multicodes1 condition:** The output is deactivated if the number of codes that have been read corresponds to the number specified by the **Multicodes1 condition**.
- **Teach-in1 condition:** The output is deactivated if the code that has been read corresponds to the **Teach-in1 condition** match code.
- **Teach-in2 condition:** The output is deactivated if the code that has been read corresponds to the **Teach-in2 condition** match code.

**or**

The **or** parameter can be used to select a second condition for deactivating the digital output.

In order for the digital output to be deactivated, one of the conditions must be met.

- ---: No second condition selected
- **Match 1 condition:** The output is deactivated if the code that has been read corresponds to the **Match 1 condition** match code.
- **Multicodes1 condition:** The output is deactivated if the number of codes that have been read corresponds to the number specified by the **Multicodes1 condition**.
- **Teach-in1 condition:** The output is deactivated if the code that has been read corresponds to the **Teach-in1 condition** match code.
- **Teach-in2 condition:** The output is deactivated if the code that has been read corresponds to the **Teach-in2 condition** match code.

**Logic**

The **Logic** parameter is used to select the polarity of the digital output.

- **Not inverted:** If this option is activated, the digital output switches from Low (0) to High (1).
- **Inverted:** If this option is activated, the digital output switches from High (1) to Low (0).

**Control system**

The **Control system** parameter allows you to choose between a configuration based on length units and a configuration based on time units.

- **Distance-controlled:** The values for the **Length** parameter are entered in mm.
- **Time-controlled:** The values for the **Length** parameter are entered in ms.

**Length**

If the **Inactive** parameter is set to the **Timer/Tracking** condition, the **Length** parameter can be used to specify how long the digital output should remain activated. The unit can be selected via the **Control system** parameter.

**175 FC1-Value on First Position**

The **FC1-Value on First Position** parameter can be used to define an alternative character for the FC1 character (control character at the start of the code) in the case of the EAN 128 code format.

Up to three characters can be defined. The values must be entered as decimal numbers.

**176 FC1-Value within Code**

The **FC1-Value within Code** parameter can be used to define an alternative character for the separator (control character within the code) in the case of the EAN 128 code format.

Up to three characters can be defined. The values must be entered as decimal numbers.

**177 Fieldbus Gateway**

All settings for connecting the reading device to a gateway are made on the [Fieldbus Gateway](#) tab. The gateway can be configured directly via the reading device. The gateway and reading device communicate via the serial interface.

The reading device is incorporated into the required fieldbus via a gateway.

**178 File Format**

The file format can be configured in the [File Format](#) group.

**179 File name**

The [File name](#) parameter can be used to specify a file name for the log file.

**180 File Path**

The [File Path](#) group contains the parameters for the directory location and naming of the image files.

**181 File Path**

The structure of the data storage can be specified under [File Path](#).

**182 Filter/Sorter for Output**

You can use the graphical interface on the [Filter/Sorter for Output](#) tab to restrict (filter) the data when outputting the reading results and to define the order in which the data is output (sorted). This means you can individually control how the data is output by combining filters and sorters.

You can use the graphical interface in the [Filters/Sorters for Output Format 2](#) group to restrict (filter) the data when outputting the reading results and to define the order in which the data is output (sorted). This means you can individually control how the data is output by combining filters and sorters.

For this purpose, any number of filters and sorters can be graphically arranged between the device and PC. The filters can also be arranged in parallel.

You can add further filters and sorters by pulling down the corresponding symbols. The filters or sorters can be copied by dragging the symbols while holding down the Ctrl key. To delete a symbol, drag it over to the recycle bin. Symbols can also be removed by pressing the **Del** pushbutton once they have been selected.

During filtering, you can use the  button to define the variable and condition for filtering.

Example: **(CL) code length = 10**: Only codes with a code length of exactly ten characters are output.

During sorting, you can use the  button to select the variable for sorting the reading results. You can also choose to sort the results in ascending or descending order.

Example: **(CL) code length - Ascending**: The codes with the shortest code length are output first.

## 183 Filters/Sorters for Output Format 1

You can use the graphical interface in the [Filters/Sorters for Output Format 1](#) group to restrict (filter) the data when outputting the reading results and to define the order in which the data is output (sorted). This means you can individually control how the data is output by combining filters and sorters.

For this purpose, any number of filters and sorters can be graphically arranged between the device and PC. The filters can also be arranged in parallel.

You can add further filters and sorters by pulling down the corresponding symbols. The filters or sorters can be copied by dragging the symbols while holding down the Ctrl key. To delete a symbol, drag it over to the recycle bin. Symbols can also be removed by pressing the **Del** pushbutton once they have been selected.

During filtering, you can use the  button to define the variable and condition for filtering.

Example: **(CL) code length = 10**: Only codes with a code length of exactly ten characters are output.

During sorting, you can use the  button to select the variable for sorting the reading results. You can also choose to sort the results in ascending or descending order.

Example: **(CL) code length - Ascending**: The codes with the shortest code length are output first.

## 184 Filters/Sorters for Output Format 2

You can use the graphical interface in the [Filters/Sorters for Output Format 2](#) group to restrict (filter) the data when outputting the reading results and to define the order in which the data is output (sorted). This means you can individually control how the data is output by combining filters and sorters.

For this purpose, any number of filters and sorters can be graphically arranged between the device and PC. The filters can also be arranged in parallel.

You can add further filters and sorters by pulling down the corresponding symbols. The filters or sorters can be copied by dragging the symbols while holding down the Ctrl key. To delete a symbol, drag it over to the recycle bin. Symbols can also be removed by pressing the **Del** pushbutton once they have been selected.

During filtering, you can use the  button to define the variable and condition for filtering.

Example: **(CL) code length = 10**: Only codes with a code length of exactly ten characters are output.

During sorting, you can use the  button to select the variable for sorting the reading results. You can also choose to sort the results in ascending or descending order.

Example: **(CL) code length - Ascending**: The codes with the shortest code length are output first.

## 185 Fixed Codelengths

Several fixed code lengths can be defined via the [Fixed Codelengths](#) parameter. Codes are only read if they feature one of these defined code lengths.



### NOTE

By defining the specific code lengths that are permissible, you can restrict the range of codes to be read. This can lead to a reduction in the decoding time.

## 186 Fixed Length

The required code length can be specified using the [Fixed Length](#) parameter. Only codes with this length are read.

## 187 Fixed size 1

A fixed symbol size can be selected using the [Fixed size 1](#) parameter. Only codes with this symbol size are read.

By defining the specific symbol sizes that are permissible, you can restrict the range of codes to be read. This can lead to a reduction in the decoding time.

## 188 Fixed size 2

A fixed symbol size can be selected using the [Fixed size 2](#) parameter. Only codes with this symbol size are read.

By defining the specific symbol sizes that are permissible, you can restrict the range of codes to be read. This can lead to a reduction in the decoding time.

## 189 Fixed size 3

A fixed symbol size can be selected using the [Fixed size 3](#) parameter. Only codes with this symbol size are read.

By defining the specific symbol sizes that are permissible, you can restrict the range of codes to be read. This can lead to a reduction in the decoding time.

## 190 Fixed size 4

A fixed symbol size can be selected using the [Fixed size 4](#) parameter. Only codes with this symbol size are read.

By defining the specific symbol sizes that are permissible, you can restrict the range of codes to be read. This can lead to a reduction in the decoding time.

## 191 Fixed size 5

A fixed symbol size can be selected using the [Fixed size 5](#) parameter. Only codes with this symbol size are read.

By defining the specific symbol sizes that are permissible, you can restrict the range of codes to be read. This can lead to a reduction in the decoding time.

## 192 Fixed speed

You can use the [Fixed speed](#) parameter to enter a constant value for the feed speed of the belt in m/sec.

This speed is converted into time/distance automatically.

## 193 FNC1 Character Replacement

In the GS1 code format, the [FNC1 Character Replacement](#) parameter can be used to define user-specific characters for the FNC1 character (control character at the start of the code).

The characters are entered via the keyboard or clipboard.

It is possible to select special characters or enter hexadecimal characters via the  symbol.

Information on editing the characters is available via the  symbol.

## 194 Folder name

The [Folder name](#) parameter is used to select the default name for the image folder.

- **Serial number:** The image files are stored in a folder with the same name as the sensor's serial number.
- **Device Name:** The image files are stored in a folder with the same name as the value set for the [Name](#) parameter. Assigning appropriate device names makes it easy to distinguish between file names when there are several similar devices (e.g., on a network).

### Name

The [Name](#) parameter can be used to define a device name for the sensor. The image files generated by the sensor are stored in a folder with the same name. Assigning appropriate device names makes it easy to distinguish between file names when there are several similar devices (e.g., on a network).

### Date

If the [Date](#) parameter is activated, the diagnosis images are sorted by date of capture and stored in a subfolder with the appropriate time stamp. A new subfolder is created for each day.



### NOTE

In order for the files to be stored by date of capture, the device time must be set exactly (see [Device Time](#)).

---

It makes sense to store the image files according to the date of capture if there are a lot of them.

**Hour**

If the [Hour](#) parameter is activated, the diagnosis images are sorted by time of capture and stored in a subfolder with the appropriate time stamp. A new subfolder is created for each complete hour.

**NOTE**

In order for the images to be stored by time of capture, the device time must be set exactly (see [Device Time](#)).

It makes sense to store the image files according to the time of capture if there are a lot of them.

**195 Folder name**

The name of the folder in which the recorded data is to be stored is specified via the [Folder name](#) parameter. The following options can be selected for the folder name:

- **Serial number:** The folder name contains the serial number of the sensor.
- **Device name:** The folder name contains the configured name of the sensor.

**196 from**

If the [Start by](#) parameter is set to the CAN signal source, the [from](#) parameter allows you to set the CAN address for a device from the CAN network. A suitable trigger signal is received via this device and distributed to the remaining devices on the CAN network.

**197 Full ASCII**

The [Full ASCII](#) parameter must be activated if the code is to contain a mixture of digits and other characters.

**Check digit test**

The [Check digit test](#) parameter is used to define the calculation method for checking the plausibility of the code content. During this check, a check digit is calculated from the code content and compared with the check digit within the code. The method that you select must be the same as the one used during code creation. The read operation is only classed as "good" (**Good Read**) if the calculated check digit matches the one in the code.

**NOTE**

Check digits prevent codes from being misinterpreted and increase the reading reliability.

## 198      Function

The **Function** parameter specifies how the device should function within the SICK network in master/slave operating mode.

- **Stand alone:** The reading device is not integrated into a SICK network and operates as a single device station in the system. The device communicates directly with the host.
- **Slave:** When configured as a slave, the reading device receives trigger signals for starting and ending the reading process from the master. The slave sends the reading result to the master.
- **Master:** When configured as the master, the reading device distributes trigger signals for starting and ending the reading process to the slaves. The master receives the trigger signals directly from a photoelectric switch or serially from the PLC. Once it receives the reading results from the slaves, the master sends these to the PLC in accordance with the configured output format.

### Slave list

The **Slave list** parameter is used to specify the device IDs of the slaves that are connected to the master device. The device IDs are separated by commas. Up to ten slaves can be entered for one master.



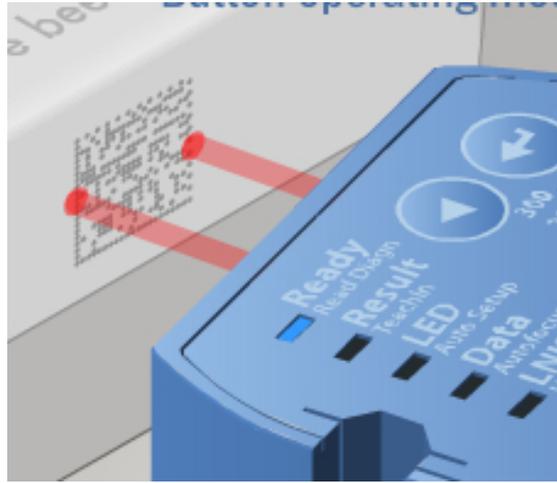
### NOTE

The input field is highlighted in red if an invalid entry is made.

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## 199 Function

The **Function** parameter is used to define the functions of the sensor pushbuttons and how they should behave.



- **No function:** The function buttons on the sensor are deactivated. This prevents operational faults from occurring because the buttons have been pushed unintentionally.
- **Trigger and aiming laser:** You can use the pushbuttons on the sensor to initiate reading without the sensor having to be connected to the PC.
  - The pushbutton on the left opens the reading gate. The reading gate remains open until you release the pushbutton or until the condition for closing the reading gate has been met.
  - The pushbutton on the right switches the aiming laser on/off. The aiming laser switches off automatically after five minutes.
- **Menu (Store permanently):** The pushbuttons on the sensor act like menu keys and can be used for configuration. The modified parameter values are permanently saved in the device. This overwrites the existing values.
- **Menu (Store temporarily):** The pushbuttons on the sensor act like menu keys and can be used for configuration. The existing values are overwritten just for the time being. The modified parameter values remain stored in the device until it is restarted. Given that the old parameter values are restored after the restart, this setting is suitable for testing parameter changes. This function can also be used if

you want to read a different code and then restore the settings more or less straight away by performing a restart.

When menu mode is activated, the following functions can be accessed via the push-buttons on the sensor:

- **Read diagn:** A suitable code is read in the reading area using the current configuration. The read rate for the last ten read operations is displayed in % above the bar display on the sensor housing.
- **Teach-in match code:** A suitable code is read in the reading area and stored as a match code (set code).
- **Auto-Setup** (only available for **Data Matrix** for the time being): Depending on how the parameters in the [Auto-Setup via function button menu](#) group are configured, the reading distance, the image settings (brightness and contrast), and the code settings are adjusted automatically. In order for this to happen, a suitable object with contrast variations or edges (e.g., code, text, or other structures) must be placed in the reading area.
- **Autofocus:** The focus position (reading distance) is adjusted automatically. In order for this to happen, a suitable object with contrast variations or edges (e.g., code, text, or other structures) must be placed in the reading area.
- **Userdefined:** (not yet implemented)

## 200 Function buttons

The [Function buttons](#) group contains the parameters for defining the functions of the sensor pushbuttons.

## 201 Gamma

The device's Gamma angle in relation to the trigger position is defined under the [Gamma](#) parameter.

## 202 General

Reading processes – such as the number of necessary multireads, rules for dealing with the start and stop characters, or check digit tests – are configured under the [General](#) group.

### Multiread

The [Multiread](#) parameter is used to define the minimum number of successful read operations (**Good Reads**) required in order for the **Good Read** result to be output.

Defining a minimum number of read operations reduces the likelihood of codes being misinterpreted if the print quality is poor or the contrast is low. At the same time, it increases the reading reliability.

## 203 General

Reading processes – such as the number of necessary multireads, rules for dealing with the start and stop characters, or check digit tests – are configured under the [General](#) group.

**Multiread**

The **Multiread** parameter is used to define the minimum number of successful read operations (**Good Reads**) required in order for the **Good Read** result to be output.

Defining a minimum number of read operations reduces the likelihood of codes being misinterpreted if the print quality is poor or the contrast is low. At the same time, it increases the reading reliability.

**Transmit start/stop**

If the **Transmit start/stop** parameter is activated, the start and stop characters are output along with the code content.

This means that the characters are available for evaluating the reading results.

**204      General**

Reading processes – such as the number of necessary multireads, rules for dealing with the start and stop characters, or check digit tests – are configured under the **General** group.

**205      General****General (PHARMA)****Multiread**

The **Multiread** parameter is used to define the minimum number of successful read operations (**Good Reads**) required in order for the **Good Read** result to be output.

Defining a minimum number of read operations reduces the likelihood of codes being misinterpreted if the print quality is poor or the contrast is low. At the same time, it increases the reading reliability.

**206      General**

Reading processes – such as the number of necessary multireads, rules for dealing with the start and stop characters, or check digit tests – are configured under the **General** group.

**Multiread**

The **Multiread** parameter is used to define the minimum number of successful read operations (**Good Reads**) required in order for the **Good Read** result to be output.

Defining a minimum number of read operations reduces the likelihood of codes being misinterpreted if the print quality is poor or the contrast is low. At the same time, it increases the reading reliability.

**207      General**

Reading processes – such as the number of necessary multireads, rules for dealing with the start and stop characters, or check digit tests – are configured under the **General** group.

**208      General**

Reading processes – such as the number of necessary multireads, rules for dealing with the start and stop characters, or check digit tests – are configured under the **General** group.

**209      General**

Password protection for the device configuration can be activated in the [General](#) group. Password protection ensures that only authorized users can modify device parameters. This prevents incorrect settings from being made.

**210      General**

The parameter switchover switches over the saved parameter sets during the reading interval. A maximum of four different parameter sets can be saved in the parameter switchover.

If codes are to be read on different background materials or under different application conditions, the parameter switchover can be used. The individual parameter sets can be adapted individually and optimally to the respective code or the application. This increases the flexibility and stability of the sensor.

**211      General**

Reading processes such as the code format and symbol size are configured under the [General](#) group.

**212      General**

Reading processes – such as the number of necessary multireads, rules for dealing with the start and stop characters, or check digit tests – are configured under the [General](#) group.

**213      General**

[General](#) (PDF)

**214      General**

In the [General](#) group, the **Auto** button provides access to a wizard, which can be used to set the code configuration automatically.

**215      General Match-code teach-in settings**

The [General Match-code teach-in settings](#) group contains the parameters for teaching in the match codes.

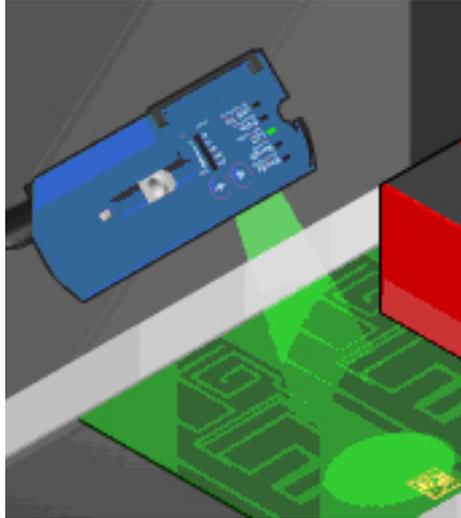
The two match codes are stored in the [Match-code teach-in 1](#) and [Match-code teach-in 2 \(Additional\)](#) groups and can be subsequently customized.

**216      Good Read / No Read file prefix**

If the [see "Good Read / No Read file prefix", page 72](#) parameter is activated, an appropriate prefix is added to the name so that the images can be analyzed more easily according to the reading result (**Good Read** or **No Read**).

## 217 Green feedback spot

The **Green feedback spot** parameter is used to select the condition that must be met for a green LED spot to light up in the reading field. This allows you to set up optical feedback for a specific event.



The illumination time frame is set via the **Duration** parameter.

- **Off:** The green LED spot never lights up.
- **Good Read:** The green LED spot lights up if the read operation was successful.
- **No Read:** The green LED spot lights up if the read operation was unsuccessful.
- **Teach-IN 1 OK:** The green LED spot lights up if the **match code teach-in 1** has been successfully read in.
- **Teach-IN 1 NOK:** The green LED spot lights up if the **match code teach-in 1** could not be successfully read in.
- **Teach-IN 2 OK:** The green LED spot lights up if the **match code teach-in 2** has been successfully read in.
- **Teach-IN 2 NOK:** The green LED spot lights up if the **match code teach-in 2** could not be successfully read in.
- **Match1 condition:** The green LED spot lights up if the code that has been read corresponds to the **Match1 condition** match code.
- **Multicodes1 condition:** The green LED spot lights up if the number of codes that have been read corresponds to the number specified by the **Multicodes1 condition**.
- **Teach-in1 condition:** The green LED spot lights up if the code that has been read corresponds to the **Teach-in1 condition** match code.
- **Teach-in2 condition:** The green LED spot lights up if the code that has been read corresponds to the **Teach-in2 condition** match code.

## 218 GS1 / EAN 128

The control characters in the EAN 128 code format can be replaced with alternative, user-specific characters under the **GS1 / EAN 128** group. Control characters in the EAN 128 code format are used at the start of the code to identify the code format and within the code to classify the data groups. The user-specific characters are entered via the keyboard or clipboard as hexadecimal values.

## 219 GS1 DataBar

If the [GS1 DataBar](#) parameter is activated, decoding is activated for the [DataBar 14](#), [DataBar Expanded](#), and [DataBar Limited](#) activated code types. (This requires the [GS1 DataBar](#) code type to be deactivated.)



### NOTE

As only activated code types are processed, you can increase the processing speed by deactivating the code types that are not being used.

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## 220 GS1 DataBar

If the [DataBar 14](#) parameter is activated, decoding is enabled for the relevant code type.



### NOTE

As only activated code types are processed, you can increase the processing speed by deactivating the code types that are not being used.

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- Code name: [DataBar 14](#)
- Character set: 14 fixed digits
- Structure: 94 modules divided into 46 elements; code words consist of 15 or 16 modules and are represented by 4 gaps and 4 lines; the finder pattern has 14 modules; the lines and gaps are shown with 8 different module widths, i.e., the elements can be between 1X and 8X wide
- Intrinsic safety: High
- Standard: ISO/IEC 2427
- Areas of application: Trade

## 221 GS1 Format

The control characters in the GS1 Data Matrix code format can be replaced with alternative, user-specific characters under the [GS1 Format](#) group. Control characters in the GS1 Data Matrix code format are used at the start of the code to identify the code format and within the code to classify the data groups. The user-specific characters are entered as hexadecimal values via the keyboard, clipboard, or the **Add variable or constant** button.

## 222 GTIN 13 / EAN 13

If the [GTIN 13 / EAN 13](#) parameter is activated, decoding is enabled for the relevant code type.



### NOTE

As only activated code types are processed, you can increase the processing speed by deactivating the code types that are not being used.



- Code name: [GTIN 13 / EAN 13](#) (European Article Numbering) (4-value)
- Character set: 13 numeric characters (check digits: last two characters)
- Structure: 2 characters for country prefix (in accordance with GS1 standards), 8 characters for the manufacturer and article (in accordance with GS1 standards), 2 characters as check digits
- Intrinsic safety: High
- Spatial requirements: Low
- Standard: DIN/EN 797
- Areas of application: Foodstuffs and consumer goods in Europe

## 223 GTIN 8 / EAN 8

If the [GTIN 8 / EAN 8](#) parameter is activated, decoding is enabled for the relevant code type.



### NOTE

As only activated code types are processed, you can increase the processing speed by deactivating the code types that are not being used.



- Code name: [GTIN 8 / EAN 8](#) (European Article Numbering) (4-value)
- Character set: 8 numeric characters (check digits: last two characters)
- Structure: 2 characters for country prefix (in accordance with GS1 standards), 4 characters for the manufacturer and article (in accordance with GS1 standards), 2 characters as check digits
- Intrinsic safety: High
- Spatial requirements: Low
- Standard: DIN/EN 797
- Areas of application: Foodstuffs and consumer goods in Europe

## 224 Hardware

The protocol for the serial interfaces (RS232 or RS244) is selected via the [Hardware](#) parameter.

## 225 Heartbeat interval

The [Heartbeat interval](#) parameter is used to define the time between the heartbeat signals in seconds.

## 226 Hour

If the [Hour](#) parameter is activated, a subfolder is created with the creation time (hour). A separate log file is created each hour.

## 227 Illumination

The parameters in the [Illumination](#) group are used to switch the illumination elements on or off as well as to adjust them.

By optimizing the settings, you can create a high-contrast reading field that is constantly illuminated. In this way, external influences – such as sunlight, darkness, room illumination, etc. – can be minimized.

## 228 Image Capturing Mode

Two image capturing processes are available under the [Image Capturing Mode](#) parameter:

- **Continuous:** Continuous image capturing by the sensor at the set image frequency. If the image frequency was not set manually, images are captured at 25 or 60 Hz depending on the device type.
- **Individual images:** Only the number of images set under the [Number of Images](#) parameter are captured regardless of the reading interval length.

The **Continuous** image capturing mode is the default setting and suitable for most applications. It is recommended that **Individual images** capturing mode is used for fast applications with small gaps between objects. The decoding time is considerably reduced due to the limited number of images captured.

## 229 Image Diagnosis Settings

The [Image Diagnosis Settings](#) tab is used to define which images are transmitted or stored by the reading device for diagnostic purposes. It is even possible to define time delays and the conditions for transmitting or saving the images.

The file path, storage medium, and image names can also be defined.

One of the purposes of saving images is to support the user during the commissioning process by making it clear what the device is detecting. A further function of saving images is to help with device analysis in the event of a failed read operation (reading result: **No Read**). The stored images make it easy to identify potential causes of failure such as the deterioration of code markings.

## 230 Image Diagnosis Settings

The [Image Diagnosis Settings](#) group contains the parameters for outputting the images.

You can restrict the range of images that you want to be saved in accordance with your requirements. This means, for example, that you can just save images relating to unsuccessful read operations in order to investigate the potential causes.

## 231 Image file name

The [Image file name](#) parameter can be used to specify the name for the image files. The image files also contain a consecutive number and, if the [Good Read / No Read file prefix](#) parameter is activated, a name prefix is included as well (**Good Read** or **No Read**).

Assigning appropriate file names makes it possible to identify the image files clearly (e.g., by attributing them to a particular project/device).

## 232 Image filter

The [Image filter](#) group contains parameters for optimizing the camera image in the case of noise or special code markings.

## 233 Image quality

The [Image quality](#) parameter can be used to adjust the file size/quality (resolution) of the stored image files. This setting does not affect the reading speed of the sensor.

An xml file containing the [Codeinfo](#) data is stored for each image.

- Quality level 6 (maximum resolution): File size for full image region of interest 354 KB
- Quality level 5: File size for full image region of interest 90 KB
- Quality level 4: File size for full image region of interest 41 KB
- Quality level 3: File size for full image region of interest 24 KB
- Quality level 2: File size for full image region of interest 16 KB
- Quality level 1: File size for full image region of interest 12 KB

## 234 Image region of interest

The [Image region of interest](#) parameter allows you to focus the reading field on the relevant areas.

Reducing the size of the reading field makes the decoding time shorter and increases the frame rate. This enables faster object speeds to be achieved.



### NOTE

To change the size of the reading field, adjust the red marking by dragging and dropping or by entering the four % values.

## 235 Image rotation 180°

If the [Image rotation 180°](#) parameter is activated, the image is rotated 180° when it is captured.

Given that images are always processed from top to bottom, codes that are located toward the top of the image get detected earlier. Rotating the image 180° reduces the decoding time for codes that are not positioned centrally. This is particularly applicable when reading stationary objects.

## 236 Image selection

The [Image selection](#) parameter is used to select the images that are to be stored for each reading gate.

- **Last Good Read / Last image:** Following a successful code reading operation, the system stores the last image from which one or more codes have been read. If the code reading operation was unsuccessful, the most recently captured image is stored. (This is recommended for applications where the code does not move out of the reading gate during reading.)
- **First image:** The system stores the first image captured in each case. (This is recommended for applications where the code moves during reading and the code acts as a trigger, i.e., the first image already contains a code.)
- **Image sequence:** All captured images are stored as a sequence. (This is recommended for applications where the reading gate is opened by an object and the position of the code on the object is not precisely known.) Image sequences can be captured to carry out a triggering check and to verify the quality of the shots in the case of moving objects. The images are numbered in the top left-hand corner. If any image numbers are missing, it means that not all the shots could be decoded and so the settings (e.g., code settings) must be adjusted accordingly.

## 237 Image settings

The image brightness and contrast settings are made via the parameters in the [Image settings](#) group.

A good image that displays the code clearly is essential for a reliable reading. Optimization of the image settings results in better code identification and, in turn, increases the reliability of the reading.

## 238 Inactive

The [Inactive](#) parameter is used to select the event that leads to the digital output being deactivated.

- **Timer/Tracking:** The output is deactivated on expiry of a specific period ([Length](#)).
- **Next object trigger:** The output is deactivated as soon as the next reading gate opens.
- **SOPAS command:** The output can be deactivated via a command. This allows defined statuses to be displayed by a connected indicator lamp when a corresponding command is issued by the control (PLC).
- **Good Read:** The output is deactivated if the read operation was successful.
- **No Read:** The output is deactivated if the read operation was unsuccessful.
- **Teach-IN 1start:** The output is deactivated as soon as the **match code teach-in 1** teach-in process commences.
- **Teach-IN 2start:** The output is deactivated as soon as the **match code teach-in 2** teach-in process commences.
- **Match 1 condition:** The output is deactivated if the code that has been read corresponds to the **Match 1 condition** match code.
- **Multicodes1 condition:** The output is deactivated if the number of codes that have been read corresponds to the number specified by the **Multicodes1 condition**.
- **Teach-in1 condition:** The output is deactivated if the code that has been read corresponds to the **Teach-in1 condition** match code.
- **Teach-in2 condition:** The output is deactivated if the code that has been read corresponds to the **Teach-in2 condition** match code.

## 239 Increase of decoding robustness

The settings in the [Increase of decoding robustness](#) group are used to increase the readability of codes when the print quality is poor. However, these settings reduce the reading reliability.

## 240 Increase Performance

The parameters in the [Increase Performance](#) group can be used to ensure the readability of the codes at higher object speeds and/or to reduce the decoding time.

## 241 Increment

The [Increment](#) group contains parameters for converting distance and speed signals. The signals are either generated by the configuration software (SOPAS)/CAN interface or via an incremental encoder at the digital input. Incremental encoders are sensors for detecting positional changes (linear) or angle changes (rotating) that can capture the distance and direction or the angle change and direction of rotation. They are also known as rotary encoders, incremental rotary encoders, and rotary pulse encoders.

## 242 Increment Configuration

The [Increment Configuration](#) tab contains parameters for converting distance and speed signals.

The signals are either generated by the configuration software (SOPAS)/CAN interface or via an incremental encoder at the digital input. Incremental encoders are sensors for detecting positional changes (linear) or angle changes (rotating) that can capture the distance and direction or the angle change and direction of rotation. They are also known as rotary encoders, incremental rotary encoders, and rotary pulse encoders.

## 243 Increment source

The [Increment source](#) parameter is used to select the source of the incremental signals:

- **Fixed speed:** You can use the [Fixed speed](#) parameter to enter a constant value for the feed speed of the belt.
- **Sensor 1:** The incremental signals are expected from a rotary encoder connected at digital input 1. You configure the digital input using the parameters in the [Sensor / Input 1](#) group. The maximum input frequency at the input is 300 Hz.
- **Sensor 2:** The incremental signals are expected from a rotary encoder connected at digital input 2. You configure the digital input using the parameters in the [Sensor / Input 2](#) group. The maximum input frequency at the input is 300 Hz.
- **CAN:** The incremental signals are expected via the CAN interface.
- **SOPAS command:** Appropriate commands are expected to arrive as incremental signals. The commands can be generated by an external control (PLC), for example, and transmitted to the sensor at defined intervals.

## 244 Inhibit Time

The [Inhibit Time](#) parameter defines the interval that must elapse between the repeated transmission of process data objects (PDOs) in ms.

## 245 Internal

The [Internal](#) parameter is used to adjust the internal illumination of the sensor in line with the local lighting situation of the application.

- **Off:** If external illumination is used, the internal illumination can be deactivated.
- **Left / Red** (type-dependent): This illumination type permits the maximum contrast for codes in the wavelength spectrum between blue and green.
- **Right / Blue** (type-dependent): This illumination type offers the maximum contrast for codes in the wavelength spectrum between green and red, and can improve the reflective properties of codes on metal surfaces.
- **Both / Red + blue** (type-dependent): The combination of both illumination types offers the maximum contrast for black codes. The reading area is illuminated uniformly with increased light output. This setting is recommended for large reading distances and when the background color is unknown or subject to change.
- **Both / Infrared** (type-dependent): The advantage of the infrared illumination type is that the light is invisible to humans, meaning that no disruptive light sources are emitted by the device. The code contrast achieved by the illumination is dependent on the material properties and surface condition of the code and must be tested.



### NOTE

Some parameter values are not supported by all device types.

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By setting the internal illumination, you can achieve optimum illumination of the reading field and a higher read rate.

## 246 Internal memory (permanent)

If the [Internal memory \(permanent\)](#) parameter is activated, the results from the data source are written to the internal memory (permanent).

## 247 Internal memory (temporary)

If the [Internal memory \(temporary\)](#) parameter is activated, the results from the data source are written to the internal memory (temporary).

## 248 Internal memory (temporary)

If the [Internal memory \(temporary\)](#) parameter is activated, the captured images are stored in the sensor's internal memory. The stored images are deleted when the sensor is switched off.

The amount of internal memory available is 15 MB. This is enough to store approximately 40 images. The stored images can be transferred to the PC and deleted manually.

**Counter**

The **Counter** parameter is used to define the numbering for the stored images.

- **Cyclic no.:** The stored images are numbered consecutively up to a definable value (**Modulo**). As soon as this value is reached, the numbering recommences at 1, which results in existing images being overwritten. Likewise, when the device is restarted or the configuration is changed, the numbering starts again from 1. Cyclic numbering stores the images that were captured last.
- **Trigger no.:** The stored images are numbered consecutively. The number is increased by 1 as soon as the reading gate opens. When the device is restarted, the numbering starts again from 1. Once the memory is full, no more images can be stored. Trigger-based numbering stores the images that were captured first.

**249 Interval**

The minimum and maximum code length can be defined via the **Interval** parameter. Codes are only read if their length falls between these two values.

By defining a minimum and maximum code length, you can restrict the range of codes to be read. This can lead to a reduction in the decoding time.

**250 Invert condition**

A condition can be inverted using the **Invert condition** parameter. Inverting a condition allows all code content to be approved except the taught-in match code content.

With this function, it is possible to prevent a particular product from leaving the production line.

**251 Invert condition**

A condition can be inverted using the **Invert condition** parameter. Inverting a condition allows all code content to be approved except the taught-in match code content.

With this function, it is possible to prevent a particular product from leaving the production line.

**252 IP-Address**

The Ethernet address for the sensor is set manually via the **IP-Address** parameter. Before this can happen, a connection must be established with the sensor at the **Service employee** user level.

**NOTE**

The **IP-Address** and **Subnet mask** parameters can be changed via the connection wizard if the **Authorized customer** user level is accessed.

The Ethernet address must match the setting for the **Subnet mask** parameter and be adjusted in line with the network.

**253 IP port**

The **IP port** parameter can be used to adjust the port number for the Ethernet host interface (default value: 2112) in line with the connected PC or control (PLC).

## 254 ISO15415 (Data Matrix)

If the [ISO15415 \(Data Matrix\)](#) parameter is activated, the quality of the codes that are read is evaluated based on ISO/IEC 15415.

General notes on the standard:

The verification method is used to evaluate the code quality and readability universally and independently of the production process.

The ISO/IEC 15415 standard primarily only refers to Data Matrix codes that are printed on labels.

The device configuration, the intensity, and the aperture angle of the illumination should be implemented in accordance with the standard. The verifiers are calibrated in such a way that the code classification will always have the same result regardless of which verification device is used. This standard is therefore suitable for verifying that 2D codes, which need to be read by a wide variety of reading systems at any production site, are fit for purpose. The evaluation result is output either in levels from A to F or as a numerical value from 4 to 0.

## 255 ISO TR29158 / AIM DPM (Data Matrix)

If the [ISO TR29158 / AIM DPM \(Data Matrix\)](#) parameter is activated, the quality of the codes that are read is evaluated based on ISO TR29158/AIM DPM.

General notes on the standard:

The verification method is used to evaluate the code quality and readability universally and independently of the production process.

The ISO TR29158 and AIM DPM standards supplement the ISO/IEC 15415 standard and refer to Data Matrix codes that are printed on labels. The classification is performed using special verification devices known as verifiers.

DPM AIM takes into account the following evaluation criteria:

- Damage to fixed finder patterns
- Extension of modulation from ISO/IEC 15415
- Determination of the final result (grading)

The device configuration, the intensity, and the aperture angle of the illumination should be implemented in accordance with the standard. The verifiers are calibrated in such a way that the code classification will always have the same result regardless of which verification device is used. This standard is therefore suitable for verifying that 2D codes, which need to be read by a wide variety of reading systems at any production site, are fit for purpose. The evaluation result is output either in levels from A to F or as a numerical value from 4 to 0.

## 256 Italic Text

Activating the [Italic Text](#) parameter enables italic fonts to be read.

This parameter increases the quality and stability of the reading operation when italic font is used or text is at a slight angle.

## 257 Label Timeout

If the [Data transmission point](#) parameter is set to the value **As soon as possible**, the [Label Timeout](#) parameter can be used to define how much time must elapse before the data is output again. After this time, the data is output again, provided that the code is within the reading area.

The unit can be selected via the [Output delay](#) parameter.

## 258 Label timeout active

If the [Label timeout active](#) parameter is activated, you can define how much time has to elapse before an identical code may be output again.

## 259 Length

If the [Inactive](#) parameter is set to the **Timer/Tracking** condition, the [Length](#) parameter can be used to specify how long the digital output should remain activated. The unit can be selected via the [Control system](#) parameter.

## 260 Length

Codes with a defined number of characters can be excluded from the reading process via the parameters in the [Length](#) group.

Limiting the number of codes to be read reduces the decoding time.

### Code length

The [Code length](#) parameter can be used to restrict the number of characters allowed within a code.

- **Free:** Codes of any code length are read.
- **Interval:** The [Intervall](#) parameter can be used to define the minimum and maximum code length. Codes are only read if their length falls between these two values.
- **Fixed:** The [Feste Längen](#) parameter can be used to define several fixed code lengths. Codes are only read if they feature one of these defined code lengths.

### Interval

The [Interval](#) parameter can be used to define the minimum and maximum code length. Codes are only read if their length falls between these two values.

By defining a minimum and maximum code length, you can restrict the range of codes to be read. This can lead to a reduction in the decoding time.

### Fixed Codelengths

The [Feste Längen](#) parameter can be used to define several fixed code lengths. Codes are only read if they feature one of these defined code lengths.



### NOTE

By defining the specific code lengths that are permissible, you can restrict the range of codes to be read. This can lead to a reduction in the decoding time.

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**261 Length**

Codes with a defined number of rows and columns can be excluded from the reading process via the parameters in the [Length](#) group.

Limiting the number of codes to be read reduces the decoding time.

**262 Length**

If the [GS1 DataBar](#) parameter is activated, decoding is activated for the [DataBar 14](#), [DataBar Expanded](#), and [DataBar Limited](#) activated code types. (This requires the [GS1 DataBar](#) code type to be deactivated.)

**NOTE**

As only activated code types are processed, you can increase the processing speed by deactivating the code types that are not being used.

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**263 Length**

Codes with a defined number of characters can be excluded from the reading process via the parameters in the [Length](#) group.

Limiting the number of codes to be read reduces the decoding time.

**Code length**

The [Code length](#) parameter can be used to restrict the number of characters allowed within a code.

- **Free:** Codes of any code length are read.
- **Interval:** The [Intervall](#) parameter can be used to define the minimum and maximum code length. Codes are only read if their length falls between these two values.
- **Fixed:** The [Feste Längen](#) parameter can be used to define several fixed code lengths. Codes are only read if they feature one of these defined code lengths.

**Interval**

The [Interval](#) parameter can be used to define the minimum and maximum code length. Codes are only read if their length falls between these two values.

By defining a minimum and maximum code length, you can restrict the range of codes to be read. This can lead to a reduction in the decoding time.

**Fixed Codelengths**

The [Fixed Codelengths](#) parameter can be used to define several fixed code lengths. Codes are only read if they feature one of these defined code lengths.

**NOTE**

By defining the specific code lengths that are permissible, you can restrict the range of codes to be read. This can lead to a reduction in the decoding time.

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**264 Length**

[Length](#) (PHARMA)

## 265 Length

Codes with a defined number of characters can be excluded from the reading process via the parameters in the [Length](#) group.

Limiting the number of codes to be read reduces the decoding time.

### Code length

The [Code length](#) parameter can be used to restrict the number of characters allowed within a code.

- **Free:** Codes of any code length are read.
- **Interval:** The [Intervall](#) parameter can be used to define the minimum and maximum code length. Codes are only read if their length falls between these two values.
- **Fixed:** The [Feste Längen](#) parameter can be used to define several fixed code lengths. Codes are only read if they feature one of these defined code lengths.

### Interval

The [Interval](#) parameter can be used to define the minimum and maximum code length. Codes are only read if their length falls between these two values.

By defining a minimum and maximum code length, you can restrict the range of codes to be read. This can lead to a reduction in the decoding time.

### Fixed Codelengths

The [Feste Längen](#) parameter can be used to define several fixed code lengths. Codes are only read if they feature one of these defined code lengths.



### NOTE

By defining the specific code lengths that are permissible, you can restrict the range of codes to be read. This can lead to a reduction in the decoding time.

## 266 Length

Codes with a defined number of characters can be excluded from the reading process via the parameters in the [Length](#) group.

Limiting the number of codes to be read reduces the decoding time.

### Code length

The [Code length](#) parameter can be used to restrict the number of characters allowed within a code.

- **Free:** Codes of any code length are read.
- **Interval:** The [Intervall](#) parameter can be used to define the minimum and maximum code length. Codes are only read if their length falls between these two values.
- **Fixed:** The [Feste Längen](#) parameter can be used to define several fixed code lengths. Codes are only read if they feature one of these defined code lengths.

### Interval

The [Interval](#) parameter can be used to define the minimum and maximum code length. Codes are only read if their length falls between these two values.

By defining a minimum and maximum code length, you can restrict the range of codes to be read. This can lead to a reduction in the decoding time.

**Fixed Codelengths**

The [Feste Längen](#) parameter can be used to define several fixed code lengths. Codes are only read if they feature one of these defined code lengths.

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**NOTE**

By defining the specific code lengths that are permissible, you can restrict the range of codes to be read. This can lead to a reduction in the decoding time.

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**267 Length**

Codes with a defined number of rows and columns can be excluded from the reading process via the parameters in the [Length](#) group. Limiting the number of codes to be read reduces the decoding time.

**268 Length of Input-Data**

The length of the input data for the PLC or master is determined via the [Length of Input-Data](#) parameter.

**269 Length of Output-Data**

The length of the output data for the PLC or master is determined via the [Length of Output-Data](#) parameter.

**270 Line / Character Recognition**

The line and character recognition can be activated and configured in the [Line / Character Recognition](#) group.

The OCR algorithm first segments the lines in the image and then the individual characters in a line of plain text. The number of expected lines and characters must be specified for the algorithm process.

**271 Log File Diagnosis Settings**

Using the [Log File Diagnosis Settings](#) parameter, reading results from different interfaces can be written to the internal memory or the micro SD card.

This function enables the reading results to be recorded without an external PC so that they can be evaluated later.

**272 Logic**

The [Logic](#) parameter is used to select the polarity for the [Sensitivity](#) parameter.

- **Not inverted:** The digital input responds to a rising edge, i.e., to a switch from Low (0) to High (1), or to a High signal (1) that is permanently present.
- **Inverted:** The digital input responds to a falling signal edge, i.e., to a switch from High (1) to Low (0), or to a Low signal (0) that is permanently present.

## 273 Logic

The [Logic](#) parameter is used to select the polarity for the [Sensitivity](#) parameter.

- **Not inverted:** The digital input responds to a rising edge, i.e., to a switch from Low (0) to High (1), or to a High signal (1) that is permanently present.
- **Inverted:** The digital input responds to a falling signal edge, i.e., to a switch from High (1) to Low (0), or to a Low signal (0) that is permanently present.

## 274 MAC address

The [MAC address](#) display field shows a unique number for devices with an Ethernet interface. The sensor can be uniquely identified on the basis of this number.

## 275 Master / Slave

The [Master / Slave](#) group is used to configure the device as a node on a SICK network running in the master/slave operating mode. A maximum of 10 slaves can be connected to a master. The master sends the trigger signal to the slaves via the CAN bus at the start of the reading process. The slaves send the reading results to the master, which then sends the reading result in the configured output format to the PLC at the end of the reading process. The PLC only receives a No Read from the master to indicate an unsuccessful reading result if none of the slave devices have sent a successful reading result (Good Read) to the master.

A SICK network running in the master/slave operating mode is typically used to read objects that have the code attached to them in different positions. Several reading devices can be used to search for an available code on all sides of the object. The only reading transmitted by the master to the PLC is the one from the device with the successful reading result. The unsuccessful readings (No Reads) from the devices where no code was available are not sent to the PLC. This increases the processing speed of the control system.

### Wizard

Pressing the **Start wizard** button launches a dialog box for fully configuring the device as a node on a SICK network running in the master/slave operating mode. The wizard provides the parameters required for configuring the CAN interface, device network functions, output control, and object trigger control. The values you enter in the wizard are applied to the relevant parameter groups and tabs once configuration is complete.

## 276 Match code

The [Match code](#) tab contains the parameters for teaching in match codes (set codes). Codes read during operation are compared with the content of the match code. The correlation is displayed.



### NOTE

So that this can happen, the first step is to ensure that the prerequisites for a successful read operation are in place by checking that the parameters on the [Camera and Illumination](#) tab have been set correctly.



### NOTE

If a match code is to be activated after it has been taught in, the relevant condition must be selected for the [Condition for Good Read](#) parameter, for example. If the content of the codes that has been read does not match the active match code conditions, the read operation is classed as unsuccessful (**No Read**).

## 277 Match-code teach-in 1

The [Match-code teach-in 1](#) group contains the parameters for teaching in match code 1.



### NOTE

If a match code is to be activated after it has been taught in, the relevant condition must be selected for the [Condition for Good Read](#) parameter, for example.

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## 278 Match-code teach-in 2 (Additional)

The [Match-code teach-in 2 \(Additional\)](#) group contains the parameters for teaching in match code 2.



### NOTE

If a match code is to be activated after it has been taught in, the relevant condition must be selected for the [Condition for Good Read](#) parameter, for example.

---

## 279 Max. allowed Error Correction

The level of redundancy that may be used for decoding is specified as a percentage via the [Max. allowed Error Correction](#) parameter. With an error correction of 0%, no redundancy within the code is used for the read operation. Only good-quality codes that have been properly applied are read and identified. With an error correction of 100%, code detection is maximized by exploiting the redundancy within the code.

Setting the error correction parameter to a high value increases the read rate. Low values reduce the read rate but increase the quality of the reading results.

## 280 Max. Storage Space (MB)

The maximum amount of storage space reserved in the save destination for the log files can be specified under the [Max. Storage Space \(MB\)](#) parameter. If the specified maximum storage space is exceeded, the oldest log files are deleted.

## 281 Maximum

The [Maximum](#) parameter defines the maximum number of different codes that may be detected in order for a reading to be classed as "good" (**Good Read**). If the specified value is exceeded, the reading is deemed invalid (**No Read**).

In this context, the system counts all the codes that differ from other codes in terms of the code type, code length, code content, or code position.

## 282 Measuring Region

The measuring region for the brightness tuning is determined by changing the horizontal and vertical limits.

## 283 MicroSD card

If the [MicroSD card](#) parameter is activated, the captured images are stored permanently on the sensor's memory card.

This is only possible if a suitable memory card (MicroSD up to 32 GB, FAT file system) has been inserted in the sensor.

Memory cards provide an easy way of expanding the available storage space. The stored image files can be analyzed or undergo further processing on any PC.



### NOTE

Many MicroSD cards restrict the number of files per folder to a maximum of 10,000.

### Counter

The [Counter](#) parameter is used to define the numbering for the stored images.

- **Cyclic no.:** The stored images are numbered consecutively up to a definable value ([Modulo](#)). As soon as this value is reached, the numbering recommences at 1, which results in existing images being overwritten. Likewise, when the device is restarted or the configuration is changed, the numbering starts again from 1. Cyclic numbering stores the images that were captured last.
- **Trigger no.:** The stored images are numbered consecutively. The number is increased by 1 as soon as the reading gate opens. When the device is restarted, the numbering starts again from 1. Once the memory is full, no more images can be stored. Trigger-based numbering stores the images that were captured first.

### Modulo

The [Modulo](#) parameter defines the maximum value for the counter.

As soon as this value is reached, the numbering recommences at 1, which results in existing images being overwritten. In this way, you can restrict the maximum amount of memory required by the stored images.

## 284 MicroSD card

If the [MicroSD card](#) parameter is activated, the results from the data source are written to the micro SD card.

## 285 Minimum

The [Minimum](#) parameter defines the minimum number of different codes that must be detected in order for a reading to be classed as "good" (**Good Read**). If the specified value is not reached, the reading is deemed invalid (**No Read**).

In this context, the system counts all the codes that differ from other codes in terms of the code type, code length, code content, or code position.

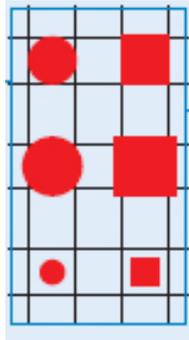
## 286 Minimum bar width

The smallest structure for decoding a code is defined in mm via the [Minimum bar width](#) parameter.

To optimize the decoding process, the value should be matched as precisely as possible to the smallest code element (module width) that actually exists within the code. An average module width must be specified so that codes with varying module widths can still be read reliably.

## 287 Minimum cell size

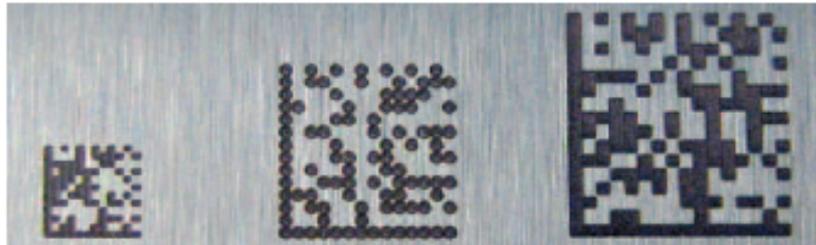
The smallest cell structure for decoding a code is defined in mm via the [Minimum cell size](#) parameter.



To optimize the decoding process, the value should be matched as precisely as possible to the smallest code element (cell size) that actually exists within the code. The cell size should be between 60% and 105% of the ideal cell size.



The very smallest cell size must be specified so that codes with varying cell sizes can still be read reliably.



## 288 Mode

The type of parameter switchover can be selected via the [Mode](#) parameter:

- **Automatic parameter switchover (APS):** Automatic switchover to an activated **APS / EPS** parameter set is carried out after a specified number of attempts, which is configured in the **Number of Attempts** parameter. One image is captured and decoded by the sensor per attempt. The activated parameter sets are used one after the other until the reading operation is successful. The next time a trigger is initiated, the sensor starts with the parameter set that was last successfully used for reading.
- **Event-based parameter switchover (EPS):** Switchover to an activated parameter set is carried out based on an external event, which is configured in the **EPS Source** parameter.

## 289 Mode

The [Mode](#) parameter is used to define whether the CAN interface should be used, and if so how.

- **Inactive:** Communication via the CAN interface is deactivated.
- **SICK network:** The device is integrated into a SICK network. On a SICK network, only SICK reading devices are networked via the CAN bus. This type of device group is used to scan an object from different perspectives and transmit the reading result to a host. As far as the host is concerned, the device group functions as an individual device.
- **CANopen:** The device is integrated into an unspecified CAN fieldbus system. The SICK reading device operates as a slave under a CANopen client (PLC) and can communicate with devices from other manufacturers.



### NOTE

The master/slave or multiplexer/server operating modes are available for the SICK network. The operating modes are configured on the [Network / Interface / IOs](#) tab.

## 290 Mode to send ReadResult

The [Mode to send ReadResult](#) parameter determines how the reading result is transmitted within the CANopen protocol.

- **With SDO:** The reading result is stored in the object directory in the configured output format. The reading device sends a process data object (PDO) with a status bit set to **data available** to indicate that reading results are available. A CANopen client, typically the PLC, can load the data via the service data object domain (SDO domain). Once the upload is complete, the CANopen client issues an enable signal for the reading results in the object directory.
- **With PDO:** The reading result is transmitted via several consecutive process data objects (PDOs). The configured reading result is restricted to 50 characters for this type of transmission. It is possible to configure the number of PDOs used for the transmission and the identifier of the first PDO sent. All other PDOs involved in data transmission use consecutive identifiers.
- **Deactivated:** No reading results are transferred.



### NOTE

The output format is configured on the [Output Format](#) tab under the [Data processing](#) folder.

## 291 Module width

The [Module width](#) parameter allows you to choose between an automatic module width or a user-defined one.

## 292 Modulo

The [Modulo](#) parameter defines the maximum value for the counter.

As soon as this value is reached, the numbering recommences at 1, which results in existing images being overwritten. In this way, you can restrict the maximum amount of memory required by the stored images.

## 293 Monitored Devices

The [Monitored Devices](#) parameter is used to specify the device IDs of the nodes that are to be monitored by the reading device. The device IDs are separated by commas.



### NOTE

The input field is highlighted in red if an invalid entry is made.

---

### Max. startup time for the monitored devices

The [Max. startup time for the monitored devices](#) parameter defines an interval in seconds for the startup time of the monitored devices. A node is considered available if the time gaps between the sent signals are within the specified interval.

## 294 Monitored ports

In the [Monitored ports](#) group, ports are activated for a TCP connection to the device to monitor the device's communication via the serial host or aux interface.



### NOTE

A TCP connection to the device is only possible if an output format is activated on the monitored interface. The output format is activated on the [Serial](#) tab.

---

The function is used to monitor the data exchange between PLC and device via serial interface at a terminal.

## 295 Monitoring

The CAN network monitoring function is activated and configured in the [Monitoring](#) group.

### assign to

The [assign to](#) parameter is used to activate or deactivate the CAN network monitoring function for the reading device.

- **Deactivated:** The device does not monitor any other reading devices.
- **CAN:** The reading device monitors other reading devices on the CAN bus. The device responsible for monitoring detects which nodes are available and which devices have dropped out.

## 296 Multiple Identical Codes Present

The robustness of the code reading operation can be further enhanced using the [Multiple Identical Codes Present](#) parameter if multiple codes with identical structures and content are present in the sensor's field of view.

As recommended by the SEMI PV29-0212 standard, multiple codes with identical structures and content are used to mark solar wafers. By activating this parameter, codes that are destroyed by the finger bars of the solar wafers can also be read.

## 297 Multiple Lines

If the [Multiple Lines](#) parameter is activated, the sensor can detect multiple lines of text.



### NOTE

If the device needs to detect multiple lines of text, this parameter must be activated.

---

## 298 Multiplexer / Server

The [Multiplexer / Server](#) group is used to configure the device as a node on a SICK network running in the multiplexer/server operating mode. A maximum of 31 devices can be connected to a multiplexer as servers. The servers receive trigger signals for starting and ending the reading process via their respective photoelectric switches, which are connected to the digital input (sensor 1). This allows them to be distributed at different positions throughout a system. The servers transmit the reading results to the multiplexer, which forwards them to the PLC in the configured output format along with the relevant server device IDs. As the servers have their own trigger sources and operate independently of each other, the reading results are processed and forwarded in the multiplexer in the same order that they arrive.

In the multiplexer/server operating mode, a SICK network of 32 reading devices can be managed without auxiliary devices. This operating mode is typically used in systems with a large number of distributed reading devices that function independently of each other.

### Wizard

Pressing the **Start wizard** button launches a dialog box for fully configuring the device as a node on a SICK network running in the multiplexer/server operating mode. The wizard provides the parameters required for configuring the CAN interface, device network functions, output format, output control, and object trigger control. The values you enter in the wizard are applied to the relevant parameter groups and tabs once configuration is complete.

## 299 Multiplexer Output

Data output can be switched on or off via the [Multiplexer Output](#) parameter.

## 300 Multiplexer Output

Data output can be switched on or off via the [Multiplexer Output](#) parameter.

## 301 Multiread

The [Multiread](#) parameter is used to define the minimum number of successful read operations (**Good Read**) required in order for the (**Good Read**) result to be output.

Defining a minimum number of read operations reduces the likelihood of codes being misinterpreted if the print quality is poor or the contrast is low. At the same time, it increases the reading reliability.

## 302 Multiread

The [Multiread](#) parameter is used to define the minimum number of successful read operations (**Good Read**) required in order for the (**Good Read**) result to be output.

Defining a minimum number of read operations reduces the likelihood of codes being misinterpreted if the print quality is poor or the contrast is low. At the same time, it increases the reading reliability.

## 303 Name

The [Name](#) parameter can be used to specify a device name as the folder name.

## 304 Network / Interface / IOs

Settings for using the CAN bus interface can be made on the [Network / Interface / IOs](#) tab. The CDF600 connection module provides SICK reading devices with a CAN interface that can be used as follows:

- The CAN interface is used to integrate the device into a SICK network. On a SICK network, only SICK reading devices are networked via the CAN bus. This type of device group is used to scan an object from different perspectives and transmit the reading result to a host. As far as the host is concerned, the device group functions as an individual device. The master/slave or multiplexer/server operating modes are available for the SICK network. Both operating modes can be combined.
- The reading device can be integrated into an unspecified CAN fieldbus system via CANopen. The SICK reading device operates as a slave under a CANopen client (PLC) and can communicate with devices from other manufacturers.

The [Network / Interface / IOs](#) folder in the project tree contains all the parameters for configuring and activating serial interfaces, fieldbus interfaces, digital inputs and outputs, and beepers.

## 305 Network Options

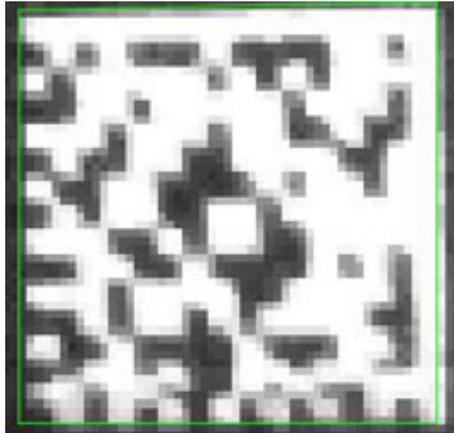
The [Network Options](#) group contains parameters for identifying the reading devices on the network.

### 306 Noise reduction

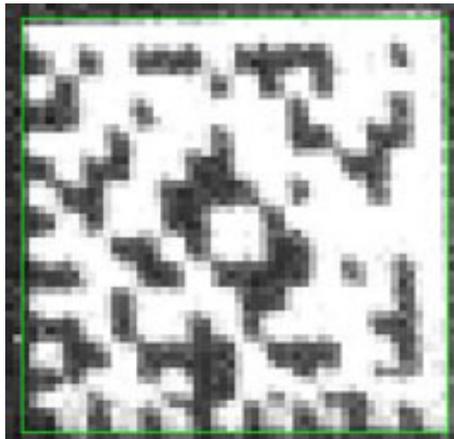
Image smoothing is switched on and off via the [Noise reduction](#) parameter to pick out the code clearly against the background.

Smoothing improves the reading properties, particularly if the image appears to be affected by noise due to a high level of amplification ([Brightness](#)) or if the code background is unstable.

#### Without noise



#### With noise



Various events can be selected as application counters.

### 308 Number of Attempts

Enter the maximum number of read attempts that are to be made with an activated parameter set in the event of an automatic parameter switchover under the [Number of Attempts](#) parameter.

### 309 Number of Images

The [Number of Images](#) parameter is used to set the number of images that are captured in **Individual images** capturing mode. The number of images captured depends on the reading gate length.

**310 Number of Lines Detected**

The [Number of Lines Detected](#) parameter outputs the number of lines that have been detected.

The value may change if the [Number of Lines Expected](#) parameter has been changed. If all the lines have been correctly identified in a stable manner, the values for the number of lines expected and detected will be the same.

**311 Number of Lines Expected**

The [Number of Lines Expected](#) parameter determines the number of lines in the image expected by the sensor.

The number of expected lines must be specified. The algorithm uses this value to optimize the search for lines of text.

**312 Number of mapped RPDO bytes**

The [Number of mapped RPDO bytes](#) parameter defines the scope of the receive process data objects (RPDOs) that can be received by the script program.

**313 Number of PDOs**

The [Number of PDOs](#) parameter is used to determine the number of process data objects (PDOs) that transmit the reading result.

When reading results are transmitted via PDOs, the reading result data is distributed across several PDOs. The PDOs are transmitted in sequence. The configured reading result is restricted to 50 characters for this type of transmission.

**314 Object Trigger Control**

The [Object Trigger Control](#) tab contains the parameters for opening and closing the reading gate.

**315 OCR**

If the [OCR](#) parameter is activated, optical character recognition is switched on in the sensor. The text must be taught in using the OCR Setup wizard.

**316 Online Image**

The most recently captured image is displayed in the main view of the [Online Image](#) group.

The display enables you to look at the images in detail and assess the quality of the shots. By modifying the configuration and comparing each of the images captured, you can optimize the reading properties and the position of the sensor.

**NOTE**

The reading results are displayed in the [Codeinfo](#) box.

---

So that the current contrast setting can be evaluated, the identified codes are displayed in different colors:

- Green (excellent): Contrast between 55% and 100%
- Yellow (good): Contrast between 20% and 55%
- Red (poor): Contrast less than 20%

## 317 Online Image

The captured images are displayed on the [Online Image](#) tab.

The display enables you to look at the images in detail and assess the quality of the shots. By modifying the configuration and comparing each of the images captured, you can optimize the reading properties and the position of the sensor.



### NOTE

The reading results are displayed in the [Codeinfo](#) box.

---

So that the current contrast setting can be evaluated, the identified codes are displayed in different colors:

- Green (excellent): Contrast between 55% and 100%
- Yellow (good): Contrast between 20% and 55%
- Red (poor): Contrast less than 20%

## 318 Operating Data

Various items of operating information are recorded for the device under [Operating Data](#).

- **Power-on counter:** Displays how many times the device has been switched on.
- **Operating hours:** Displays the total number of device operating hours.
- **Power-on time:** Displays the current number of operating hours since the last switch-on.

## 319 Operating Data

The [Operating Data](#) tab contains data relating to the device, operation, and service and maintenance.

## 320 Operating mode

The [Operating mode](#) parameter is used to select a data transmission mode.

- **Mode1: CMF standard format / Byte handshake / Digital IO:** In this transmission mode, telegram acknowledgment ensures that no telegrams are lost. This mode is recommended for high object frequencies and long telegrams.
- **Mode2: CMF standard format / No byte handshake / Digital IO:** In this transmission mode, no telegrams are acknowledged. It is possible to lose telegrams if the PLC cycle time is too slow. The mode should only be used for low object frequencies and short telegrams.
- **Mode3: BMV-compatible / No digital IO:** The mode is compatible with BMV/H10-0111. The mode should only be selected if it is necessary to replace a BMV/H.



### NOTE

Some parameter values are not supported by all device types.

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## 321 Operation

If you press the [Operation](#) button, the mode for setting up the sensor is stopped, and the operating mode of the sensor is activated in accordance with the current configuration.



### NOTE

[Bildverlauf](#) displays the captured images one after the other. The reading results are displayed in the [Codeinfo](#) box. The reading results for the last readings are combined in the display fields for the Statistics group.

So that the current contrast setting can be evaluated, the identified codes are displayed in different colors:

- Green (excellent): Contrast between 55% and 100%
- Yellow (good): Contrast between 20% and 55%
- Red (poor): Contrast less than 20%

## 322 or

The [or](#) parameter can be used to select a second signal source/condition for closing the reading gate.

In order for the reading gate to be closed, one of the signal sources/conditions must apply.

- **Not defined:** No function defined for closing the reading gate
- **Read cycle source:** The reading gate is closed by the same signal source that opened it (e.g., the reading gate opens as soon as an object trips a photoelectric switch and closes again as soon as the object is clear of the photoelectric switch).
- **Sensor / Input 1:** A signal at digital input 1 (e.g., from a photoelectric switch) causes the reading gate to close.
- **Sensor / Input 2:** A signal at digital input 2 (e.g., from a photoelectric switch) causes the reading gate to close.
- **External input 1:** A signal at external digital input 1 (e.g., from a photoelectric switch) causes the reading gate to close.
- **External input 2:** A signal at external digital input 2 (e.g., from a photoelectric switch) causes the reading gate to close.
- **SOPAS command:** A corresponding standard command for closing the reading gate is expected from a device such as an external control (PLC) (a detailed list of the commands can be obtained from SICK on request).
- **Timer / Distance:** The reading gate remains open for a defined time/distance ([Reading gate length](#)).
- **Good Read:** The reading gate closes as soon as the **Good Read** condition is met (e.g., the required number of codes has been read). This ensures that the reading gate is only kept open for as long as necessary (direct feedback).
- **User-defined command:** For the purpose of closing the reading gate, you can freely define a corresponding command that is generated by a device such as an external control (PLC) and transmitted to the sensor.
- **Match 1 condition:** The reading gate closes as soon as the condition is met.
- **Multicodes1 condition:** The reading gate closes as soon as the number of detected codes corresponds to the number specified.
- **Teach-in1 condition:** The reading gate closes as soon as the [Match-code teach-in 1](#) condition is met.
- **Teach-in2 condition:** The reading gate closes as soon as the [Match-code teach-in 2 \(Additional\)](#) condition is met.

## 323 or

The **or** parameter can be used to select a third signal source/condition for closing the reading gate.

In order for the reading gate to be closed, one of the signal sources/conditions must apply.

- **Not defined:** No function defined for closing the reading gate
- **Read cycle source:** The reading gate is closed by the same signal source that opened it (e.g., the reading gate opens as soon as an object trips a photoelectric switch and closes again as soon as the object is clear of the photoelectric switch).
- **Sensor / Input 1:** A signal at digital input 1 (e.g., from a photoelectric switch) causes the reading gate to close.
- **Sensor / Input 2:** A signal at digital input 2 (e.g., from a photoelectric switch) causes the reading gate to close.
- **External input 1:** A signal at external digital input 1 (e.g., from a photoelectric switch) causes the reading gate to close.
- **External input 2:** A signal at external digital input 2 (e.g., from a photoelectric switch) causes the reading gate to close.
- **SOPAS command:** A corresponding standard command for closing the reading gate is expected from a device such as an external control (PLC) (a detailed list of the commands can be obtained from SICK on request).
- **Timer / Distance:** The reading gate remains open for a defined time/distance ([Reading gate length](#)).
- **Good Read:** The reading gate closes as soon as the **Good Read** condition is met (e.g., the required number of codes has been read). This ensures that the reading gate is only kept open for as long as necessary (direct feedback).
- **User-defined command:** For the purpose of closing the reading gate, you can freely define a corresponding command that is generated by a device such as an external control (PLC) and transmitted to the sensor.
- **Match 1 condition:** The reading gate closes as soon as the condition is met.
- **Multicodes1 condition:** The reading gate closes as soon as the number of detected codes corresponds to the number specified.
- **Teach-in1 condition:** The reading gate closes as soon as the [Match-code teach-in 1](#) condition is met.
- **Teach-in2 condition:** The reading gate closes as soon as the [Match-code teach-in 2 \(Additional\)](#) condition is met.

## 324 or

The **or** parameter can be used to select a second condition for deactivating the digital output.

In order for the digital output to be deactivated, one of the conditions must be met.

- ---: No second condition selected
- **Match 1 condition:** The output is deactivated if the code that has been read corresponds to the **Match 1 condition** match code.
- **Multicodes1 condition:** The output is deactivated if the number of codes that have been read corresponds to the number specified by the **Multicodes1 condition**.
- **Teach-in1 condition:** The output is deactivated if the code that has been read corresponds to the **Teach-in1 condition** match code.
- **Teach-in2 condition:** The output is deactivated if the code that has been read corresponds to the **Teach-in2 condition** match code.

**325 or Teach-in via function buttons**

If the [or Teach-in via function buttons](#) parameter is activated, the match code teach-in process can also be started by pressing the pushbuttons on the sensor. In this case, no [Activate teach-in mode](#) signal is required to prepare for the teach-in process.

**326 Output / Result 1**

The [Output / Result 1](#) group contains the parameters for adjusting digital output 1.

**327 Output / Result 2**

The [Output / Result 2](#) group contains the parameters for adjusting digital output 2.

**Active**

The [Active](#) parameter is used to select the event that activates the digital output.

- **SOPAS command:** The output can be activated via a command. This allows defined statuses to be displayed by a connected indicator lamp when a corresponding command is issued by the control (PLC).
- **Device Ready:** The output is activated as soon as the sensor is ready for use.
- **Good Read:** The output is activated if the read operation was successful.
- **No Read:** The output is activated if the read operation was unsuccessful.
- **Teach-IN 1 OK:** The output is activated if the **match code teach-in 1** has been successfully taught in.
- **Teach-IN 1 NOK:** The output is activated if the **match code teach-in 1** could not be successfully taught in.
- **Teach-IN 2 OK:** The output is activated if the **match code teach-in 2** has been successfully taught in.
- **Teach-IN 2 NOK:** The output is activated if the **match code teach-in 2** could not be successfully taught in.
- **External illumination:** External lighting is connected to the output and can be switched on and off by the device.
- **Match 1 condition:** The output is activated if the code that has been read corresponds to the **Match 1 condition** match code.
- **Multicodes1 condition:** The output is activated if the number of codes that have been read corresponds to the number specified by the **Multicodes1 condition**.
- **Teach-in1 condition:** The output is activated if the code that has been read corresponds to the **Teach-in1 condition** match code.
- **Teach-in2 condition:** The output is activated if the code that has been read corresponds to the **Teach-in2 condition** match code.

**NOTE**

The behavior of the external illumination and the switch type are set under [Illumination](#).

---

### Inactive

The **Inactive** parameter is used to select the event that leads to the digital output being deactivated.

- **Timer/Tracking:** The output is deactivated on expiry of a specific period (**Length**).
- **Next object trigger:** The output is deactivated as soon as the next reading gate opens.
- **SOPAS command:** The output can be deactivated via a command. This allows defined statuses to be displayed by a connected indicator lamp when a corresponding command is issued by the control (PLC).
- **Good Read:** The output is deactivated if the read operation was successful.
- **No Read:** The output is deactivated if the read operation was unsuccessful.
- **Teach-IN 1start:** The output is deactivated as soon as the **match code teach-in 1** teach-in process commences.
- **Teach-IN 2start:** The output is deactivated as soon as the **match code teach-in 2** teach-in process commences.
- **Match 1 condition:** The output is deactivated if the code that has been read corresponds to the **Match 1 condition** match code.
- **Multicodes1 condition:** The output is deactivated if the number of codes that have been read corresponds to the number specified by the **Multicodes1 condition**.
- **Teach-in1 condition:** The output is deactivated if the code that has been read corresponds to the **Teach-in1 condition** match code.
- **Teach-in2 condition:** The output is deactivated if the code that has been read corresponds to the **Teach-in2 condition** match code.

### or

The **or** parameter can be used to select a second condition for deactivating the digital output.

In order for the digital output to be deactivated, one of the conditions must be met.

- **---**: No second condition selected
- **Match 1 condition:** The output is deactivated if the code that has been read corresponds to the **Match 1 condition** match code.
- **Multicodes1 condition:** The output is deactivated if the number of codes that have been read corresponds to the number specified by the **Multicodes1 condition**.
- **Teach-in1 condition:** The output is deactivated if the code that has been read corresponds to the **Teach-in1 condition** match code.
- **Teach-in2 condition:** The output is deactivated if the code that has been read corresponds to the **Teach-in2 condition** match code.

### Logic

The **Logik** parameter is used to select the polarity of the digital output.

- **Not inverted:** If this option is activated, the digital output switches from Low (0) to High (1).
- **Inverted:** If this option is activated, the digital output switches from High (1) to Low (0).

### Control system

The **Control system** parameter allows you to choose between a configuration based on length units and a configuration based on time units.

- **Distance-controlled:** The values for the **Länge** parameter are entered in mm.
- **Time-controlled:** The values for the **Länge** parameter are entered in ms.

### Length

If the [Inactive](#) parameter is set to the **Timer/Tracking** condition, the [Length](#) parameter can be used to specify how long the digital output should remain activated. The unit can be selected via the [Control system](#) parameter.

## 328 Output / Result 3

The [Output / Result 3](#) group contains the parameters for adjusting digital output 3.



### NOTE

Digital outputs 3 and 4 are not available via the 15-pin D-Sub port on the CDB620 or CDM420 connection module. They can only be utilized if a 17-pin open-ended cable is used.

---

### Active

The [Active](#) parameter is used to select the event that activates the digital output.

- **SOPAS command:** The output can be activated via a command. This allows defined statuses to be displayed by a connected indicator lamp when a corresponding command is issued by the control (PLC).
- **Device Ready:** The output is activated as soon as the sensor is ready for use.
- **Good Read:** The output is activated if the read operation was successful.
- **No Read:** The output is activated if the read operation was unsuccessful.
- **Teach-IN 1 OK:** The output is activated if the **match code teach-in 1** has been successfully taught in.
- **Teach-IN 1 NOK:** The output is activated if the **match code teach-in 1** could not be successfully taught in.
- **Teach-IN 2 OK:** The output is activated if the **match code teach-in 2** has been successfully taught in.
- **Teach-IN 2 NOK:** The output is activated if the **match code teach-in 2** could not be successfully taught in.
- **External illumination:** External lighting is connected to the output and can be switched on and off by the device.
- **Match 1 condition:** The output is activated if the code that has been read corresponds to the **Match 1 condition** match code.
- **Multicodes1 condition:** The output is activated if the number of codes that have been read corresponds to the number specified by the **Multicodes1 condition**.
- **Teach-in1 condition:** The output is activated if the code that has been read corresponds to the **Teach-in1 condition** match code.
- **Teach-in2 condition:** The output is activated if the code that has been read corresponds to the **Teach-in2 condition** match code.

## Inactive

The **Inactive** parameter is used to select the event that leads to the digital output being deactivated.

- **Timer/Tracking:** The output is deactivated on expiry of a specific period (**Length**).
- **Next object trigger:** The output is deactivated as soon as the next reading gate opens.
- **SOPAS command:** The output can be deactivated via a command. This allows defined statuses to be displayed by a connected indicator lamp when a corresponding command is issued by the control (PLC).
- **Good Read:** The output is deactivated if the read operation was successful.
- **No Read:** The output is deactivated if the read operation was unsuccessful.
- **Teach-IN 1start:** The output is deactivated as soon as the **match code teach-in 1** teach-in process commences.
- **Teach-IN 2start:** The output is deactivated as soon as the **match code teach-in 2** teach-in process commences.
- **Match 1 condition:** The output is deactivated if the code that has been read corresponds to the **Match 1 condition** match code.
- **Multicodes1 condition:** The output is deactivated if the number of codes that have been read corresponds to the number specified by the **Multicodes1 condition**.
- **Teach-in1 condition:** The output is deactivated if the code that has been read corresponds to the **Teach-in1 condition** match code.
- **Teach-in2 condition:** The output is deactivated if the code that has been read corresponds to the **Teach-in2 condition** match code.

## or

The **or** parameter can be used to select a second condition for deactivating the digital output.

In order for the digital output to be deactivated, one of the conditions must be met.

- **---**: No second condition selected
- **Match 1 condition:** The output is deactivated if the code that has been read corresponds to the **Match 1 condition** match code.
- **Multicodes1 condition:** The output is deactivated if the number of codes that have been read corresponds to the number specified by the **Multicodes1 condition**.
- **Teach-in1 condition:** The output is deactivated if the code that has been read corresponds to the **Teach-in1 condition** match code.
- **Teach-in2 condition:** The output is deactivated if the code that has been read corresponds to the **Teach-in2 condition** match code.

## Logic

The **Logic** parameter is used to select the polarity of the digital output.

- **Not inverted:** If this option is activated, the digital output switches from Low (0) to High (1).
- **Inverted:** If this option is activated, the digital output switches from High (1) to Low (0).

## Control system

The **Control system** parameter allows you to choose between a configuration based on length units and a configuration based on time units.

- **Distance-controlled:** The values for the **Length** parameter are entered in mm.
- **Time-controlled:** The values for the **Length** parameter are entered in ms.

### Length

If the [Inactive](#) parameter is set to the **Timer/Tracking** condition, the [Length](#) parameter can be used to specify how long the digital output should remain activated. The unit can be selected via the [Control system](#) parameter.

## 329 Output / Result 4

The [Output / Result 4](#) group contains the parameters for adjusting digital output 4.



### NOTE

Digital outputs 3 and 4 are not available via the 15-pin D-Sub port on the CDB620 or CDM420 connection module. They can only be utilized if a 17-pin open-ended cable is used.

---

### Active

The [Active](#) parameter is used to select the event that activates the digital output.

- **SOPAS command:** The output can be activated via a command. This allows defined statuses to be displayed by a connected indicator lamp when a corresponding command is issued by the control (PLC).
- **Device Ready:** The output is activated as soon as the sensor is ready for use.
- **Good Read:** The output is activated if the read operation was successful.
- **No Read:** The output is activated if the read operation was unsuccessful.
- **Teach-IN 1 OK:** The output is activated if the **match code teach-in 1** has been successfully taught in.
- **Teach-IN 1 NOK:** The output is activated if the **match code teach-in 1** could not be successfully taught in.
- **Teach-IN 2 OK:** The output is activated if the **match code teach-in 2** has been successfully taught in.
- **Teach-IN 2 NOK:** The output is activated if the **match code teach-in 2** could not be successfully taught in.
- **Match 1 condition:** The output is activated if the code that has been read corresponds to the **Match 1 condition** match code.
- **Multicodes1 condition:** The output is activated if the number of codes that have been read corresponds to the number specified by the **Multicodes1 condition**.
- **Teach-in1 condition:** The output is activated if the code that has been read corresponds to the **Teach-in1 condition** match code.
- **Teach-in2 condition:** The output is activated if the code that has been read corresponds to the **Teach-in2 condition** match code.

## Inactive

The **Inactive** parameter is used to select the event that leads to the digital output being deactivated.

- **Timer/Tracking:** The output is deactivated on expiry of a specific period (see "Length", page 83).
- **Next object trigger:** The output is deactivated as soon as the next reading gate opens.
- **SOPAS command:** The output can be deactivated via a command. This allows defined statuses to be displayed by a connected indicator lamp when a corresponding command is issued by the control (PLC).
- **Good Read:** The output is deactivated if the read operation was successful.
- **No Read:** The output is deactivated if the read operation was unsuccessful.
- **Teach-IN 1start:** The output is deactivated as soon as the **match code teach-in 1** teach-in process commences.
- **Teach-IN 2start:** The output is deactivated as soon as the **match code teach-in 2** teach-in process commences.
- **Match 1 condition:** The output is deactivated if the code that has been read corresponds to the **Match 1 condition** match code.
- **Multicodes1 condition:** The output is deactivated if the number of codes that have been read corresponds to the number specified by the **Multicodes1 condition**.
- **Teach-in1 condition:** The output is deactivated if the code that has been read corresponds to the **Teach-in1 condition** match code.
- **Teach-in2 condition:** The output is deactivated if the code that has been read corresponds to the **Teach-in2 condition** match code.

## or

The **or** parameter can be used to select a second condition for deactivating the digital output.

In order for the digital output to be deactivated, one of the conditions must be met.

- **---**: No second condition selected
- **Match 1 condition:** The output is deactivated if the code that has been read corresponds to the **Match 1 condition** match code.
- **Multicodes1 condition:** The output is deactivated if the number of codes that have been read corresponds to the number specified by the **Multicodes1 condition**.
- **Teach-in1 condition:** The output is deactivated if the code that has been read corresponds to the **Teach-in1 condition** match code.
- **Teach-in2 condition:** The output is deactivated if the code that has been read corresponds to the **Teach-in2 condition** match code.

## Logic

The **Logic** parameter is used to select the polarity of the digital output.

- **Not inverted:** If this option is activated, the digital output switches from Low (0) to High (1).
- **Inverted:** If this option is activated, the digital output switches from High (1) to Low (0).

## Control system

The **Control system** parameter allows you to choose between a configuration based on length units and a configuration based on time units.

- **Distance-controlled:** The values for the **Länge** parameter are entered in mm.
- **Time-controlled:** The values for the **Länge** parameter are entered in ms.

**Length**

If the [Inactive](#) parameter is set to the **Timer/Tracking** condition, the [Length](#) parameter can be used to specify how long the digital output should remain activated. The unit can be selected via the [Control system](#) parameter.

**330 Output Condition**

If the [Data transmission point](#) parameter is set to the value **As soon as possible**, the [Output Condition](#) parameter can be used to select the data output condition.

- **Good Read:** The reading results are output if the read operation was successful.
- **Match1 condition:** The reading results are output if the code that has been read corresponds to the **Match1 condition** match code.
- **Multicodes1 condition:** The reading results are output if the number of codes that have been read corresponds to the number specified by the **Multicodes1 condition**.
- **Teach-in1 condition:** The reading results are output if the code that has been read corresponds to the **Teach-in1 condition** match code.
- **Teach-in2 condition:** The reading results are output if the code that has been read corresponds to the **Teach-in2 condition** match code.

**331 Output Control**

The [Output Control](#) tab contains the parameters used to determine the timings for outputting the [Output Format 1](#) and [Output Format 2](#) data.

**332 Output Control**

The [Output Control](#) group contains the parameters used to determine the timings for outputting the [Output Format 1](#) and [Output Format 2](#) data.

**Control system**

- **Distance-controlled:** If a distance-controlled delay is set, the reading gate only opens once the object has continued traveling for a predefined distance after the trigger signal is issued.
- **Time-controlled:** If a time-controlled delay is set, the reading gate only opens once a predefined time has elapsed after the trigger signal is issued.

**333 Output delay**

The [Output delay](#) parameter allows you to choose between a configuration based on length units and a configuration based on time units for the [Delay](#), [Label Timeout](#), [Condition Timeout](#), and [Timeout](#) parameters.

- **Distance-controlled:** The parameter values are entered in mm.
- **Time-controlled:** The parameter values are entered in ms.

## 334 Output Format 1

The format of the data string for outputting the reading results is defined on the graphical interface of the [Output Format 1](#) group. A total of two different formats ([Output Format 1](#) and [Output Format 2](#)) can be defined. During configuration of the interfaces, either of the two output formats can be assigned.

The output format is graphically displayed and can contain conditions, special characters (orange), variables (blue), or free text. To customize the output format, select the required insertion position with the mouse. Use the keyboard or special buttons to make your entries:

You can use the  button or the context menu (right mouse button) to insert conditions, special characters (e.g., start and stop), or variables, for example, for the reading results.

You can use the  button to modify the properties of a condition. For each condition, you can define which data should be output if the condition is met. You can also define data in case the condition is not met. Conditions can be interleaved.

To check the output format, you can display the reading results on the terminal. To do this, open the terminal using the relevant  button in the toolbar and establish a connection with the device (**Connection** menu on the terminal). For each trigger (reading gate), a data string is transferred and displayed on the terminal.

## 335 Output Format

The format of the data strings for outputting the reading results are defined on the [Output Format](#) tab.

The flexibility of the output format allows additional information to be added relating to the code and its position, the reading gate, and the individual reading results.

## 336 Output Format 2

The format of the data string for outputting the reading results is defined on the graphical interface of the [Output Format 2](#) group. A total of two different formats ([Output Format 1](#) and [Output Format 2](#)) can be defined. During configuration of the interfaces, either of the two output formats can be assigned.

The output format is graphically displayed and can contain conditions, special characters (orange), variables (blue), or free text. To customize the output format, select the required insertion position with the mouse. Use the keyboard or special buttons to make your entries:

You can use the  button or the context menu (right mouse button) to insert conditions, special characters (e.g., start and stop), or variables, for example, for the reading results.

You can use the  button to modify the properties of a condition. For each condition, you can define which data should be output if the condition is met. You can also define data in case the condition is not met. Conditions can be interleaved.

To check the output format, you can display the reading results on the terminal. To do this, open the terminal using the relevant  button in the toolbar and establish a connection with the device (**Connection** menu on the terminal). For each trigger (reading gate), a data string is transferred and displayed on the terminal.

## 337 Output Format

An output format is assigned to the interface via the [Output Format](#) parameter.



### NOTE

Output formats are defined under [Data processing](#).

### Enable heartbeat

If the [Enable heartbeat](#) parameter is activated, what happens at regular intervals ([Heartbeat-Intervall](#)) is that a signal is output via the interface. In this way, the availability of the reading device can be checked via the interface.

### Heartbeat interval

The [Heartbeat interval](#) parameter is used to define the time between the heartbeat signals in seconds.

### Restart interval on sending

If the [Restart interval on sending](#) parameter is activated, the time between the heartbeat signals starts again after the reading results have been output.

### 338 Output Format

The output format for the interface is selected via the [Output Format](#) parameter.

- **No output:** No data is output via this interface.
- **Output Format 1:** Data that is output via this interface is formatted in line with the configuration in the [Output Format 1](#) group.
- **Output Format 2:** Data that is output via this interface is formatted in line with the configuration in the [Output Format 2](#) group.
- **Customer output format:** Via this interface, data is output in a customer-specific format. The formatting is defined using the [with number](#) parameter.

### 339 Output Format

An output format for the SICK Visualization Platform data is specified under the [Output Format](#) parameter.

The output format is set under the [Data Processing](#) tab.

### 340 Output Hex-ASCII

If the [Output Hex-ASCII](#) parameter is activated, every code character is output as a hexadecimal value. If hexadecimal output has been deactivated via the parameter, the code content is output directly as ASCII characters. If an ASCII code is output containing control characters, these are replaced by the @ character to avoid conflicts with the protocol framework.

Converting the code content into hexadecimal values enables all characters – including control characters – to be output.

### 341 Parameter

Settings for protecting the configuration can be made on the [Parameter](#) tab.

The [Parameter](#) folder in the project tree brings together all the available parameters in one location.

### 342 Parameterization is password-protected

If this parameter is activated, access to the device configuration is password protected. Before you can change any parameters, you must log in to the device at the user level of authorized customer or higher. You can use the SOPAS options (which are located outside of the device configuration) without logging in. Password protection is activated the next time the device is restarted.

### 343 Password

A password for the FTP image transfer to the SICK Visualization Platform is specified under the [Password](#) parameter.

### 344 Pause

If the [Start by](#) parameter is set to the [Autocycle](#) signal source, the [Pause](#) parameter can be used to specify how long the reading gate should remain closed. The unit can be selected via the [Trigger delay](#) parameter.

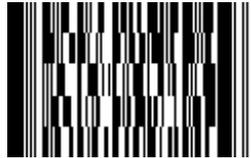
**345 PDF 417**

If the [PDF 417](#) parameter is activated, decoding is activated for the corresponding code type. The configuration tab for the corresponding code type can be seen and opened in SOPAS ET.

**NOTE**

As only activated code types are processed, you can increase the processing speed by deactivating the code types that are not being used.

---



- Code name: [PDF 417](#)
- Character set: 2,710 numeric, 1,850 alphanumeric, 1,400 ASCII, or 1,108 ISO characters
- Symbol size: 3 to 90
- Intrinsic safety: Very high (error correction)
- Spatial requirements: Very low
- Standard: ISO/IEC 15438
- Areas of application: Parcel and postal service

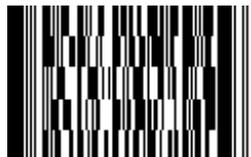
**346 PDF 417**

If the [PDF 417](#) parameter is activated, decoding is activated for the corresponding code type. The configuration tab for the corresponding code type can be seen and opened in SOPAS ET.

**NOTE**

As only activated code types are processed, you can increase the processing speed by deactivating the code types that are not being used.

---



- Code name: [PDF 417](#)
- Character set: 2,710 numeric, 1,850 alphanumeric, 1,400 ASCII, or 1,108 ISO characters
- Symbol size: 3 to 90
- Intrinsic safety: Very high (error correction)
- Spatial requirements: Very low
- Standard: ISO/IEC 15438
- Areas of application: Parcel and postal service

## 347 Pharmacode

If the [Pharmacode](#) parameter is activated, decoding is activated for the corresponding code type. The configuration tab for the corresponding code type can be seen and opened in SOPAS ET.



### NOTE

All other code types are deactivated.



- Code name: [Pharmacode](#) (binary)
- Character set: Numeric characters (integers between 3 and 131,070)
- Structure: Wide bars: 1, narrow bars: 0 (main code and additional code can be different colors)
- Intrinsic safety: High
- Spatial requirements: Low
- Standard: Laetus bar code standard
- Areas of application: Packaging checks in the pharmaceutical industry (must match a reference code in a code list)

## 348 Pharmacode

If the [Pharmacode](#) parameter is activated, decoding is activated for the corresponding code type. The configuration tab for the corresponding code type can be seen and opened in SOPAS ET.



### NOTE

All other code types are deactivated.



- Code name: [Pharmacode](#) (binary)
- Character set: Numeric characters (integers between 3 and 131,070)
- Structure: Wide bars: 1, narrow bars: 0 (main code and additional code can be different colors)
- Intrinsic safety: High
- Spatial requirements: Low
- Standard: Laetus bar code standard
- Areas of application: Packaging checks in the pharmaceutical industry (must match a reference code in a code list)

## 349 Port

The port of the SVP server to which the data is to be sent is specified under the [Port](#) parameter. The default setting for the port is 2008.

**350 Port**

The **Port** parameter is used to set the port for establishing the connection to the time server.

**351 Port**

The port of the image server to which the images for the SICK Visualization Platform are to be sent is specified under the **Port** parameter.

**352 Position**

The coordinates and angles of the sensor above the conveying system are defined on the **Position** tab. In the application, this means that objects can be clearly assigned, a defined position can be output, and the objects can be aligned in relation to the reading point.

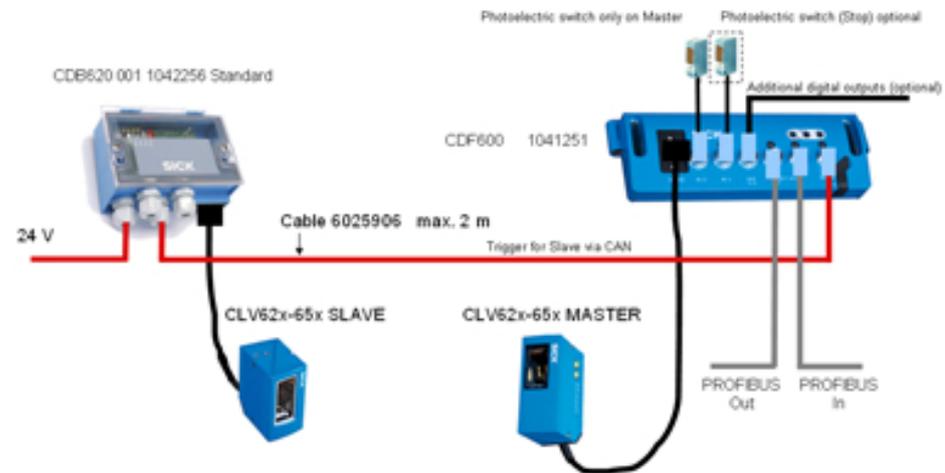
**353 PROFIBUS DP-Gateway**

The **PROFIBUS DP-Gateway** group contains the parameters for the Profibus settings.

**354 Profibus Proxy CDF600**

The **Profibus Proxy CDF600** group contains the parameters for establishing a connection between the reading device and the CDF600 Profibus proxy.

A typical cable layout when using the CDF600 is shown below.



**355 Protocol / Output Format**

An output format is assigned to the interface via the **Protocol / Output Format** parameter. Output formats are defined under **Data Processing**.

**Assembly size output on the PLC**

The **Assembly Größe Output an der SPS** parameter identifies the size of the incoming telegrams from the PLC in bytes. Values can be specified between 8 and 500 bytes.

### Assembly size input on the PLC

The [Assembly size input on the PLC](#) parameter identifies the size of the outgoing telegrams to the PLC in bytes. Values can be specified between 8 and 500 bytes.

## 356 Pulse

If the [Start by](#) parameter is set to the **Autocycle** signal source, the [Pulse](#) parameter can be used to specify how long the reading gate should remain open. The unit can be selected via the [Trigger delay](#) parameter.

## 357 RDT ID

### RDT ID

#### Enable heartbeat

If the [Enable heartbeat](#) parameter is activated, what happens at regular intervals ([Heartbeat-Intervall](#)) is that a signal is output via the interface. In this way, the availability of the sensor can be checked via the interface.

#### Heartbeat interval

The [Heartbeat interval](#) parameter is used to define the time between the heartbeat signals in seconds.

#### Restart interval on sending

If the [Neustart des Intervalls beim Senden](#) parameter is activated, the time between the heartbeat signals starts again after the reading results have been output.

## 358 Reading distance

The distance between the sensor and the object is set via the parameters in the [see "Reading distance", page 113](#) group. The reading distance is used to adapt the focal range of the sensor to the mounting location.

The value can be entered manually in mm or set automatically via the [Auto](#) button.



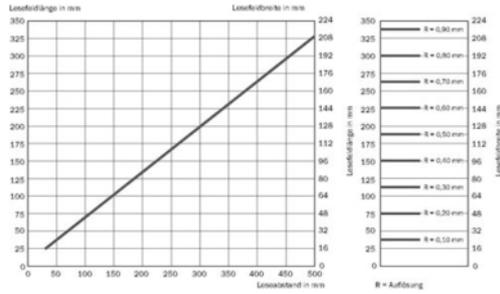
### NOTE

To avoid disruptive reflections on the object surface, the sensor should be mounted on a suitable mounting bracket (see mounting information).

### The reading distance affects the minimum code resolution and the size of the reading field:

- If the reading distance is small, smaller codes can be read.
- A larger reading distance increases the reading field. The resulting reduction in image brightness is compensated by means of the brightness control and, if necessary, by increasing the shutter time.

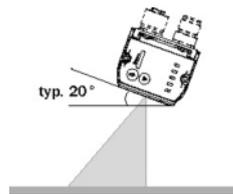
Reference values for reading distance - reading field size - resolution



Maximum reading distance with minimum resolution

Max. Lesesabstand	Minimale Auflösung
50 mm	0,10 mm
80 mm	0,15 mm
110 mm	0,20 mm
135 mm	0,25 mm
165 mm	0,30 mm
280 mm	0,50 mm
430 mm	0,75 mm

Skew angle, depending on the application



The sensor should typically be tilted by 20° out of plumb to the surface of the code to avoid disruptive reflections.

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

359 Reading distance

The **Reading distance** parameter sets the distance between the sensor and the object. The reading distance is used to adapt the focal range of the sensor to the mounting location.

The value can be entered manually in mm or set automatically via the **Auto** button.



**NOTE**

To avoid disruptive reflections on the object surface, the sensor should be mounted on a suitable mounting bracket (see mounting information).

**The reading distance affects the minimum code resolution and the size of the reading field:**

- If the reading distance is small, smaller codes can be read.
- A larger reading distance increases the reading field. The resulting reduction in image brightness is compensated by means of the brightness control and, if necessary, by increasing the shutter time.

## 360 Reading field / scan frequency

The [Reading field / scan frequency](#) tab displays reading field diagrams and scan frequency diagrams.

The diagrams are important for the application design and support the correct alignment and assembly of the device.

## 361 Reading gate length

If the [Stop by](#) parameter is set to the [Timer / Distance](#) signal source, the [Reading gate length](#) parameter can be used to specify how long the reading gate should remain open. The unit can be selected via the [Trigger delay](#) parameter.

## 362 Reading gate off

The reading gate can be closed manually by pressing the [Reading gate off](#) button.

This allows you to terminate the reading process even if the condition configured for closing the reading gate automatically has not been met.



### NOTE

This function is ideal for testing the operating mode and simulating a machine trigger with a click of the mouse.

---

## 363 Reading gate on

The reading gate can be opened manually by pressing the [Reading gate on](#) button.

All the outputs, the output strings, and the image transmission process behave in accordance with the configuration so that the current settings can be tested. The reading gate is closed in accordance with the configuration.



### NOTE

This function is ideal for testing the operating mode and simulating a machine trigger with a click of the mouse.

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## 364 Reduction of decoding time

The decoding time is adapted to, and optimized for, the local application via the parameters in the [Reduction of decoding time](#) group.

## 365 Reset counter values

Pressing the [Reset counter values](#) button resets all counters.

To reset the permanent flash memory in addition to this, you must also press the [Store current counter values now](#) button.

## 366 Restart interval on sending

If the [Restart interval on sending](#) parameter is activated, the time between the heart-beat signals starts running again once the reading results have been output.

**367 Reverse**

If the [Reverse](#) parameter is activated, the code is read backwards (in reverse).

Given that codes based on the [Pharmacode](#) symbology do not have any start or stop characters and do not include a check digit at the end, the code content varies according to the direction in which the code is read. Therefore, the reading direction must be defined in the configuration.

**368 Rx Header**

The [Rx Header](#) parameter is used to define a **header for the received data**. This header is used by the sensor to identify the start of the input data. The ID must differ from the SOPAS command. It is recommended to use the default setting.

The header is restricted to two characters and must be entered via the context menu or

the  button. It is possible to enter control characters and constants. The input field is highlighted in red if invalid characters are entered.

**369 Rx Header**

The [Rx Header](#) parameter is used to define a **header for the received data**. This header is used by the sensor to identify the start of the input data. The ID must differ from the SOPAS command. It is recommended to use the default setting.

The header is restricted to two characters and must be entered via the context menu or

the  button. It is possible to enter control characters and constants. The input field is highlighted in red if invalid characters are entered.

**370 Rx Header**

The [Rx Header](#) parameter is used to define a **header for the received data**. This header is used by the sensor to identify the start of the input data. The ID must differ from the SOPAS command. It is recommended to use the default setting.

The header is restricted to two characters and must be entered via the context menu or

the  button. It is possible to enter control characters and constants. The input field is highlighted in red if invalid characters are entered.

**371 Rx Terminator**

The [Rx Terminator](#) parameter is used to define a **terminator for the received data**. This terminator is used by the sensor to identify the end of the input data.

The input is restricted to two characters and must be entered via the context menu or

the  button. It is possible to enter control characters and constants. The input field is highlighted in red if invalid characters are entered.

### 372 Rx Terminator

The [Rx Terminator](#) parameter is used to define a **terminator for the received data**. This terminator is used by the sensor to identify the end of the input data.

The input is restricted to two characters and must be entered via the context menu or

the  button. It is possible to enter control characters and constants. The input field is highlighted in red if invalid characters are entered.

### 373 Rx Terminator

The [Rx Terminator](#) parameter is used to define a **terminator for the received data**. This terminator is used by the sensor to identify the end of the input data.

The input is restricted to two characters and must be entered via the context menu or

the  button. It is possible to enter control characters and constants. The input field is highlighted in red if invalid characters are entered.

### 374 Save Destination

The [Save Destination](#) group contains the parameters for saving the image files. The save destination determines the media that is used to store the images.



#### NOTE

The storage media selection affects the storage times. Saving the data to the internal memory or onto a microSD memory card takes significantly longer than other storage options. It is therefore recommended to select the **Internal memory (permanent)** storage option or the **SOPAS (PC)** storage option at high reading speeds. Only one storage option should be activated at high reading speeds.

### 375 Save Destination

In the [Save Destination](#) group select where the recorded data should be saved.

### 376 Save Images

If the [Save Images](#) parameter is activated, the images recorded by the sensor are stored on a separate image server.

### 377 Save permanent

If the [Save permanent](#) parameter is activated, the taught-in match code remains stored in the memory even after the sensor has been switched off.

The save process may be slowed down by the fact that the information is saved in the device's internal memory, on the microSD memory card, and/or in the CMC600 parameter memory module.

### 378 Script List

All active scripts in a sensor are displayed in the [Script List](#) group.

### 379 Scripts

All active scripts in a sensor can be displayed using the [Scripts](#) parameter.

## 380 Select Directory

The [Select Directory](#) button can be used to define the location on the connected PC that should be used to store the captured images.

### Modulo

The [Modulo](#) parameter defines the maximum value for the counter.

As soon as this value is reached, the numbering recommences at 1, which results in existing images being overwritten. In this way, you can restrict the maximum amount of memory required by the stored images.

### Counter

The [Zähler](#) parameter is used to define the numbering for the stored images.

- **Cyclic no.:** The stored images are numbered consecutively up to a definable value ([Modulo](#)). As soon as this value is reached, the numbering recommences at 1, which results in existing images being overwritten. Likewise, when the device is restarted or the configuration is changed, the numbering starts again from 1. Cyclic numbering stores the images that were captured last.
- **Trigger no.:** The stored images are numbered consecutively. The number is increased by 1 as soon as the reading gate opens. When the device is restarted, the numbering starts again from 1. Once the memory is full, no more images can be stored. Trigger-based numbering stores the images that were captured first.

## 381 Sensitivity

The [Sensitivity](#) parameter allows you to choose between edge control and level control.

- **Edge:** The digital input responds to the switch between Low (0) and High (1) according to how the [Logic](#) parameter is configured. Any signal that is permanently present is ignored.
- **Level:** The digital input responds to a permanently present signal according to how the [Logic](#) parameter is configured.

## 382 Sensor / Input 1

The [Sensor / Input 1](#) group contains parameters for adjusting digital input 1.

The [Control system](#) parameter allows you to choose between a configuration based on length units and a configuration based on time units.

- **Distance-controlled:** The configuration is based on distance increments in mm. These are either generated by the configuration software (SOPAS)/CAN interface or via a rotary encoder at the digital input.
- **Time-controlled:** The configuration is based on times entered in ms.

The [Empfindlichkeit](#) parameter allows you to choose between edge control and level control.

- **Edge:** The digital input responds to the switch between Low (0) and High (1) according to how the [Logic](#) parameter is configured. Any signal that is permanently present is ignored.
- **Level:** The digital input responds to a permanently present signal according to how the [Logic](#) parameter is configured.

The [Logic](#) parameter is used to select the polarity for the [Sensitivity](#) parameter.

- **Not inverted:** The digital input responds to a rising edge, i.e., to a switch from Low (0) to High (1), or to a High signal (1) that is permanently present.
- **Inverted:** The digital input responds to a falling signal edge, i.e., to a switch from High (1) to Low (0), or to a Low signal (0) that is permanently present.

Depending on how the [Control system](#) parameter is configured, the [Debouncing](#) parameter specifies the minimum distance in mm or the minimum time in ms for the signal at the external input. If the value is not achieved, the signal is not detected.

Depending on the application, this value may have to be adapted in line with the read cycle rates required.

## 383 Sensor / Input 2

The [Sensor / Input 2](#) group contains the parameters for adjusting digital input 2.

### Control system

The [Control system](#) parameter allows you to choose between a configuration based on length units and a configuration based on time units.

- **Distance-controlled:** The configuration is based on distance increments in mm. These are either generated by the configuration software (SOPAS)/CAN interface or via a rotary encoder at the digital input.
- **Time-controlled:** The configuration is based on times entered in ms.

### Sensitivity

The [Empfindlichkeit](#) parameter allows you to choose between edge control and level control.

- **Edge:** The digital input responds to the switch between Low (0) and High (1) according to how the [Logic](#) parameter is configured. Any signal that is permanently present is ignored.
- **Level:** The digital input responds to a permanently present signal according to how the [Logic](#) parameter is configured.

**Logic**

The **Logic** parameter is used to select the polarity for the **Sensitivity** parameter.

- **Not inverted:** The digital input responds to a rising edge, i.e., to a switch from Low (0) to High (1), or to a High signal (1) that is permanently present.
- **Inverted:** The digital input responds to a falling signal edge, i.e., to a switch from High (1) to Low (0), or to a Low signal (0) that is permanently present.

**Debouncing**

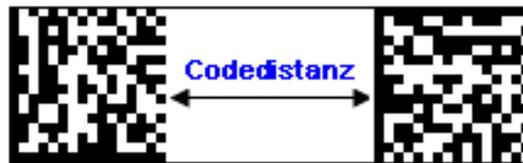
Depending on how the **Control system** parameter is configured, the **Debouncing** parameter specifies the minimum distance in mm or the minimum time in ms for the signal at the external input. If the value is not achieved, the signal is not detected.

Depending on the application, this value may have to be adapted in line with the read cycle rates required.

**384 Separate codes depending on position**

If the **Separate codes depending on position** parameter is activated, codes of the same type and with identical content are distinguished from one another according to their position on the object.

For this to take place, there must be a definable minimum distance (**Code distance**) between the identical codes on the object.

**385 Separator Character Replacement**

In the GS1 code format, the **Separator Character Replacement** parameter can be used to define user-specific characters for the separator (control character within the code).

The characters are entered via the keyboard or clipboard.

It is possible to select special characters or enter hexadecimal characters via the  symbol.

Information on editing the characters is available via the  symbol.

**386 Serial**

The **Serial** tab contains parameters for configuring the serial host and aux interfaces. The serial host interface is typically used for communication with the control (PLC). The serial aux interface is used to configure the reading device separately.

**387 Serial Aux**

If the **Serial Aux** parameter is activated, the results from the serial aux interface are written to the save destination.

## 388 Serial Aux

The [Serial Aux](#) group contains the parameters for configuring the serial aux interface. The serial aux interface is typically used for configuring and analyzing the sensor.

As the configuration of the interface cannot be changed on the sensor, the settings must be adapted on the connected device (e.g., PC or control).

### Output Format

The [Output Format](#) parameter is used to select the output format for the interface.

- **No output:** No data is output via this interface.
- **Reading diagnosis:** This interface is used to output a diagnosis string for each reading gate.
- **Monitor serial host interface:** The aux interface is used to output the same data that is output via the host interface. This makes it possible to check the data traffic for the host interface.
- **RDT400 protocol:** A predefined data string is output via this interface. As a result, the reading results of several devices can be combined and evaluated using a remote diagnostic tool (RDT).
- **Output Format 1:** Data that is output via this interface is formatted in line with the configuration in the [Output Format 1](#) group.
- **Output Format 2:** Data that is output via this interface is formatted in line with the configuration in the [Output Format 2](#) group.

For the reading diagnosis, the following information is combined in a diagnosis string for each reading gate:

- TT: Reading gate duration in ms
- OTL: Trigger length in mm
- CC: No. of codes per reading gate
- FC: Focal position in mm
- Code content
- Code type

For 1D Symbologies

- CL: Code length
- RSD1DV: Ratio of scans to decoded scans (reading reliability) in %

For 2D Symbologies

- SZ: Symbol size
- RES: Cell resolution in pixels
- CTV: Symbol contrast in %
- UECV: Decodability (unused error correction) in %
- MC: Number of multireads per code

## 389 Serial Auxiliary Interface (Port 4002)

If the parameter [Serial Auxiliary Interface \(Port 4002\)](#) is activated, the serial aux interface can be monitored via TCP and port 4002.

### 390 Serial AUX Interface

The [Serial AUX Interface](#) parameter specifies which fieldbus gateway is to be used on the serial auxiliary interface provided by the CDM4xx connection module.

- **None:** No connection module with a fieldbus gateway is connected.
- **Profibus DP:** The CDM4xx connection module is equipped with a Profibus CMF card that acts as a gateway into the Profibus DP fieldbus system.
- **DeviceNet:** The CDM4xx connection module is equipped with a DeviceNet CMF card that acts as a gateway into the DeviceNet fieldbus system.



#### NOTE

To use the interface, you must move the switch on the gateway to the AUX position.

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### 391 Serial Host

The [Serial Host](#) group contains the parameters for configuring the serial host interface. The serial host interface is typically used for communication with the control (PLC).

### 392 Serial Host

If the [Serial Host](#) parameter is activated, the results from the serial host interface are written to the save destination.

### 393 Serial Host Interface (Port 4003)

If the parameter [Serial Host Interface \(Port 4003\)](#) is activated, the serial host interface can be monitored via TCP and port 4003.

### 394 Serial host interface

The [Serial host interface](#) parameter specifies which fieldbus gateway is to be used on the serial host interface provided by the CDM4xx connection module.

- **None:** No connection module with a fieldbus gateway is connected.
- **Profibus DP:** The CDM4xx connection module is equipped with a Profibus CMF card that acts as a gateway into the Profibus DP fieldbus system.
- **DeviceNet:** The CDM4xx connection module is equipped with a DeviceNet CMF card that acts as a gateway into the DeviceNet fieldbus system.
- **PROFINET IO:** The device is connected to a CDM425 connection module with a PROFINET IO gateway, which integrates the reading device into the PROFINET IO Industrial Ethernet standard.



#### NOTE

To use the interface, you must move the switch on the gateway to the AUX position.

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### 395 Server / Client

The [Server / Client](#) parameter is used to select what function the sensor should perform within a network.

- **Server:** Within a network, the sensor functions as a server.
- **Client:** Within a network, the sensor is subordinate to a server. The server is defined via the [Server Address](#) parameter.

## 396 Server Address

The [Server Address](#) parameter is used to define the IP address of the server to which the sensor is subject within a network.

### Enable heartbeat

If the [Enable heartbeat](#) parameter is activated, what happens at regular intervals ([Heartbeat-Intervall](#)) is that a signal is output via the interface. In this way, the availability of the sensor can be checked via the interface.

### Heartbeat interval

The [Heartbeat interval](#) parameter is used to define the time between the heartbeat signals in seconds.

### Restart interval on sending

If the [Restart interval on sending](#) parameter is activated, the time between the heartbeat signals starts again after the reading results have been output.

## 397 Service Information

Service and maintenance data is displayed in the [Service Information](#) group. Maintenance times can be entered.

- **Last user:** User name of the last user to be logged in
- **Last configuration at:** Date and time of the last configuration saved in the device
- **Last maintenance:** Date on which maintenance was last completed
- **Next maintenance:** Date on which maintenance should next be completed

## 398 Set frame rate manually

If the [Set frame rate manually](#) parameter is activated, the frame rate (image frequency) can be specified by the user. If this parameter is deactivated, the reading device operates at the maximum frame rate. The **Request** button can be used to retrieve the current frame rate of a connected device. There may be a discrepancy between the frame rate set and the actual frame rate used by the reading device. The device adjusts the frame rate in line with other settings, such as the shutter time. A long shutter time reduces the frame rate significantly.

It makes sense to reduce the frame rate for slow applications where the object containing the code moves past the reading device slowly. Reducing the frame rate increases the time for evaluating individual images. This results in increased reading reliability for each individual image. A lower frame rate is not suitable for fast applications, as you run the risk of not detecting the code on any image.

## 399 Setup

Pressing the [Setup](#) button starts the reading process for testing the configuration. During this process, images are captured in free-running mode and displayed in the main view.

Changes to the configuration (e.g., image settings or code configuration) or the position of the sensor (e.g., reading distance or angle) are immediately visible in the main view. This makes it possible to complete test readings, as well as to check and optimize the current position and configuration of the sensor.

So that the current contrast setting can be evaluated, the identified codes are displayed in different colors:

- Green (excellent): Contrast between 55% and 100%
- Yellow (good): Contrast between 20% and 55%
- Red (poor): Contrast less than 20%

### Behavior of the sensor during editing:

- Images are integrated into the image sequence at a rate of one per second so that changes can be recorded.
- So that the current contrast setting can be evaluated, the identified codes are displayed in different colors.
- The code content and other relevant data are displayed in the code info box for all detected codes so that the reading stability can be assessed.
- The reading results are transferred to the AUX interface in the configured output format.
- The reading results are not transferred to the host interface.
- External triggers at the digital inputs are ignored.
- Trigger distribution on the CAN interface is deactivated.
- No digital outputs are set.

## 400 Shutter time

The [Shutter time](#) parameter is used to define the time frame for capturing an image in  $\mu\text{s}$ . The shutter time can be set via the slide control.

- A short shutter time can accommodate high object speeds. As this causes the image brightness to decrease, it may be necessary to adjust the signal amplification ([Brightness](#)). This does, however, increase the image noise.
- A long shutter time offers a high level of brightness and, therefore, minimal image noise. This is the optimal setting for stationary or slow-moving objects.

## 401 Shutter time

The parameters in the [Shutter time](#) group are used to define the time frame for capturing an image in  $\mu\text{s}$ .

- A short shutter time can accommodate high object speeds. As this causes the image brightness to decrease, it may be necessary to adjust the signal amplification ([Brightness](#)). This does, however, increase the image noise.
- A long shutter time offers a high level of brightness and, therefore, minimal image noise. This is the optimal setting for stationary or slow-moving objects.

## 402 SICK Visualization Platform

The SVP data output can be activated on the [SICK Visualization Platform](#) tab.

The SVP (SICK Visualization Platform) is a dynamic database used to monitor, analyze, and evaluate all the information, including camera images and videos that are captured using automatic SICK data collection systems.

## 403 Slave Address

The [Slave Address](#) parameter displays the slave address of the Profibus node via which the reading device is connected to the Profibus network. The slave address is set via the rotary switch on the CDF600.

## 404 SOPAS (PC)

If the [SOPAS \(PC\)](#) parameter is activated, the captured images are stored on the connected PC.

For this to happen, the SOPAS configuration software must be running while the images are being captured. The captured images are shown in the main view of the [Online Image](#) tab.

## 405 Speed

The maximum transmission rate for data sent by the sensor can be adjusted in line with the speed of the network via the [Speed](#) parameter.

To ensure a reliable connection, we recommend determining the speed of your directly connected PC automatically ([Auto](#)).

## 406 Stacked Symbologies Active

If the [GS1 DataBar](#) parameter is activated, decoding is activated for the [DataBar 14](#), [DataBar Expanded](#), and [DataBar Limited](#) activated code types. (This requires the [GS1 DataBar](#) code type to be deactivated.)



### NOTE

As only activated code types are processed, you can increase the processing speed by deactivating the code types that are not being used.

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## 407 Standard gateway

The [Standard gateway](#) parameter is used to specify the IP address of a gateway to implement the network protocol. Before this can happen, a connection must be established with the sensor at the **Service employee** user level.



### NOTE

The [IP-Address](#) and [Subnet mask](#) parameters can be changed via the connection wizard if the **Authorized customer** user level is accessed.

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## 408 Start/Stop identical

If the [Start/Stop identical](#) parameter is activated, codes are only read if their start character is identical to their stop character.



In the case of codes that rely on the [Codabar](#) symbology, any one of the following four characters can be used as the start/stop character: A, B, C, or D. If only identical start and stop characters are permitted, this increases the reading reliability and prevents codes from being misinterpreted.

## 409 Start/Stop of Object Trigger

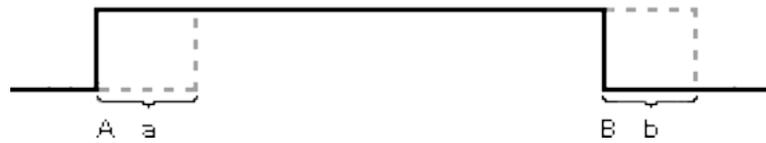
The [Start/Stop of Object Trigger](#) group contains the parameters for opening and closing the reading gate.

To ensure that the image is captured at the correct time and the code is reliably detected, the electrical properties of the digital inputs must be adjusted in line with the connected sensors and triggers.

Depending on the application, this ensures that the appropriate image region of interest is captured and that the settings are adjusted according to whether the read operation is performed while an object is moving or stationary.

## 410 Start by

The **Start by** parameter is used to select the signal source for opening the reading gate.



- **A Start by** (signal for opening the reading gate)

When the reading gate is open, the sensor captures images at a frequency of 60 Hz and evaluates them on the basis of codes. In an ideal scenario, at least one of the codes on one of the images will be captured fully and recognized. No images are captured while the reading gate is closed.

**Signal sources for opening the reading gate:**

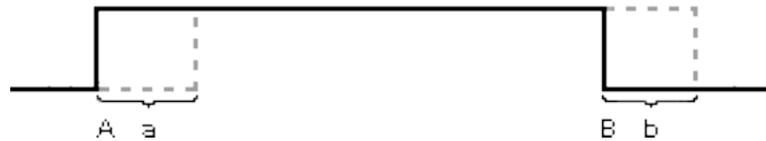
- **Sensor / Input 1:** A signal at digital input 1 (e.g., from a photoelectric switch) causes the reading gate to open.
- **Sensor / Input 2:** A signal at digital input 2 (e.g., from a photoelectric switch) causes the reading gate to open.
- **External input 1:** A signal at external digital input 1 (e.g., from a photoelectric switch) causes the reading gate to open.
- **External input 2:** A signal at external digital input 2 (e.g., from a photoelectric switch) causes the reading gate to open.
- **SOPAS command:** A corresponding command for opening the reading gate is expected from a device such as an external control (PLC). (A detailed list of the commands can be obtained from SICK on request.)
- **Autocycle:** The reading gate opens and closes automatically in accordance with a definable cycle (defined via the **Pulse** and **Pause** parameters) (e.g., when the feed speed is constant and the code position does not change, or for the purpose of reading a code manually).
- **CAN:** The signal for opening and closing the reading gate is expected via the CAN interface. In a group of devices that communicate with each other via the CAN network, the signal for opening the reading gate can be distributed. This involves an appropriate trigger signal being received by one of the devices (usually the master) and distributed to the remaining devices on the CAN network.
- **User-defined command:** For the purpose of opening the reading gate, you can freely define a corresponding command that is generated by a device such as an external control (PLC) and transmitted to the sensor.
- **Free-running:** The reading gate remains permanently open. This enables a code to be read manually without any external trigger signal (e.g., from a photoelectric switch). Any signals for opening/closing the reading gate are ignored. This means that no specific time can be defined to specify when the data should be output (the data transmission point). As a result, no signal can be output for the **No Read** result, either. The data transmission point and the reading speed are dependent on the extent to which the sensor's capacity is being utilized.

## 411 Start delay

The [Start delay](#) parameter can be used to control when the reading window opens. The unit can be selected via the [Trigger delay](#) parameter.

If a positive value is set, the reading gate opens at a later point, e.g., so that the sensor only detects codes at the rear end of an object in order to reduce the decoding time.

Image capture can be tailored more precisely to the code position by adjusting the trigger.



- **A Start delay** (additional time/distance for which the reading gate must remain closed after event A)

## 412 Start teach-in

The [Start teach-in](#) parameter is used to select the signal that triggers the automatic process for teaching in a match code.

- **Automatic / Static:** A signal (e.g., a key switch) makes the reading gate open automatically. The next code read by the system is taught in as a match code.
- **System trigger / Dynamic:** A signal (e.g., a key switch) at one of the sensor's digital inputs prepares it for teaching in a match code. Once the reading gate has opened (typically triggered by a photoelectric switch), the next code read by the system is taught in as a match code.

## 413 Station Name

A name for the PROFINET IO gateway is defined via the [Station Name](#) parameter.

The following naming conventions apply:

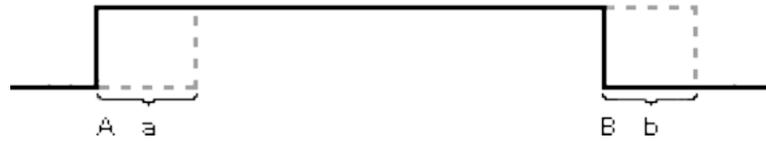
- The station name consists of letters, digits, a dash, or a period, and must not exceed 127 characters.
- A single component of the device name, i.e., a string of characters between two periods, must not exceed 63 characters.
- With the exception of hyphens, special characters must not be used.
- The device name must not start or end with a hyphen or period.
- The device name must not begin with digits.
- The device name must not be in the form of n.n.n.n (where n is a number between 0 and 999).
- The device name must not start with the character sequence "port-xyz-" (where x,y,z are numbers between 0 and 9).

## 414 Stop bits

The parameter [Stop bits](#) is used to specify whether one (typical) or two characters should be used as a pause (stop bits) after a character has been transmitted. The setting must match the one on the host.

## 415 Stop by

The **Stop by** parameter is used to select the signal source/condition for closing the reading gate.



- **B Stop by** (signal for closing the reading gate)

When the reading gate is open, the sensor captures images at a frequency of 60 Hz and evaluates them on the basis of codes. In an ideal scenario, at least one of the codes on one of the images will be captured fully and recognized. No images are captured while the reading gate is closed.

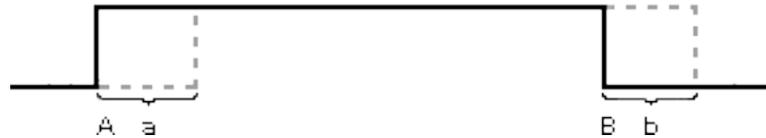
#### Signal sources for closing the reading gate:

- **Not defined:** No function defined for closing the reading gate
- **Read cycle source:** The reading gate is closed by the same signal source that opened it (e.g., the reading gate opens as soon as an object trips a photoelectric switch and closes again as soon as the object is clear of the photoelectric switch).
- **Sensor / Input 1:** A signal at digital input 1 (e.g., from a photoelectric switch) causes the reading gate to close.
- **Sensor / Input 2:** A signal at digital input 2 (e.g., from a photoelectric switch) causes the reading gate to close.
- **External input 1:** A signal at external digital input 1 (e.g., from a photoelectric switch) causes the reading gate to close.
- **External input 2:** A signal at external digital input 2 (e.g., from a photoelectric switch) causes the reading gate to close.
- **SOPAS command:** A corresponding standard command for closing the reading gate is expected from a device such as an external control (PLC) (a detailed list of the commands can be obtained from SICK on request).
- **Timer / Distance:** The reading gate remains open for a defined time/distance ([Reading gate length](#)). If the speed of the objects remains constant, no incremental pulse is required ([Increment source](#)). If the speed varies, the current speed can, for example, be calculated on the basis of signals from a rotary encoder. As a result, the reading gate can be closed as soon as the object has covered a specific distance, regardless of the object speed.
- **Good Read:** The reading gate closes as soon as the **Good Read** condition is met (e.g., the required number of codes has been read). This ensures that the reading gate is only kept open for as long as necessary (direct feedback concerning whether a code has been identified).
- **User-defined command:** For the purpose of closing the reading gate, you can freely define a corresponding command that is generated by a device such as an external control (PLC) and transmitted to the sensor.
- **Match 1 condition:** The reading gate closes as soon as the condition is met.
- **Multicodes1 condition:** The reading gate closes as soon as the number of detected codes corresponds to the number specified.
- **Teach-in1 condition:** The reading gate closes as soon as the [Match-code teach-in 1](#) condition is met.
- **Teach-in2 condition:** The reading gate closes as soon as the [Match-code teach-in 2 \(Additional\)](#) condition is met.

## 416 Stop delay

The [Stop delay](#) parameter can be used to control when the reading gate closes. The unit can be selected via the [Trigger delay](#) parameter.

If a positive value is set, the reading gate closes at a later point, e.g., to extend the decoding time for codes at the rear end of an object.



- **B Stop delay** (additional time/distance for which the reading gate must remain open after event B)

## 417 Store current counter values now

Pressing the [Store current counter values now](#) button saves all values to the device's flash memory. This means the values remain available without a permanent supply voltage, i.e., the values are still saved after the device is restarted.

## 418 Stored Images

Stored images can be displayed on the [Stored Images](#) tab.

The images saved in the sensor or on the microSD memory card can be transferred to the PC, where they can be stored in a database, for example, and opened when required. The data (images, .xml files, etc.) stored in the sensor or on the microSD memory card can also be deleted.



### NOTE

By comparing and evaluating the images that have been captured, it is possible to analyze which codes were not identified and whether faulty code structures prevented reading from taking place, for example. Click on the smaller images on display in the [Bildverlauf](#) to display them in the main view. The relevant code data is listed in the [Codeinfo](#). By right-clicking, you can display the date and time when the images were captured, which makes it easier to attribute them correctly.

So that the current contrast setting can be evaluated, the identified codes are displayed in different colors:

- Green (excellent): Contrast between 55% and 100%
- Yellow (good): Contrast between 20% and 55%
- Red (poor): Contrast less than 20%

## 419 Stored Images

Stored images can be displayed in the main view of the [Stored Images](#) group.

The images saved in the sensor or on the microSD memory card can be transferred to the PC, where they can be stored in a database, for example, and opened when required. The data (images, .xml files, etc.) stored in the sensor or on the microSD memory card can also be deleted.



### NOTE

By comparing and evaluating the images that have been captured, it is possible to analyze which codes were not identified and whether faulty code structures prevented reading from taking place, for example. Click on the smaller images on display in the [Bildverlauf](#) to display them in the main view. The relevant code data is listed in the [Codeinfo](#). By right-clicking, you can display the date and time when the images were captured, which makes it easier to attribute them correctly.

So that the current contrast setting can be evaluated, the identified codes are displayed in different colors:

- Green (excellent): Contrast between 55% and 100%
- Yellow (good): Contrast between 20% and 55%
- Red (poor): Contrast less than 20%

## 420 Stored Log Files

Reading results from different interfaces can be written to the internal memory or the micro SD card via the [Stored Log Files](#) settings.

This function enables the reading results to be recorded without an external PC so that they can be evaluated later.

## 421 Store value permanent

If the [Store value permanent](#) parameter is activated, the counter value is automatically backed up in the flash memory every six minutes.

An additional backup can be performed manually at any time by pressing the [Store current counter values now](#) button.

The automatic backup function ensures that the counter values remain available even in the event of a brownout or device restart.

## 422 Subfolder Good Read / No Read

If the [Subfolder Good Read / No Read](#) parameter is activated, the images are stored in two different subfolders so that the reading result can be analyzed more easily (**Good Read** or **No Read**).

## 423 Subnet mask

The bitmask or prefix mask for network protocol IPv4/IPv6 is defined via the [Subnet mask](#) parameter. Before this can happen, a connection must be established with the sensor at the **Service employee** user level.



### NOTE

The [IP-Address](#) and [Subnet mask](#) parameters can be changed via the connection wizard if the **Authorized customer** user level is accessed.

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The setting must be adjusted in line with the network.

## 424 Supervision

On the [Supervision](#) tab, ports are activated for a TCP connection to the device, which is used to monitor the device's communication via the serial host or aux interface.



### NOTE

A TCP connection to the device is only possible if an output format is activated on the monitored interface. The output format is activated on the [Serial](#) tab.

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The function is used to monitor the data exchange between PLC and device via serial interface at a terminal.

## 425 SVP

The SVP data output can be activated in the [SVP](#) group.

The SVP (SICK Visualization Platform) is a dynamic database used to monitor, analyze, and evaluate all the information, including camera images and videos that are captured using automatic SICK data collection systems.

## 426 Symbologies

Optical Character Recognition (OCR) can be activated in the [Symbologies](#) group.

## 427 System increment resolution

The [System increment resolution](#) parameter is used to define the conversion factor for the incremental signal.

The value corresponds to the distance traveled per increment in mm. In order for speeds and distances to be calculated correctly, the value must be adjusted for the specific rotary encoder used.

## 428 System Information

The [System Information](#) group displays the messages from the device log file that can be used for connection analysis and diagnostic purposes.

## 429 System status

Device status information that has been recorded is displayed on the [System status](#) tab. This data is used to analyze the connections to the device and identify any system errors that occur.

**430 Teach in code content**

If the [Teach in code content](#) parameter is activated, the code content of the match code is taught in and applied as a condition.

This reduces the likelihood of the code being mistaken for a different one.

**431 Teach in code content**

If the [Teach in code content](#) parameter is activated, the code content of the match code is taught in and applied as a condition.

This reduces the likelihood of the code being mistaken for a different one.

**432 Teach-in code ID**

If the [Teach-in code ID](#) parameter is activated, the code type of the match code is taught in.

This reduces the likelihood of the code being mistaken for a different one.

**433 Teach-in code ID**

If the [Teach-in code ID](#) parameter is activated, the code type of the match code is taught in.

This reduces the likelihood of the code being mistaken for a different one.

**434 Teach in code length**

If the [Teach in code length](#) parameter is activated, the code length of the match code is taught in.

This reduces the likelihood of the code being mistaken for a different one.

**435 Teach in code length**

If the [Teach in code length](#) parameter is activated, the code length of the match code is taught in.

This reduces the likelihood of the code being mistaken for a different one.

**436 Teach-in Condition**

The [Teach-in Condition](#) parameter defines the condition that must apply when the newly taught-in match code content is stored. The selected condition is used as a basis when the target/actual comparison is activated. Each code that is read is compared to the code content that was read in for the target condition.

The [Teach-in Condition](#) parameter is used to assign the items of code content that are to be compared to a condition. The taught-in match codes can be retrieved and activated at a later time, subject to the condition being met.

**437 Teach-in stop by**

Depending on how the [Start teach-in](#) parameter has been configured, the [Teach-in stop by](#) parameter is used to define which signal or condition should terminate the teach-in process for the match code.

- **Teach-in trigger source:** The teach-in process is terminated by a signal (e.g., a key switch) at one of the sensor's digital inputs.
- **Object Trigger:** The teach-in process is terminated as soon as the reading gate closes.
- **Valid code taught in:** The teach-in process is terminated as soon as a match code has been successfully read.

**438 Text**

The plain text to be read can be configured in the [Text](#) group.

To enable the sensor to read the plain text in a stable manner, the corresponding text properties must be set.

**439 Text Color**

The [Text Color](#) parameter is used to define the difference in color between the text and background.

- **Black:** Text is darker than the background
- **White:** Text is lighter than the background
- **Automatic:** Automatic detection

**NOTE**

To increase the stability of reading it is recommended that the text color is defined.

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**440 Tilt angle**

The [Tilt angle](#) parameter is used to define the tilt angle of all characters to the base line.

This parameter increases the quality and stability of reading if the text is written at a slight tilt angle. The maximum value must not exceed  $\pm 5^\circ$ .

**441 Time (hh:mm:ss)**

The [Time \(hh:mm:ss\)](#) parameter is used to enter the time that the reading device should apply when setting its device time. Device time synchronization is triggered by the user via the **Set device time** button.

**442 Timeout**

If the [Data transmission point](#) parameter is set to the **End of label** value, the [Timeout](#) parameter can be used to define how much time must elapse before a code is output again.

The unit can be selected via the [Output delay](#) parameter.

## 443 Timeout Command Response

The [Timeout Command Response](#) parameter defines an interval in ms during which a response to a SOPAS command remains available in the object directory for upload by an SDO client. Once this interval has elapsed, the command response is discarded.

When responses to SOPAS commands are transmitted, the device response is stored in the object directory and downloaded by the SDO client. A timeout must be specified for the SDO client upload.

## 444 Timeout Diag. Output

The [Timeout Diag. Output](#) parameter defines an interval in ms during which reading diagnosis data remains available in the object directory for upload by the control. Once this interval has elapsed, the reading diagnostic data is discarded.

Alternatively, the timeout values can be modified directly in the object directory via objects 0x3010/01 to 0x3010/02. The changes are not applied until the device has been restarted.

If the reading diagnostic data is being monitored, the data is stored in the object directory and downloaded by the control. A timeout must be specified for the upload.

## 445 Timeout ReadResult

The [Timeout ReadResult](#) parameter defines an interval in ms during which a reading result remains available in the object directory for upload by an SDO client. Once this interval has elapsed, the reading result is discarded.

If the reading results are transmitted via a service data object (SDO), the reading results are stored in the object directory and downloaded by the SDO client. A timeout must be specified for the SDO client upload.

## 446 Time server IP address

The [Time server IP address](#) parameter is used to enter the IP address of the server from which the reading device obtains the time during synchronization. The user can initiate the first synchronization process using the **Retrieve time from time server** button.

## 447 Time Shift to GMT

A deviation from Greenwich Mean Time (GMT) is set via the [Time Shift to GMT](#) parameter. The time difference is entered in minutes.

You are recommended (and indeed required) to set a deviation from GMT if the time server that you are using is set to the GMT time zone but your reading device is located in a different time zone.

## 448 Transmission Type

The processing and triggering procedures for process data objects (PDOs) are configured via the [Transmission Type](#) parameter. The CANopen parameter defines the processing and triggering time in relation to the SYNC object. The SYNC object is used to synchronize the CAN nodes on the CAN bus and, together with the TIME STAMP object, ensures that the time is standardized across the network. The parameter must be entered in accordance with the CANopen standard.

0xFE example: The device processes and transmits PDOs as soon as new data becomes available.

There are three different transfer types:

- **Asynchronous:** The PDOs do not have any kind of relationship with the SYNC object. PDOs are processed as soon as they have been received and sent immediately after they have been triggered. The trigger can be controlled by an event or a send request.
- **Synchronous:** PDOs are processed with temporal reference to the SYNC object. It is possible to set the number of SYNC objects required before processing takes place.
- **Acyclic synchronous:** PDOs are received without any reference to the SYNC object but are not processed until after the next SYNC object. The PDO is triggered by an event without any reference to the SYNC object but is not transmitted until after the next SYNC object.

## 449 Transmit start/stop

If the [Transmit start/stop](#) parameter is activated, the start and stop characters are output along with the code content.

This means that the characters are available for evaluating the reading results.



## 450 Trigger delay

The [Trigger delay](#) parameter allows you to choose between a configuration based on length units and a configuration based on time units.

- **Distance-controlled:** The values for the [Pause](#), [Reading gate length](#), [Start delay](#), and [Stop delay](#) parameters are entered in mm. If a distance-controlled delay is set, the reading gate only opens once the object has continued traveling for a predefined distance after the trigger signal is issued.
- **Time-controlled:** The values for the [Pause](#), [Reading gate length](#), [Start delay](#), and [Stop delay](#) parameters are entered in ms. If a time-controlled delay is set, the reading gate only opens once a predefined time has elapsed after the trigger signal is issued.

## 451 Trigger Distribution

The [Trigger Distribution](#) group is used to define how the trigger signal is communicated to network nodes.

In the case of a network with several reading devices, it is often sufficient to use a photoelectric switch or connect a reading device to the control. The trigger signal is then distributed to the network nodes.

The [Trigger Distribution](#) function can be used to reduce the trigger signals and the number of photoelectric switches considerably. This leads to a significant reduction in system complexity and cost.

## 452 Trigger echo on

If the [Start by](#) parameter is set to the **Command** signal source and the [Trigger echo on](#) parameter is activated, the sensor responds by sending the command back to the control.

This allows the control to check SOPAS commands that have been sent.

## 453 Tx Header

The [Tx Header](#) parameter is used to define a header for the received data, which is applied when the data is output. Once the data has been received, the [Rx Header](#) and [Rx Terminator](#) are removed. The string is reframed with the [Tx Header](#) and [Tx Terminator](#) so that it can be output.

The input is restricted to two characters and must be entered via the context menu or

the  button. It is possible to enter control characters and constants. The input field is highlighted in red if invalid characters are entered.

## 454 Tx Terminator

The [Tx Terminator](#) parameter is used to define a terminator for the received data, which is applied when the data is output. Once the data has been received, the [Rx Header](#) and [Rx Terminator](#) are removed. The string is reframed with the [Tx Header](#) and [Tx Terminator](#) so that it can be output.

The input is restricted to two characters and must be entered via the context menu or

the  button. It is possible to enter control characters and constants. The input field is highlighted in red if invalid characters are entered.

## 455 UCC/GS1-128 Emulation

If the [GS1 DataBar](#) parameter is activated, decoding is activated for the [DataBar 14](#), [DataBar Expanded](#), and [DataBar Limited](#) activated code types. (This requires the [GS1 DataBar](#) code type to be deactivated.)



### NOTE

As only activated code types are processed, you can increase the processing speed by deactivating the code types that are not being used.

**456**      **UPC / GTIN / EAN**

If the [UPC / GTIN / EAN](#) parameter is activated, decoding is jointly enabled for the following code types: [UPC A](#), [UPC E](#), [GTIN 8 / EAN 8](#), and [GTIN 13 / EAN 13](#). The configuration tab for the corresponding code types can be seen and opened in SOPAS ET.

**NOTE**

As only activated code types are processed, you can increase the processing speed by deactivating the code types that are not being used.

**457**      **UPC / GTIN / EAN**

If the [UPC / GTIN / EAN](#) parameter is activated, decoding is jointly enabled for the following code types: [UPC A](#), [UPC E](#), [GTIN 8 / EAN 8](#), and [GTIN 13 / EAN 13](#). The configuration tab for the corresponding code types can be seen and opened in SOPAS ET.

**NOTE**

As only activated code types are processed, you can increase the processing speed by deactivating the code types that are not being used.

**458**      **UPC**

The [UPC](#) group can be used to activate or deactivate the [UPC A](#), [UPC E](#), and [UPC E extended](#) code types.

**459**      **UPC A**

If the [UPC A](#) parameter is activated, decoding is enabled for the relevant code type.

**NOTE**

As only activated code types are processed, the processing speed can be increased by specifically activating/deactivating the necessary code types.



- Code name: [UPC A](#) (Universal Product Code) (4-value)
- Character set: 12 numeric characters (check digit: last character)
- Structure: 2 characters for country prefix, 9 characters for the manufacturer and article, 1 character as the check digit
- Intrinsic safety: High
- Spatial requirements: Low
- Standard: DIN/EN 797
- Areas of application: Foodstuffs and consumer goods in the USA and Canada

## 460 UPC E

If the [UPC E](#) parameter is activated, decoding is enabled for the relevant code type.



### NOTE

As only activated code types are processed, the processing speed can be increased by specifically activating/deactivating the necessary code types.



- Code name: [UPC E](#) (Universal Product Code) (4-value)
- Character set: 8 numeric characters
- Structure: System identifier (always 0), 2 characters for country prefix, 4 characters for the manufacturer and article, 1 character as the check digit
- Intrinsic safety: High
- Spatial requirements: Low
- Standard: DIN/EN 797
- Areas of application: Foodstuffs and consumer goods in the USA and Canada

## 461 UPC E extended

If the [UPC E extended](#) parameter is activated, 8-character codes based on the [UPC E](#) symbology are automatically converted into 12-character codes. (This requires the [Pharmacode](#) code type to be deactivated.)

## 462 Usage of Input Data

The [Usage of Input Data](#) parameter is used to define how the sensor uses data received at the serial host interface.

- **No input data:** No data is received at the interface.
- **Data String Forwarding:** The incoming data is forwarded to another interface. Possible destination interfaces are serial auxiliary, serial host, Ethernet auxiliary, and Ethernet host.
- **Auxiliary Input:** The incoming data is output to all configured interfaces in the same way as an internal reading result.
- **EDS text element in output format:** The incoming data is assigned to the EDS variable, which can be used in the output string.



### NOTE

For further details and settings, see [External Input Data](#).

## 463 Usage of Input Data

The [Usage of Input Data](#) parameter is used to define how the sensor uses data received at the serial host interface.

- **No input data:** No data is received at the interface.
- **Data String Forwarding:** The incoming data is forwarded to another interface. Possible destination interfaces are serial auxiliary, serial host, Ethernet auxiliary, and Ethernet host.
- **Auxiliary Input:** The incoming data is output to all configured interfaces in the same way as an internal reading result.
- **EDS text element in output format:** The incoming data is assigned to the EDS variable, which can be used in the output string.



### NOTE

For further details and settings, see [External Input Data](#).

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## 464 Usage PLC-Input Bit0

The [Usage PLC-Input Bit0](#) parameter specifies how the PLC input should be used.

- **No function:** The PLC input is not used.
- **Device Ready**
- **Good Read**
- **No Read**
- **Status of input sensor 1**
- **Status of input sensor 2**
- **Status of external input 1**
- **Status of external input 2**

The parameter is used in conjunction with the CMF400 operating mode to assign properties to PLC inputs. As there is no opportunity to use triggers in the CMF400 communication mode, instructions can be issued via the input properties.

## 465 Usage PLC-Input Bit1

The [Usage PLC-Input Bit1](#) parameter specifies how the PLC input should be used.

- **No function:** The PLC input is not used.
- **Device Ready**
- **Good Read**
- **No Read**
- **Status of input sensor 1**
- **Status of input sensor 2**
- **Status of external input 1**
- **Status of external input 2**

The parameter is used in conjunction with the CMF400 operating mode to assign properties to PLC inputs. As there is no opportunity to use triggers in the CMF400 communication mode, instructions can be issued via the input properties.

## 466 Usage PLC-Output Bit0

The [Usage PLC-Output Bit0](#) parameter specifies how the PLC output should be used.

- **No function:** The PLC output is not used.
- **Object trigger:** A digital trigger signal is sent via the PLC output. To use this function, you must set the **Object Trigger Control** parameter to the **Fieldbus input** value. The **Object Trigger Control** parameter is located under **Reading configuration -> Object Trigger Control**.
- **Set / Reset external output 1/2:** External output 1 or 2 is reset. To use this function, you must set the **External output 1** or **External output 2** parameter to the **Fieldbus input** value. The **External Output 1/2** parameters can be found under **Network / Interfaces / IOs -> Digital Outputs / Beeper**.
- **Distance configuration bit 0/1:** The **Dynamic focus** parameter is controlled via the PLC output. To use this function, you must set the **Dyn. conf. mode** parameter to the **Fieldbus** value.

The parameter is used in conjunction with the CMF400 operating mode to assign properties to PLC outputs. As there is no opportunity to use triggers in the CMF400 communication mode, instructions can be issued via the output properties.

## 467 Usage PLC-Output Bit1

The [Usage PLC-Output Bit1](#) parameter specifies how the PLC output should be used.

- **No function:** The PLC output is not used.
- **Object trigger:** A digital trigger signal is sent via the PLC output. To use this function, you must set the **Object Trigger Control** parameter to the **Fieldbus input** value. The **Object Trigger Control** parameter is located under **Reading configuration -> Object Trigger Control**.
- **Set / Reset external output 1/2:** External output 1 or 2 is reset. To use this function, you must set the **External output 1** or **External output 2** parameter to the **Fieldbus input** value. The **External Output 1/2** parameters can be found under **Network / Interfaces / IOs -> Digital Outputs / Beeper**.
- **Distance configuration bit 0/1:** The **Dynamic focus** parameter is controlled via the PLC output. To use this function, you must set the **Dyn. conf. mode** parameter to the **Fieldbus** value.

The parameter is used in conjunction with the CMF400 operating mode to assign properties to PLC outputs. As there is no opportunity to use triggers in the CMF400 communication mode, instructions can be issued via the output properties.

## 468 Use Additional Error Correction

Activating the [Use Additional Error Correction](#) parameter makes the sensor more tolerant in terms of reading partially destroyed codes or codes that are carelessly marked.

It is particularly recommended to activate this parameter when reading poor-quality, directly marked codes. Activating this additional error correction may affect the duration of the reading operation.

## 469 Use Device-ID as DeviceNet-Address

If this parameter is activated, the device ID is used as a DeviceNet address.

### Device ID

Under the [Device ID](#) parameter, the device ID is displayed. If the device ID is activated for use as a fieldbus address, a new device ID can be assigned.

**470 Use Device-ID as Node-ID**

If this parameter is activated, the assigned device ID is used as a CAN node for the CAN bus.

**Device ID**

The [Device ID](#) parameter displays the device ID that was assigned under [Network / Interface / IOs](#). The device ID is used to assign the device a unique number on the network. The assigned ID is used as a CAN node for the CAN bus.

The device must be uniquely identified on the network to enable communication via CAN bus and so that reading results can be correctly attributed to devices.

**471 Use Device-ID as Profibus-Address**

If the [Use Device-ID as Profibus-Address](#) parameter is activated, the device ID is used as a Profibus address.

**472 User Name**

A user name for the FTP image transfer to the SICK Visualization Platform is specified under the [User Name](#) parameter.

**473 Varying Text Size**

Activating the [Varying Text Size](#) parameter enables texts that contain characters of slightly varying heights to be read.

This parameter increases the quality and stability of segmentation for certain texts.

**474 Volume**

The [Volume](#) parameter can be used to deactivate the beeper (**Off**) or to select the volume level (**Loud** or **Soft**).

This allows you to adjust the beeper according to the level of background noise.

**475 Warning Score 1**

This parameter is used to define a value that serves as a warning if the actual score value falls below the set value.

If the actual score value is lower than the set value, an event can be generated by the sensor, e.g., an image output or an output signal.

**476 Web Server**

The device web server is activated and deactivated in the [Web Server](#) group.

The web server on the reading device provides statistical data on reading processes via Ethernet TCP/IP. The statistical data can be retrieved by the user via a web browser.

**NOTE**

The device IP address is specified on the Ethernet tab.

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**477 with number**

The **with number** parameter is used to specify the number for the customer-specific output format.

**478 X-Coordinate**

The distance between the reading device and the reference point in the X-direction, i.e., along the length of the conveying direction, is entered under the **X-Coordinate** parameter.

**479 Y-Coordinate**

The distance between the reading device and the reference point in the Y-direction (at 90° to the conveying direction) is entered under the **Y-Coordinate** parameter.

**480 Z-Coordinate**

The distance between the reading device and the reference point in the Z-direction, i.e., the distance above the conveying line, is entered under the **Z-Coordinate** parameter.

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