

Software Description

Configuration Tool for CEDES Safety Control Units

Software to configure and diagnose the CEDES Safety und Automation Products
SafeC 200, SafeC 400, SafeCIS3



English
Deutsch

Content

1. Important notice 3

2. Introduction 3

2.1 Special Features 4

3. Installation..... 4

3.1 Preparation 4

3.2 Operating Systems 4

3.3 Installation Software Configuration Tool 4

3.4 Installation USB driver for OptiLink 5

3.4.1 Successful driver installation..... 7

3.5 Program start 7

4. OptiLink 7

5. Configurator for SafeCIS3 8

5.1 Introduction..... 8

5.2 Starting SafeCIS3 Safety Configurator..... 9

5.3 The menu bar 10

5.3.1 Menu "File" 10

5.3.2 Menu "Options" 10

5.3.3 Menu "Help" 11

5.4 Main window 11

5.4.1 Tab sheet "Design" 11

5.4.2 Diagnosis 12

5.4.3 Application infos 13

5.5 Configurable possibilities 15

5.5.1 Configurable devices..... 15

5.5.2 Specification "Safety switch 2 channel" ... 15

5.5.3 Specification "Safe4" 15

5.5.4 Specification "Safe400" 15

5.5.5 Function "Double Scan"..... 16

5.5.6 Function "Interrupt ignore time" 16

5.5.7 Specification "Safety prevention" 16

5.5.8 Specification "Testable sensor" 17

5.5.9 Specification "Muting Safe400"..... 17

5.5.10 Specification "Muting Safe4"..... 17

5.5.11 Function "EDM" + "Start Release"..... 17

5.5.12 Function "Stop delay" 18

5.6 Muting 18

5.6.1 General..... 18

5.6.2 Muting lamp 19

5.6.3 Muting sensors..... 19

5.6.4 Mute override function..... 19

5.6.5 Sensor output delay function..... 19

5.6.6 Muting with enable signal..... 20

5.6.7 Muting disable signals..... 20

5.6.8 Safety light curtain interruption monitoring function..... 20

5.6.9 Muting time recorder..... 20

5.6.10 Setup: 2 sensor T-type 20

5.6.11 Setup: 4 sensor T-type 21

5.6.12 Setup: 2 sensor L-type 23

5.6.13 Setup: 2 sensor T-type with enable signal..... 24

5.7 Blanking 25

5.7.1 Configuring the Blanking Function 25

5.7.2 Indication of Blanking..... 26

5.7.3 Fixed Blanking 26

5.7.4 Floating Blanking 27

5.8 Download & Upload..... 27

5.8.1 PC ⇔ SafeC (Download)..... 27

5.8.2 Verify download 28

5.8.3 SafeCIS3 ⇔ PC (Upload)..... 30

6. Configurator for SafeC 200 / SafeC 400 31

6.1 SafeC 200/400 Introduction..... 31

6.2 Hardware recognition 31

6.3 Starting the program..... 31

6.4 The menu bar..... 33

6.4.1 Menu "File"..... 33

6.4.2 Menu "Options" 33

6.4.3 Menu "Help" 34

6.5 Main window..... 34

6.5.1 Specification window for Block A + B..... 35

6.5.2 Configurator devices..... 36

6.5.3 Function "Blanking"..... 37

6.5.4 Function "Measurement"..... 39

6.5.5 Diagnosis..... 39

6.5.6 Application info 40

6.6 PC ⇔ SafeC (Download) 42

6.6.1 Download to SafeC x00 SW < V1.15 ... 42

6.6.2 Download to SafeC x00 SW ≥ V1.15 ... 44

6.6.3 Verify download 45

6.7 SafeC ⇔ PC (Upload) 48

7. Blanking modes 48

7.1.1 Fixed Blanking..... 49

7.1.2 Floating Blanking 49

7.1.3 Reduced Resolution..... 50

7.1.4 Combining Blanking modes..... 51

7.1.5 Indication of Blanking..... 51

8. Troubleshooting 51

8.1 OptiLink Communication Error 51

This manual refers to the Software Configuration Tool V 4.33 and later Versions.

1. Important notice

Important safety advice:

CEDES safety and automation products can only achieve their function as a safety controller module, if the instructions given in this instruction manual and the within mentioned documents are exactly followed, as well as consulting the valid laws and regulations at the time of installation.

Should these instructions not be carefully followed, serious injury or death may occur. The installer or system integrator will be fully responsible for a safe integration of this product. In this case CEDES, or any other party who may have distributed the software will not be liable for any damages.

The configuration of a SafeC 200, SafeC 400 or SafeCIS3 controller may only be performed by authorized personnel. The configuration of every controller must correspond to the requirements of the risk analysis for the monitoring of every application. An incorrect, or insufficient configuration may lead to serious injury or even death.

To configure a unit mentioned above, a password and an OptiLink are necessary. Both of these must only be made available to authorized personnel.

This instruction manual is part of the controller module type SafeC 200 / SafeC 400 and SafeCIS3. It must be kept accessible together with the other machine documentation during its entire life cycle for all personnel responsible for assembly, installation, operation and maintenance.

All details reported by the program are for guidance only. CEDES does not give any warranty for calculations, general information, prices or technical details about correctness and completeness.

In the interests of continual technical advancement, CEDES reserve the right to amend the specification of the products and of the prices detailed in this software without prior notice. For further information contact the CEDES headquarters or your nearest CEDES distributor.

This software is provided "as is" without warranty of any kind either expressed or implied, including but not limited to the implied warranties merchantability and fitness for a particular purpose. The entire risk as to the quality and performance of the product is with you. Should the product prove defective, you assume the cost of all necessary servicing or error correction. CEDES does not warrant that the functions contained in the software will meet your requirements or that the operation of the software will be uninterrupted or error free.

In no event shall CEDES, or any other party who may have distributed the software as permitted above, be liable for damages, including any general, special, incidental, or consequential damages arising out of the use or inability to use the software (including but not limited to loss of data or data being rendered inaccurate or losses sustained by you or third parties or failure of the software to operate with any other products), even if such holder or other party has been advised of the possibility of such damages.

TÜV Rheinland Product Safety GmbH, has tested the functions and the safety relevant adjustment possibilities of this software, and confirmed the basic correct functioning of all adjustment possibilities.

Remark:

Obviously this program could not be tested with every type of computer or operating system. For that reason every result has to be proved for plausibility. Every calculation of this program is based on standards EN 999 (1998) and EN 61496-2. Special applications with their specific standards as well as country specific directions are not taken into account. Therefore the user is responsible for the application of this program.

2. Introduction

The software "Configuration Tool" developed by CEDES Safety & Automation is designed for the most varying of applications. It can be used as a truly active work-instrument by technicians, safety experts, maintenance personnel, designers, process controllers as well as purchase managers.

The program is used firstly to configure the CEDES safety and automation products and secondly for diagnosis functions together with the "OptiLink". The "Configuration Tool" software is delivered with every OptiLink and is also available free of charge, on the Internet at <http://csa.cedes.com>.

This software description manual covers the following CEDES controller types:

- Safety relay SafeCIS3
- Safety relay SafeC 200 xx
- Safety relay SafeC 400 xx

With the help of this software, functions like start method (automatic, manual, or two-hand), stop delay, Blanking, EDM, and "Safety prevention" can be chosen easily and configured graphically

The Configuration Tool for following light curtains is covered by the manual 104 058 "Configuration Tool CEDES Light Curtains".

- Safety light curtain Safe2+
- Safety light curtain Safe4
- Safety light curtain Safe200
- Safety light curtain Safe400
- Measuring light curtain Object100

The software is an excellent tool where technical data and various application information of all the different systems is obtained in seconds. Use this software as an active work tool and you will be impressed by the large range of possibilities the CEDES safety systems offer.

2.1 Special Features

The outstanding features of the Configuration Tool are:

- Simple installation
- Simple graphical user interface
- Easy to use
- No programming knowledge necessary
- Diagnosis tool integrated
- Detailed safety information integrated
- OptiLink communication software included
- Password protected configuration
- Enables process control
- Optimize maintenance services
- Order code generation by mouse click
- Comfortable design of more than 14,000,000 light curtains
- Visual indication of terminal assignment
- TÜV certificated application info
- Free download at www.cedes.com

3. Installation

3.1 Preparation

⚠ Important notice:

Before connecting the USB OptiLink to the computer the software Configuration Tool has to be installed (see chapter 3.3).

During installation the USB driver software is copied to the hard disk. After this the USB OptiLink can be connected to the computer and the driver software installed according chapter 3.4.

Before installation of the newest version of the Configuration Tool, CEDES recommends that the previous versions be uninstalled. This is carried out using the following link:

Windows-Start - Program - CEDES - SAFETY - Safety Configurator Additional - Uninstall CEDES Configuration Tool

Make sure that all programs active in the background on your PC are shut down. These may disturb the correct "Set up" installation of the Configuration Tool.

3.2 Operating Systems

The Configuration Tool works on the following operating systems:

- Windows 2000
- Windows XP SP1, SP2
- Windows Vista

3.3 Installation Software Configuration Tool

Start installation with the following link

setupConfigurationTool_Vxxx.exe

The program can be found on the CEDES Safety & Automation CD (103 282, supplied with each OptiLink), or downloaded free of charge from www.cedes.com.

Follow the instructions of the setup program (Figures 1-15). This manual refers to the proposed settings of the setup program. Using the blue marked buttons leads to a successful installation of the Configuration Tool.

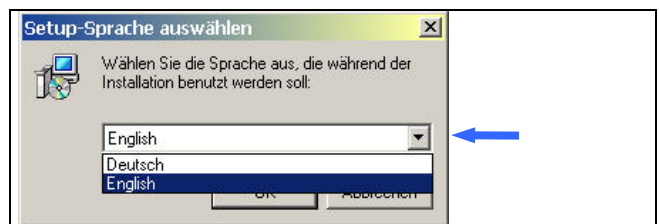


Figure 1: Language selection

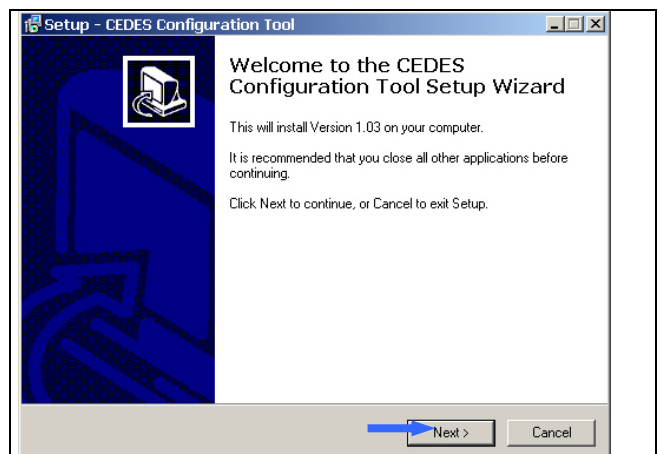


Figure 2: Welcome window for installation

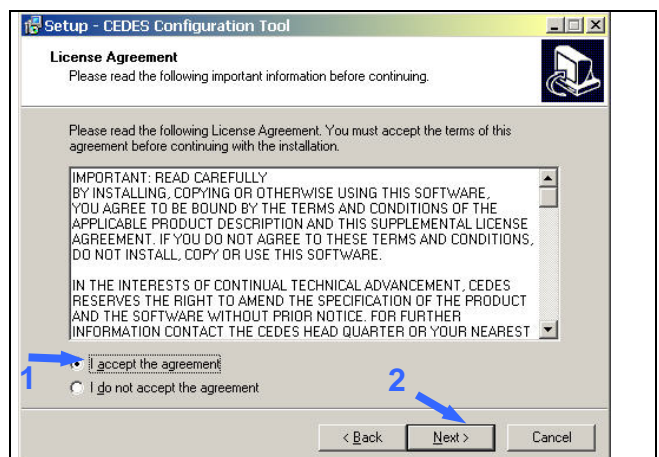


Figure 3: License agreement

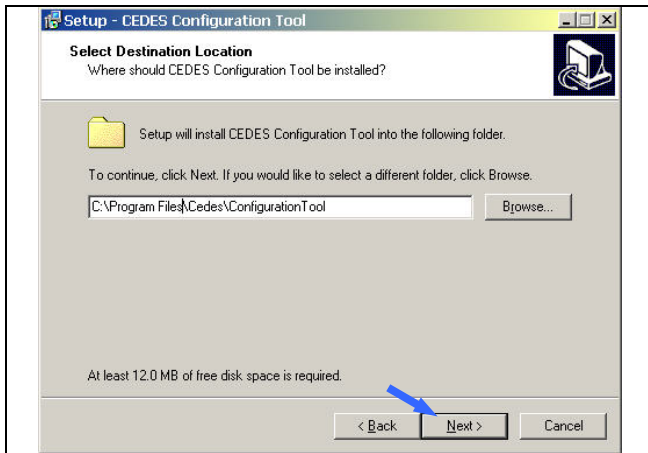


Figure 4: Select target folder of installation
(Default: C:\Program Files\Cedes\ConfigurationTool)

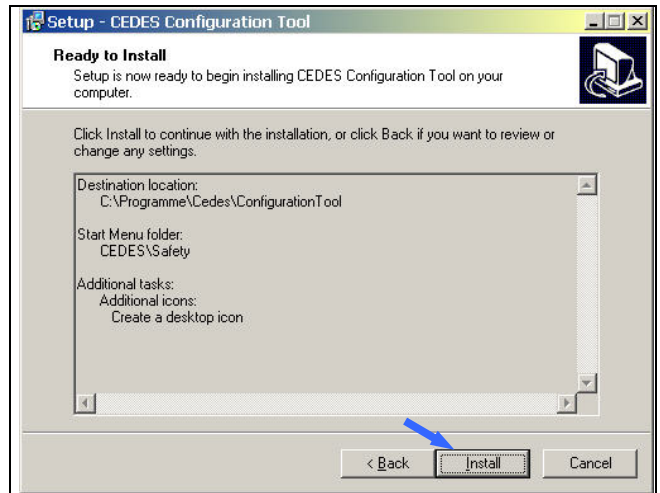


Figure 7: Run installation

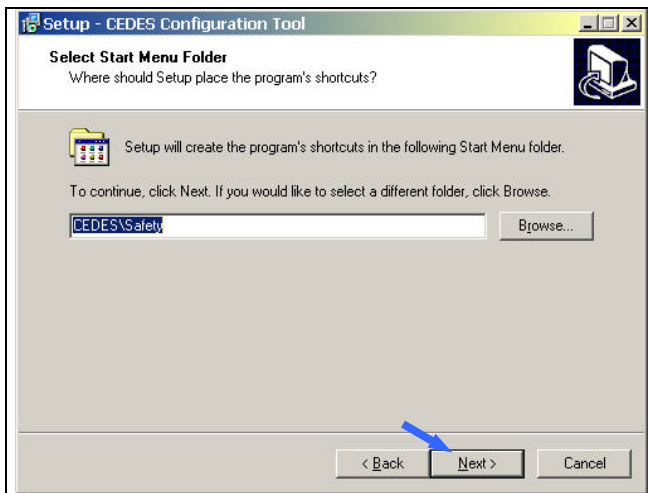


Figure 5: Select the start menu folder

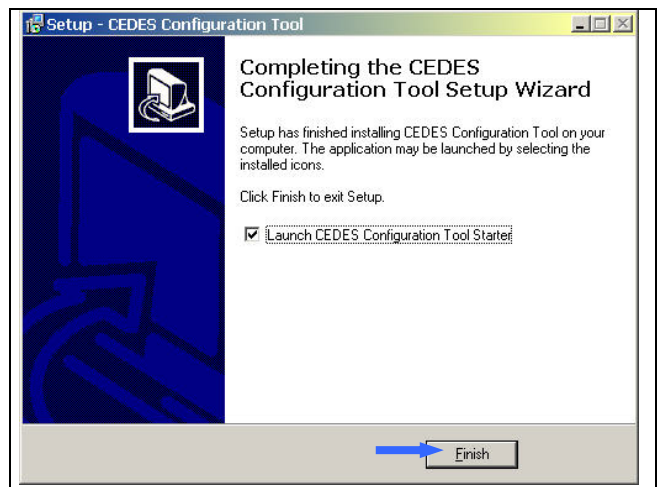


Figure 8: Installation finished

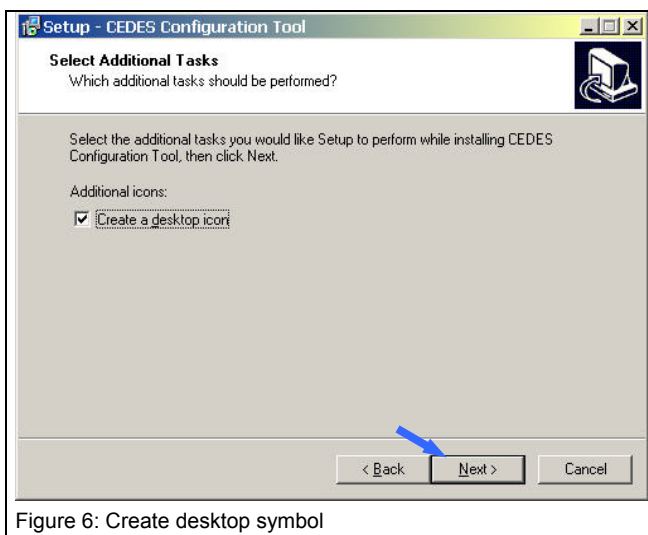


Figure 6: Create desktop symbol

⚠ Important safety notice:

After installation, in the program Safety Configurator SafeC 200/400 the authorized user is recommended to immediately enter their user registration information, as well as change the password (chapter 6.3). The first time the program starts up, you will be automatically prompted to customize the password and user data. Access to the password, as well as the OptiLink, is only permitted for authorized personnel.

3.4 Installation USB driver for OptiLink

In case the driver shown in Figure 139 already installed on your computer, it has to be uninstalled (Windows-Start, Settings, Control panel, Software, select driver software, press remove).

Connect the USB OptiLink to your computer. The following window pops up automatically (Figure 9). Depending from the Windows operating system the message can be slightly different. Select 'No, not this time' (when selectable) and click 'Next'.

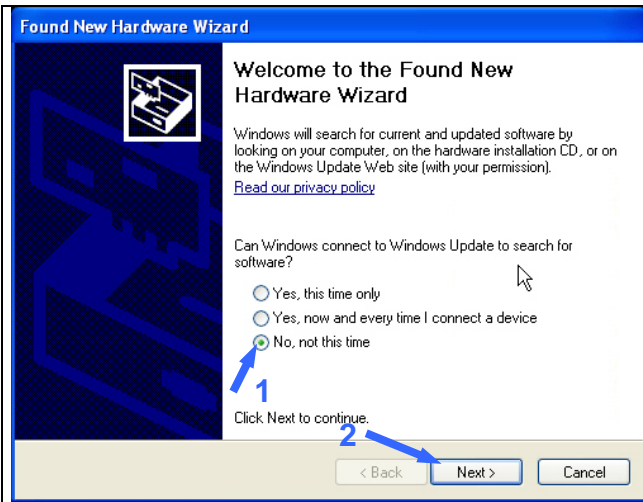


Figure 9: The assistant searching for new hardware appears after plug-in the USB OptiLink to the computer.

Run the next step according your operating system:

- Windows2000:
select 'search for driver (recommended)' and press 'continue' then select 'Other Source'
- Windows XP_
Select 'Install software from a list' and press continue.

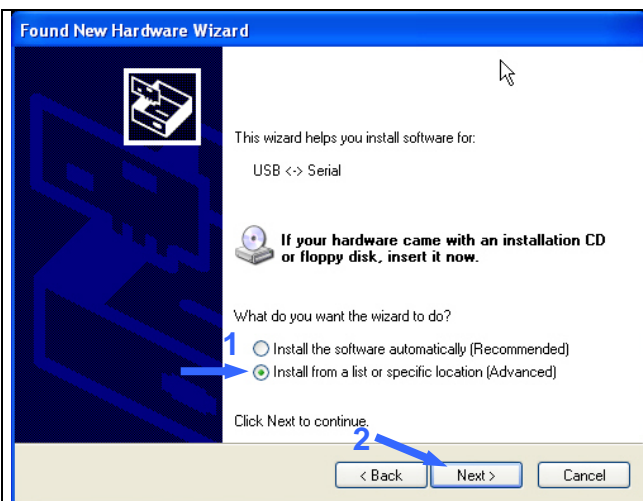


Figure 10: Install software from a list (example Windows XP)

- For both operating systems:
Select 'Search for the best driver in this location' and enter folder

C:\Program files\Cedes\ConfigurationTool\WinDriver (Figure 11). Press 'Next' to continue.

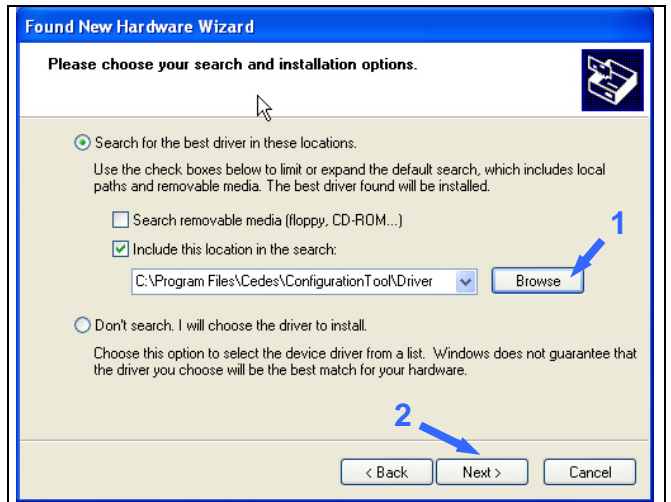


Figure 11: Select folder with driver software

Only for Windows XP: If the message warning for uncertified driver (not-WHQL certified) is configured, message in Figure 12 appears. Press 'Next'

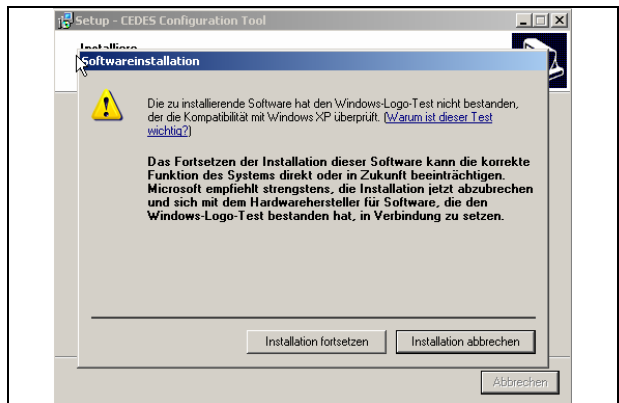


Figure 12: Message window for uncertified drivers (only Windows XP)

Figure 13 appears and shows the copying of the driver files.



Figure 13: Software is being installed

After successful installation of the software the window 'Completing the found new hardware wizard' appears (Figure 14). Pressing button 'Finish' ends the installation.



Figure 14: Completion of the installation of the USB driver

The USB serial converter is now installed. Windows however has not installed the USB port driver. Therefore the window 'Assistant for searching for new hardware' appears (Figure 9), now for a second time. Repeat the installation steps, described before (Figure 9 - Figure 14). The OptiLink will now operate with your computer.

3.4.1 Successful driver installation

With successful driver installation a new COM port (Com x) becomes available. The port number needs to be selected in the Program Configuration Tool (see menu item "Com Port Settings") in order to be able to communicate with a CEDES unit via the USB OptiLink.

The Windows Hardware Manager (Start – Settings – Control panel – Device manager) displays the USB Serial Port Number (com x). (Example: COM Port 7 in Figure 15).

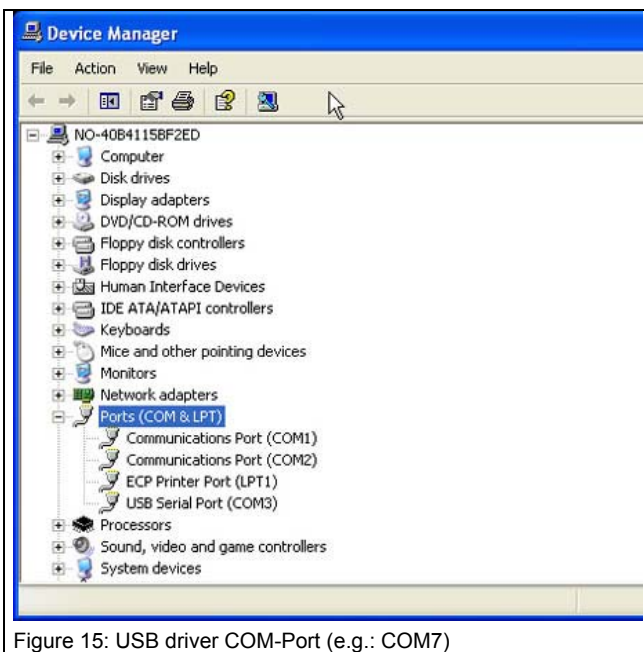


Figure 15: USB driver COM-Port (e.g.: COM7)

3.5 Program start

The Configuration Tool can be started from the desktop or the windows start menu.

'Windows-Start' – 'Program' – 'CEDES' – 'SAFETY' – 'Configuration Tool Starter'.

The Configuration Tool starts with the selection window (Figure 16). A product line can be selected and the specific configuration program will be started. At this time, the following product lines are available:

- Safety light curtain Safe2+ / 4
- Safety light curtain Safe200 / 400
- Safety Control unit SafeC 200 / 400
- Safety Control unit SafeCIS3
- Light curtain Object100



Figure 16: Selection window

First select your preferred language with the pull-down option "Language" in the top right corner of the window. Then select your preferred product group and the welcome window for this product appears.

4. OptiLink

OptiLink is an optical interface between a CEDES safety product and a computer USB interface. The OptiLink allows for a fast, simple and comfortable interface between a CEDES safety light curtain (e.g. Safe2+ / Safe4) or controller module (e.g. SafeC 400 / SafeCIS3) and a PC. The OptiLink can be used as an excellent diagnosis tool (real time and long term diagnosis) in order to find errors such as insufficient supply voltage, a short circuit of the output, etc..

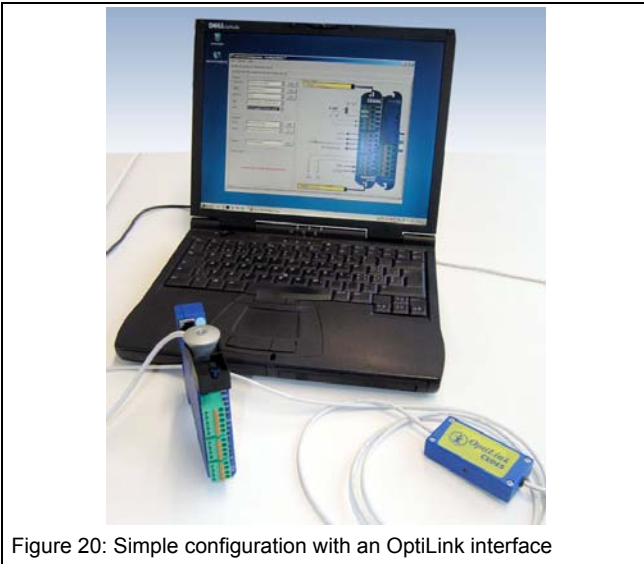


Figure 20: Simple configuration with an OptiLink interface

If a SafeCIS3 controller is connected to a CEDES Safe400 safety light curtain, then thanks to the "Safety Configurator SafeCIS3" software, various modes like e.g. Muting may be configured. Additional functions are also available. Contact your local CEDES partner to find out about the possibilities.

5.2 Starting SafeCIS3 Safety Configurator

The Configuration Tool starts with the selection window (Figure 16). First select your preferred language with the pull-down option "language". Then select "SafeCIS3" and the welcome window for this product appears.

If the user information has not yet been entered (e.g. first start-up), a window will request it (Figure 21). Change the standard password "CEDES" in window Figure 22 and enter user information in window Figure 23.

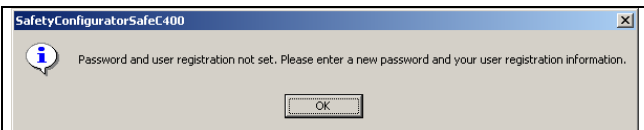


Figure 21: Message to enter the user information

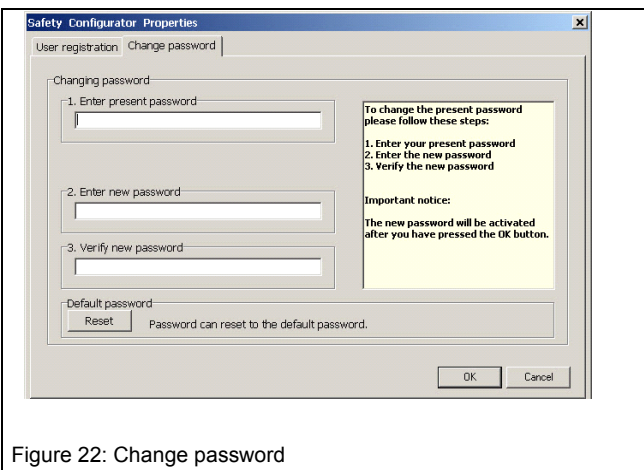


Figure 22: Change password

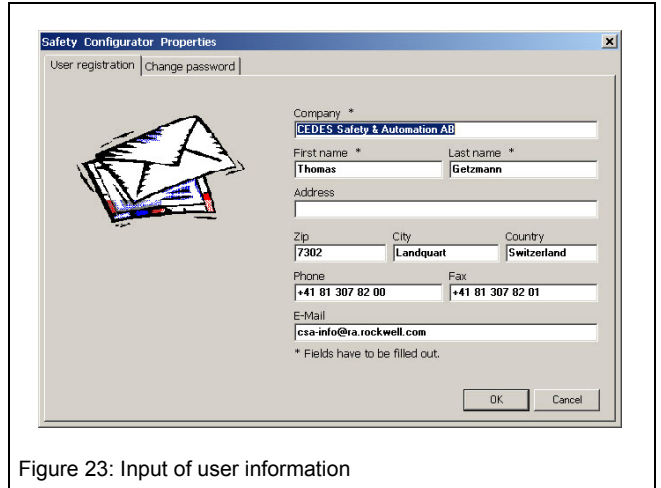


Figure 23: Input of user information

Now the program "Welcome window" (Figure 24) is opened. In this window you will find a link to the important safety information. Read the information by clicking the mouse when the cursor is in the exclamation mark (1). Press "Accept" to accept the information.

By clicking on "Enter SafeCIS3 Configurator" (2) you accept this safety information, and the program will continue.

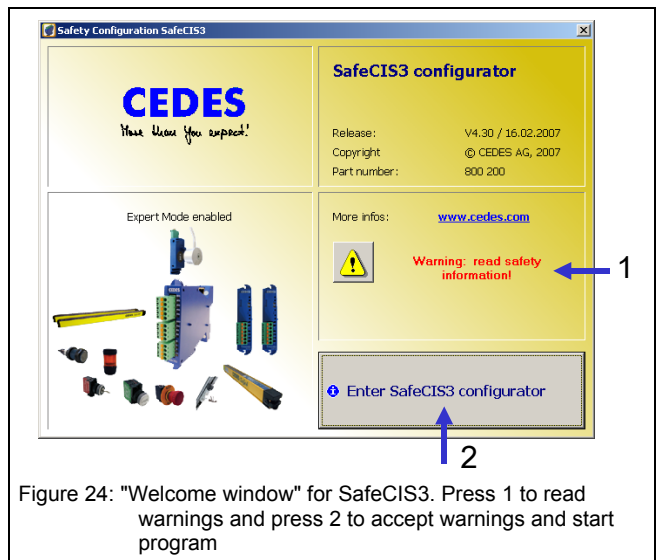


Figure 24: "Welcome window" for SafeCIS3. Press 1 to read warnings and press 2 to accept warnings and start program

Thereafter the main window will appear. In the main window you have the menu bar (1 in Figure 25), as well as the following three tab sheets (2 in Figure 25) available for selection:

1. Design
2. Diagnosis
3. Application Info

Each of these tab sheets may be divided into further tab sheets (3 in Figure 25).

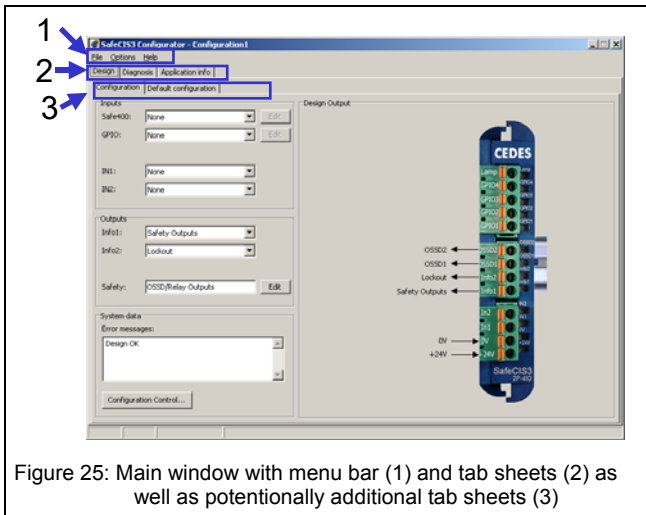


Figure 25: Main window with menu bar (1) and tab sheets (2) as well as potentially additional tab sheets (3)

5.3 The menu bar

The menu bar contains three pull-down menus (Figure 26):

1. File
2. Options
3. Help

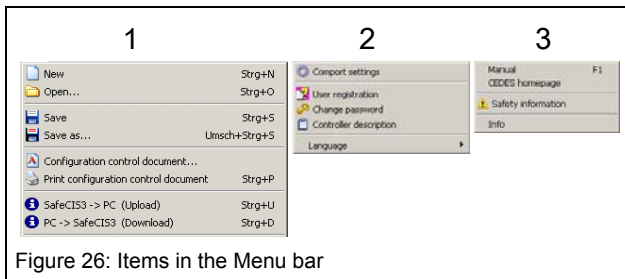


Figure 26: Items in the Menu bar

5.3.1 Menu "File"

Menu "New"

Create a new configuration.

Menu "Open"

Opens an existing configuration file according to the given String and Data name. "*.cfg" is defined as the standard extension for the configuration data name.

Menu "Save"

Saves the current configuration under the most recent name and location.

Menu "Save as"

Saves the current configuration under a new name and given location.

Menu "Configuration control document"

Displays the current configuration control document on screen.

Menu "Print configuration control document"

Creates a Configuration Control Document according to the current configuration.

Menu "SafeCIS3 => PC (Upload)"

Loads the current SafeCIS3 control unit configuration into the PC (chapter 1.1).

Menu "PC => SafeCIS3 (Download)"

Loads the current configuration from the PC, into the SafeCIS3 control unit (chapter 1.1 and 1.1).

Menu "Exit"

Ends the "Safety Configurator" program.

5.3.2 Menu "Options"

Menu "Com Port settings"

Standard settings for the interface parameters, should be controlled after every new program start.

Standard interface parameters	
Baud rate	19200
Data bits	8
Stop bits	2
Parity	None
Flow-control	None

The COM port must be selected according to the HW settings of the PC (Figure 27).

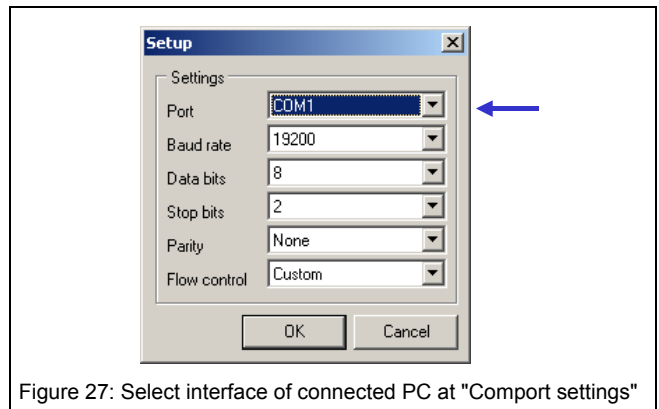


Figure 27: Select interface of connected PC at "Comport settings"

Menu "User registration"

This menu button opens the window "User registration" (Figure 28). This information is needed before a configuration download is allowed.

Data entered in the "User registration" fields will be used to complete the information printed on the Configuration control document (.). This information must only be entered once, as it is saved in the PC.

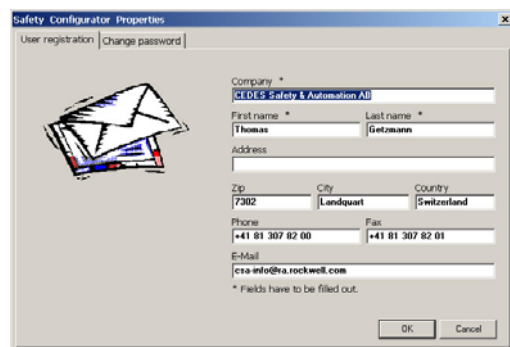


Figure 28: User registration

Software Description

Menu "Change password"

This option allows the existing password to be changed (Figure 29). The password as well as the OptiLink should only be made available to authorized personnel who are permitted to carry out new configurations. When installing the software, care should be taken to change the standard password "CEDES" as soon as possible so that any possibility of unauthorized usage can be eliminated.

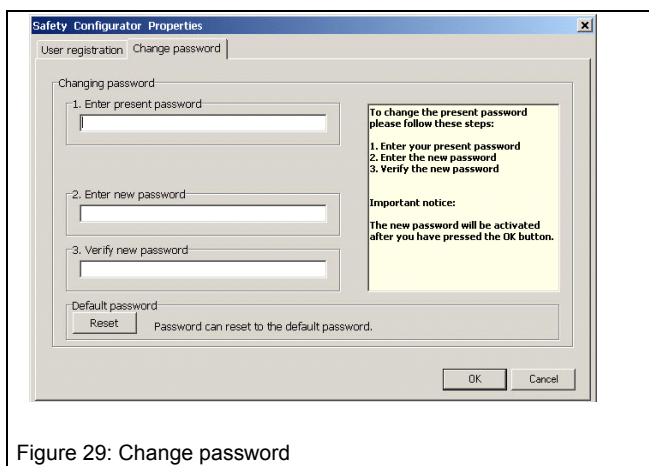


Figure 29: Change password

When the Configuration Tool is first installed the default password is "CEDES" (capital letters!). A lost password can be recovered by your CEDES partner. In such a case, please contact your nearest CEDES office.

Menu "Controller description"

The device number (Figure 30) which must be entered is found on the product label () of the control unit which will be configured. This number will be printed on the configuration control document and is the link between this document and the control unit. The field 'Designation' can be used to allocate a well-defined identifier string for the configuration (Figure 30). This identifier will be printed on the configuration document (). This string makes it easier to identify the control unit in the future.

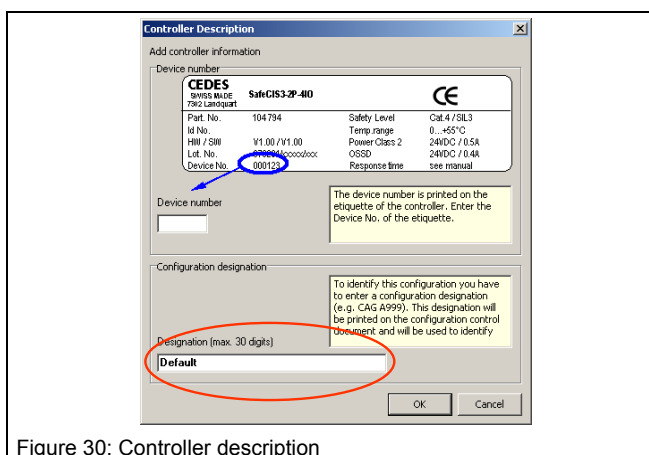


Figure 30: Controller description

Menu "Language"

Here the preferred language is selected.

5.3.3 Menu "Help"

Menu "Manual"

Shows the manual of the configuration tool software.

Menu "CEDES home page"

Opens the installed Internet-Browser and establishes a connection to the CEDES home page.

Menu "Safety-Information"

Gives important safety information for installing and operating the software.

Menu "Info"

Displays the welcome window to check software version.

5.4 Main window

In the main window, three tab sheets are available to choose from (Figure 25):

1. Design (chapter 5.4.1)
2. Diagnosis (chapter 5.4.2)
3. Application info (chapter 5.4.3)

By clicking on one of the tab sheets, you can move into the corresponding area.

5.4.1 Tab sheet "Design"

In the design window two additional tab sheets are available (1, Figure 31):

1. Configuration (chapter 5.4.1.1)
2. Default configuration (chapter 5.4.1.2)

5.4.1.1 Configuration

This tab sheet offer the possibility to specify the type and the properties of the safety components which should be controlled. By clicking on the boxes in the area "Inputs" (2, Figure 31) the following options may be specified:

- a. If a Safe400 light curtain is connected or not
- b. Which safety component is connected to the GPIO terminals (e.g. safety switch 2 channel, safety prevention switch, muting sensors)
- c. Which type of signal is connected to the input IN1 (e.g. Test input, Start, None)
- d. Which type of signal is connected to the input IN2 (e.g. Start, EDM, Start release, None)

Detailed information to the different possibilities is given in chapter 5.5.

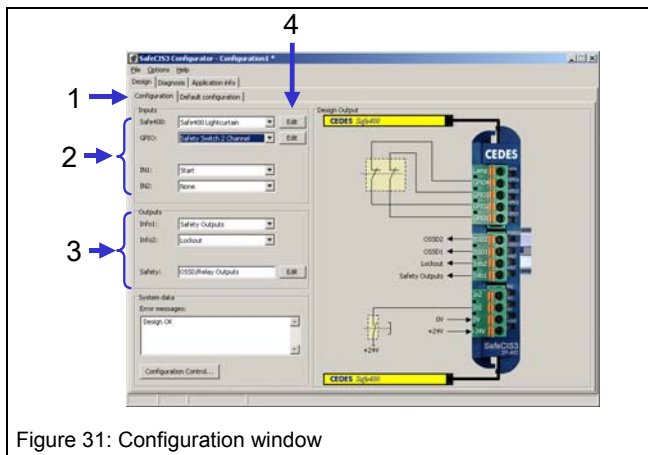


Figure 31: Configuration window

After selecting a component or a feature, an individual specification window will pop up to allow further setting adjustments. Adjust these settings by clicking on "Edit" (4, Figure 31).

All specification windows are set up similarly. They show the connection terminals, give important safety information, and allow the user to change all important configuration data.

After selecting a safety component the "Design output" shows graphically how the safety component must be connected to the control unit (Figure 31).

If one of the safety components displays an exclamation mark, this means that a stop delay has been activated for this component.

By clicking on the boxes in the area "Outputs" (3, Figure 31) following options may be specified:

- Which status information should be given over the status outputs Info1 and Info2.
- An additional delay time of the OSSD safety outputs
- Start release or external device monitoring function (EDM)

In the lower portion of the Configurator window is an information field, which gives information about the possibilities available at the current cursor location.

By selecting the "Configuration control" button the corresponding configuration control document will appear.

5.4.1.2 Basic configuration

All SafeCIS3 control units are delivered with the "basic configuration". The characteristic of this "basic configuration" is well described in the CEDES SafeCIS3 operation manual (document number 104 720). To set a SafeCIS3 control unit back to the original "basic configuration" just open the basic configuration window (Figure 32) and follow the instructions to download these parameters (chapter 1.1).

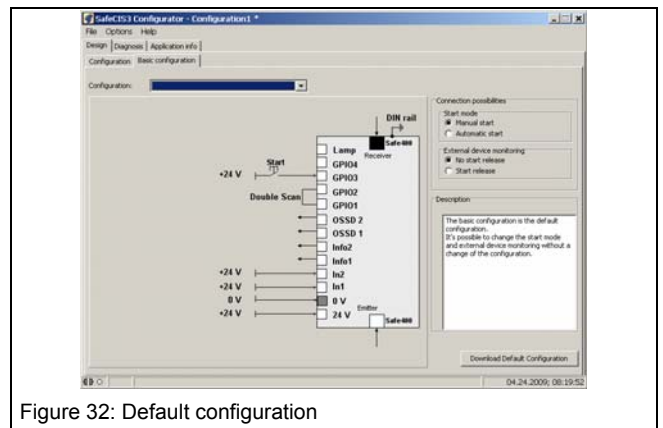


Figure 32: Default configuration

In this window the four different wiring diagrams of the "basic configuration" can also be displayed.

5.4.2 Diagnosis

In order to carry out a diagnosis of a SafeCIS3 control unit, the following steps must be made:

1. Connect the OptiLink, to both PC and SafeCIS3
2. If not already done, start the program Safety Configurator SafeCIS3
3. Select the appropriate COM interface from the menu bar, under: Options \Comport settings (Figure 27)
4. Select the "Diagnosis" tab

The program immediately detects the application and displays the transmitted data on the monitor. As soon as communication is established between the PC and the CEDES SafeCIS3 controller, four different functions may be selected:

- Protective field viewer
- Service information
- Muting time recorder
- History recorder

Switch between these functions by choosing the corresponding tab.

5.4.2.1 Protective field viewer

This function graphically shows the interrupted area of the Safe400 light curtain protective field (Figure 33). The numbers displayed in this window represent the first and the last interrupted beams.

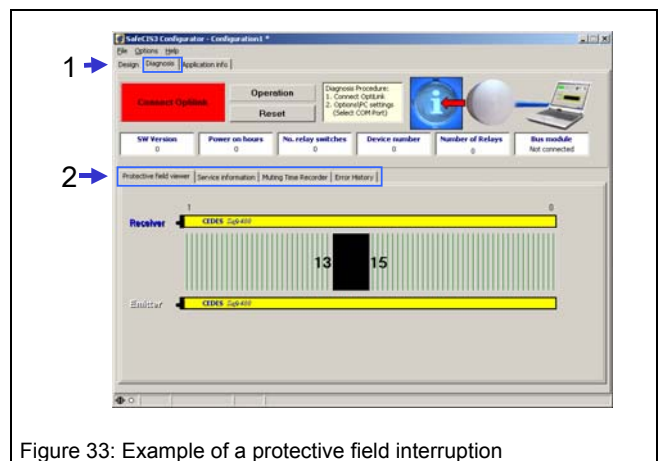


Figure 33: Example of a protective field interruption

5.4.2.2 Service information

For diagnosis of a CEDES SafeCIS3 control unit, a short description of the error type can be found in the "Service Information" (Figure 34). External and internal errors, as well as necessary corrective actions, will be displayed here.

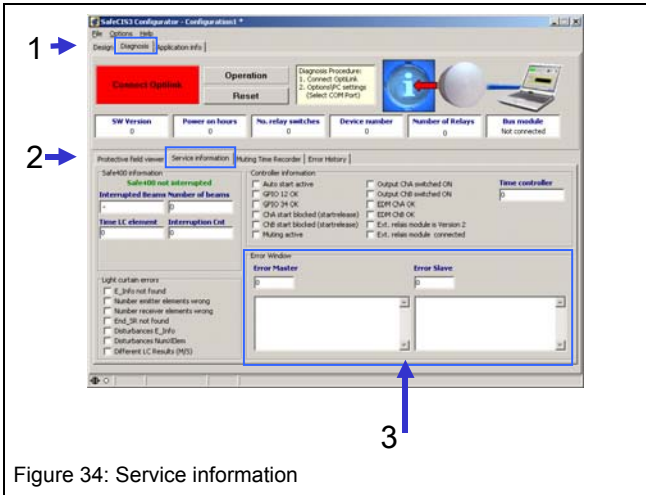


Figure 34: Service information

5.4.2.3 Muting time recorder

After configuring a muting function, the configured time sequence can be compared with the actual time sequence at the machine. By connecting the OptiLink the actual values will be displayed in the tab sheet "Muting time recorder" (Figure 35).

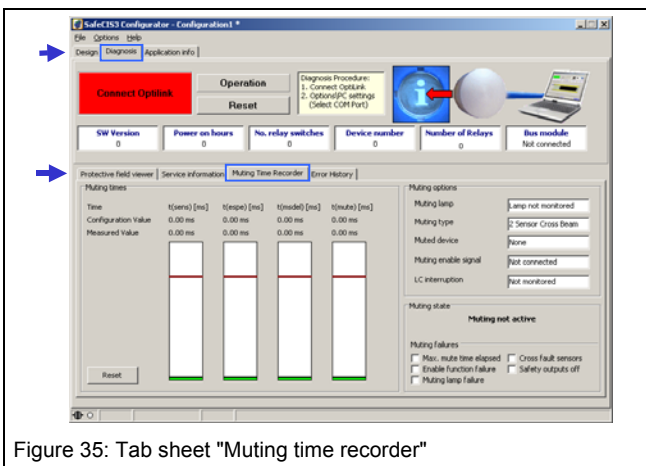


Figure 35: Tab sheet "Muting time recorder"

5.4.2.4 Error history

The tab sheet "Diagnosis" (Figure 36) contains also a tab sheet called "Error history recorder".

Contact your CEDES partner in order to receive more information regarding the tab sheet "Error history recorder".

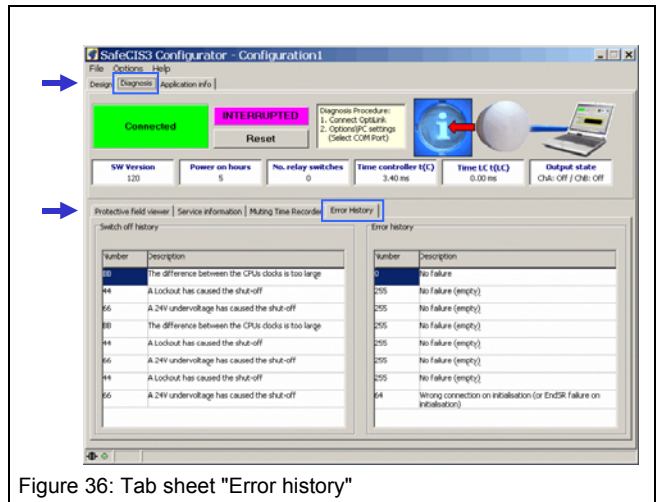


Figure 36: Tab sheet "Error history"

5.4.3 Application infos

This part of the program calculates the minimum safety distances for applications with vertically mounted light curtains Safe400. The corresponding calculations are carried out according to the standards EN 999 (1998) and EN 61496-1, -2. These results can be printed and included as part of the complete risk analysis documentation (all calculations are tested and certified by TÜV Rheinland).

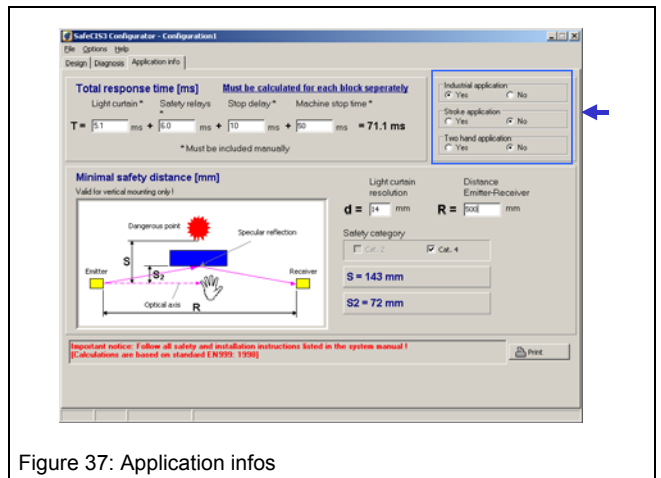


Figure 37: Application infos

To start, the type of application (Figure 37) must be specified.

The Configuration Tool offers three choices of application:

1. **"Industrial Application; Yes or No"**
Choose "Yes" if the application is industrial. Select "No" if the application is not industrial (this means that children also have access to the application).
2. **"Stroke Application; Yes or No"**
Choose "Yes" if the application starts automatically after a preset number of interruptions of the protective field occurs (e.g. presses). Select "No" if the application is not a stroke application

3. "Two Hand Application; Yes or No"

Choose "Yes" if the application is started with a two hand start button. Choose "No" if not

The following information is necessary from the configuration control document in order to start the calculations of the minimum safety distances (Figure 38):

- The response time of the Safe400 light curtain [t(LC)]. (See label or if specified see configuration control document).
- The response time for the SafeCIS3 control unit [t(C)] .
- The configured stop delay for the safety output [t(delay)].
- If used the reaction time of the CEDES extension relay module [t(em)].

The machine stopping time is also needed. This "time" must consider the total length of time, from the moment the SafeCIS3 extension relay contacts open (or when the OSSD outputs change from high to low), until the machine stops. The momentum of the machine, for example, must also be taken into consideration when calculating this stopping time.

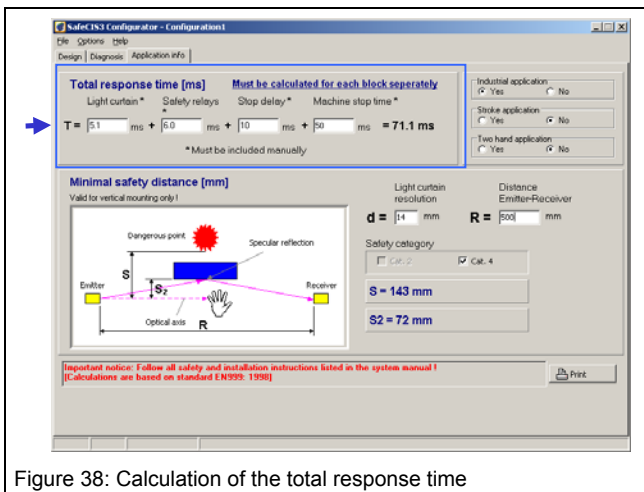


Figure 38: Calculation of the total response time

The default value for the SafeCIS3 control unit response time t(C) is set to 15 ms and can for a defined configuration can be adjusted to the time which is given on the configuration control document.

For information regarding the response time of a Safe400 safety light curtain t(LC), see label or if the Safe400 is defined (4, Figure 31) see the configuration control document.

To complete the calculations, the following data must also be entered (Figure 39):

1. The light curtain resolution (1),
2. the distance between emitter and receiver (2) and
3. the safety category (3).

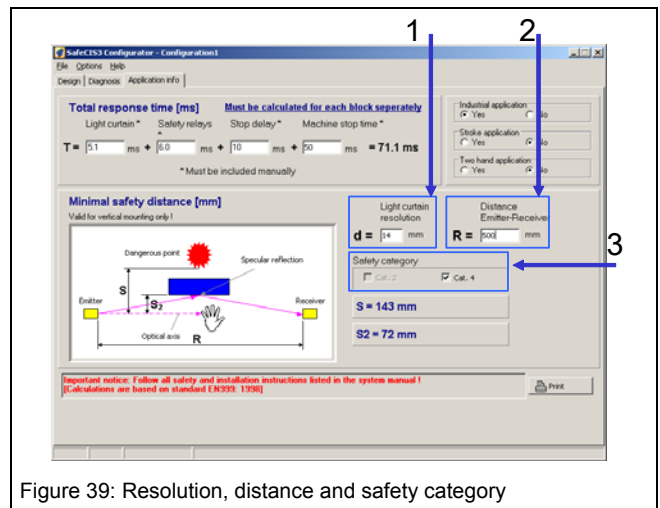


Figure 39: Resolution, distance and safety category

If all the data is entered, the following result will be displayed:

- The minimum safety distance between the protective field and the danger point (S [mm]), for vertical mounting.
- The minimum safety distance to a reflective surface (S2 [mm])

Notice:

Consult the Safe200 / Safe400 technical description document (CEDES part number: 103 373) or your nearest CEDES partner, in order to receive more information regarding these calculations.

In order to see what formula are used to calculate the safety distances, simply position the cursor over the corresponding result. After a short period of time in this position, the corresponding formula will be displayed (Figure 40).

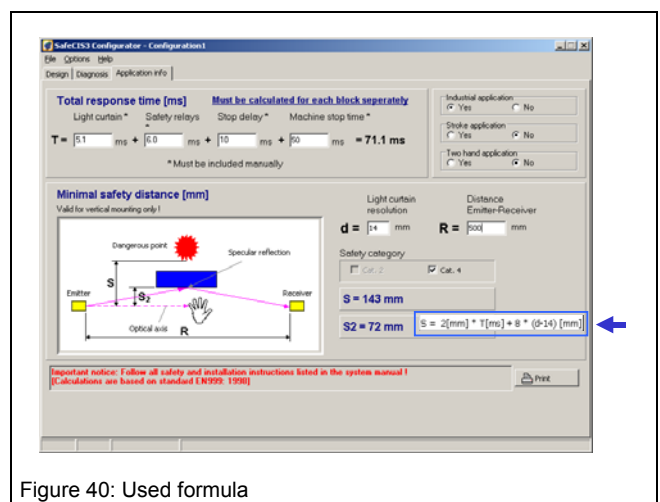


Figure 40: Used formula

5.5 Configurable possibilities

5.5.1 Configurable devices

Currently, the following inputs are available for individual safety components (2, Figure 31):

- 5.5.2 Safety switch 2 channel
- 5.5.3 Safe4
- 5.5.4 Safe400
- 5.5.8 Testable sensor

Generally the individual specification windows for the safety components are structured the same way to select if a stop delay and the kind of start mode which has to be activated for this safety component.

Furthermore the following special functions can be configured.

- 5.5.7 Safety Prevention Safe400
- 5.5.8 Muting Safe400
- 5.7 Blanking Safe400
- 5.5.10 Muting Safe4

Detailed settings or functions can be done in the individual specification windows. These windows pop up after selecting the functions or can be opened by pressing "Edit" (4, Figure 31).

⚠ Important safety notice:

When configuring the start mode and / or using the "Safety prevention switch", the general safety notices found in "Technical Description SafeCIS3 (CEDES part number: 104 720) must be followed!

All safety notices for the respective safety components can also be found by clicking on the following icons!



5.5.2 Specification "Safety switch 2 channel"

In the GPIO input specification window "Safety switch 2 channel" (Figure 41), the corresponding start mode, as well as a potential stop delay time can all be configured. To define the exact delay time see chapter 5.5.12.



Figure 41: Specification window "Safety switch 2 channel"

5.5.3 Specification "Safe4"



Figure 42: Specification window "Safe4"

In order to configure a Safe4 light curtain the GPIO input specification window: Safe4, must be opened.

Up to two Safe4 light curtains can be monitored at the same time: the OSSD outputs of one Safe4 at the terminals "GPIO1" and "GPIO3"; the OSSD outputs of second Safe4 at the terminals "GPIO2" and "GPIO4".

Similar to the previously described specification window, the corresponding start mode, as well as the potential stop delay time may be configured. Both Safe4's will have the same start mode and potential stop delay time.

5.5.4 Specification "Safe400"

In order to configure a Safe400 light curtain, the input specification window Safe400 must be opened.

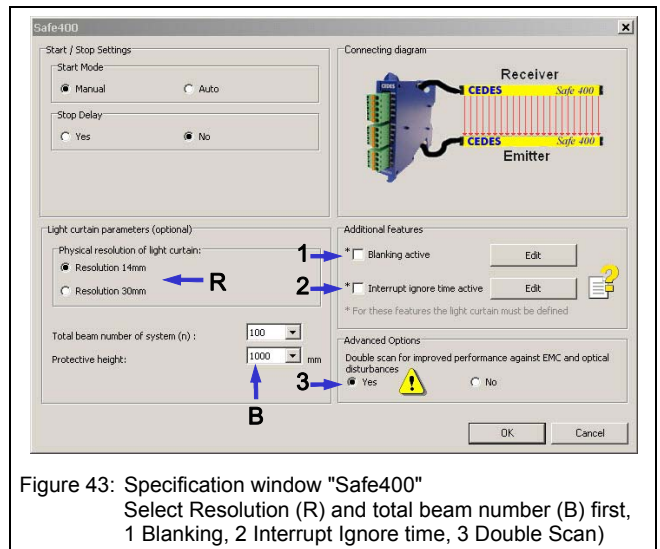


Figure 43: Specification window "Safe400"
Select Resolution (R) and total beam number (B) first, 1 Blanking, 2 Interrupt Ignore time, 3 Double Scan)

Similar to the previously described input specification windows, the corresponding start mode, as well as any potential stop delay time may be configured.

The safety function of the Safe400 safety light curtain may be overridden for a period of time through use of the "Safety prevention" switch (chapter 5.5.7) or the safety function may be muted (chapter 5.5.8). In addition some beams of the Safe400 light curtain may be blanked (chapter 5.7) The override function, blanking function as well as the muting function, is only allowed after a thorough safety analysis according to EN ISO 13849-1 and EN 12100 -1/-2 is completed.

In the Safe400 specification window it is also possible to specify the Safe400 light curtain attached to the SafeCIS3 safety controller. This specification will lead to a reaction time $t(LC)$ which is only valid for this exact type of light curtain, when connected to this SafeCIS3 safety controller. In case a specific resolution and total system length have been defined these values as well as the specific reaction time for this light curtain: $t(LC)$, will be printed on the configuration control document ().

5.5.5 Function "Double Scan Filter"

The controller scans the light curtain optical elements two times to evaluate the state of the light curtain. This mode is very robust against electrical or optical disturbances. Inactivating of the filter results in a faster response time.

Using the basic configuration or if the GPIO terminals are configured accordingly the double scan filter is activated by bridging the terminals GPIO1 with GPIO2 (see Figure 32 and Figure 44).

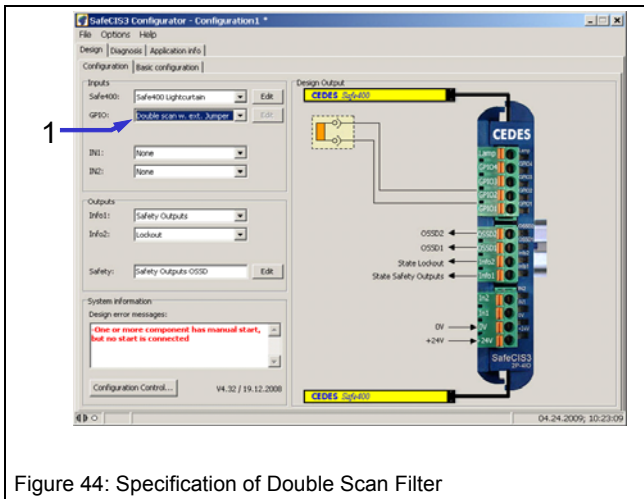


Figure 44: Specification of Double Scan Filter

The double scan filter can also be activated with a configuration only (see Figure 43 - 3).

⚠ Warning: Important safety advice

An inactive double scan mode offers a faster response time than an active mode. Consider the exact response time when evaluating the safety distance. The configuration control document shows the configured response time, by default with active double scan filter.

5.5.6 Function "Interrupt ignore time"

A limited time a light curtain interruption will be ignored. This may be used when parts may move at a fast speed through the light curtain without switching the output, but a human will interrupt the light curtain at time longer than the configured time and bring the output to switch off.

⚠ Important safety advice:

- Interrupt Ignore Time will increase the response time. Recalculate the safety distance.

The Interrupt Ignore Time function has to be activated by the configuration software and downloaded to the SafeCIS3 main module with help of the OptiLink interface.

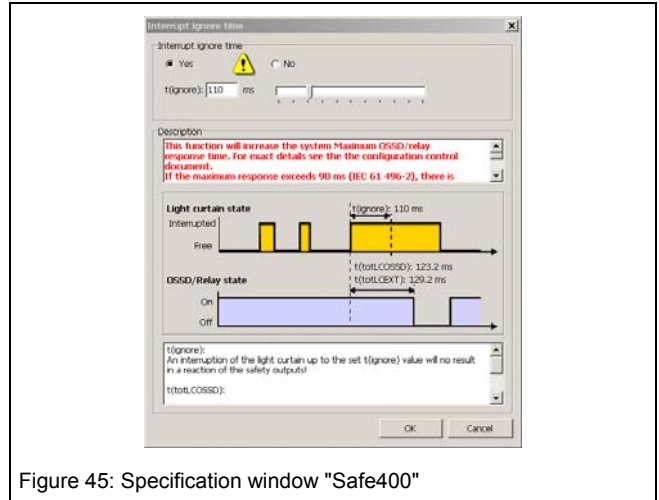


Figure 45: Specification window "Safe400"

5.5.7 Specification "Safety prevention"

Certain applications in practice require that the Safe400 light curtain protective field needs to be overridden "manually" without the SafeCIS3 safety contacts opening. A typical example of such an application is during the installation or service of a machine. It should be possible to run the machine even if the protective field is interrupted. A maintenance or service key is typically used to initiate a "Safety Prevention" mode

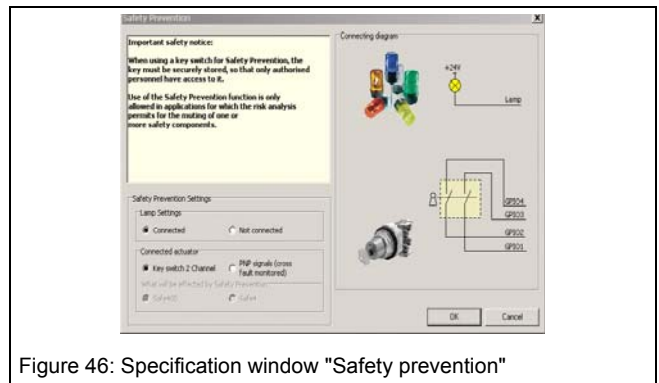


Figure 46: Specification window "Safety prevention"

If the risk analysis of the application shows that it is necessary to monitor the function of a muting lamp during such a safety prevention condition, this feature may be configured (chapter 5.6.2).

For special applications it is also possible that the 2 signals of the safety prevention switch are replaced by two safety signals (e.g. a safety PLC gives a maintenance signal that the machine should run at a lower speed for service purposes). In such an application a key must still be placed in series with

the two safety signals. Only when the key switch is activated and the safety signals are "high", will the safety prevention function be active.

Furthermore for some applications it is possible to limit the max. safety prevention time. If required a max. time may also be configured.

⚠ Important safety notice:

It must be made sure that a short circuit of one of these safety signals to ground, to +24VDC or between each other must be detected by the external safety controller and once detected this external safety controller has to immediately stop the dangerous machine movement.

⚠ Important safety notice:

When the safety prevention switch contacts are closed and the SafeCIS3 control unit is powered on, the safety prevention function will be immediately active.

The opening of only one contact will lead to a stop of the override function within the reaction time of the control unit. The override function can only be re-activated after both contacts (or signals) have been opened (or deactivated) at the same time.

5.5.8 Specification "Testable sensor"

Up to two single through beam sensors may be connected to the GPIO1-4 of a SafeCIS3 controller. Information regarding reaction times can be found in the associated Configuration Control document. Installation and operating are given in manual 104 720 SafeCIS3-4IO.

One or two sensor pairs can be selected in the scrolling window 'Inputs – GPIO'

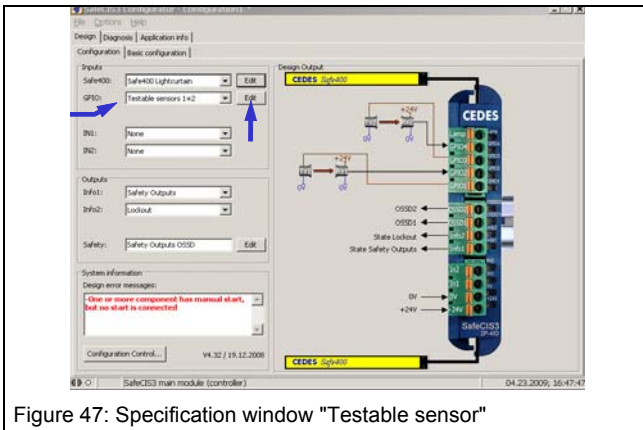


Figure 47: Specification window "Testable sensor"

Start mode and Stop delay can be selected after entering the specification window by activating the edit button.

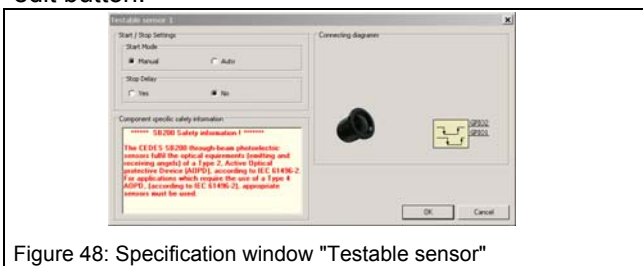


Figure 48: Specification window "Testable sensor"

5.5.9 Specification "Muting Safe400"

Certain applications in practice require that the protective field of the Safe400 light curtains need to be muted "automatically" without the safety contacts opening. A typical example of such an application is a conveyor belt. It should be possible to transport the goods on a pallet through the protective field without stopping the pallet movement.

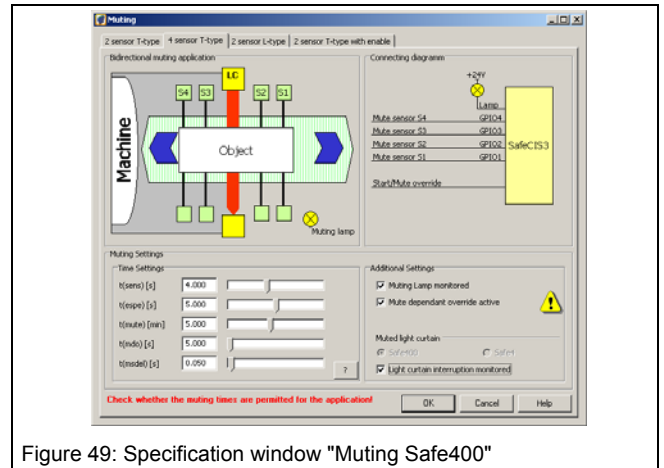


Figure 49: Specification window "Muting Safe400"

A detailed description of the specification windows "Muting" is given in chapter 5.6.

5.5.10 Specification "Muting Safe4"

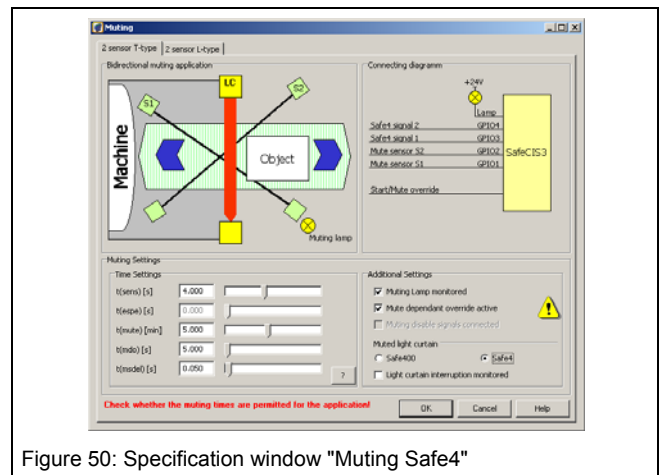


Figure 50: Specification window "Muting Safe4"

The SafeCIS3 also offers the possibility of connecting one CEDES Safe4 safety light curtain for muting applications. Due to the number of GPIO's, only 2 sensor T-type, and 2 sensor L-type muting is possible with a Safe4 light curtain. The time sequences which can be adjusted are equal to those for the muting of a Safe400 system which are described in chapter 5.6. The only difference is that instead of the Safe400 safety light curtain now the Safe4 safety light curtain is muted.

5.5.11 Function "EDM" + "Start Release"

High energy applications with very high power ratings require switching circuits with corresponding switching capacities. If the switching capacity of the

integrated OSSD outputs and / or extension relay module are insufficient, then external force guided, power contactors must be used, whose function is monitored using contact feedback. This function is called EDM (= External Device Monitoring).

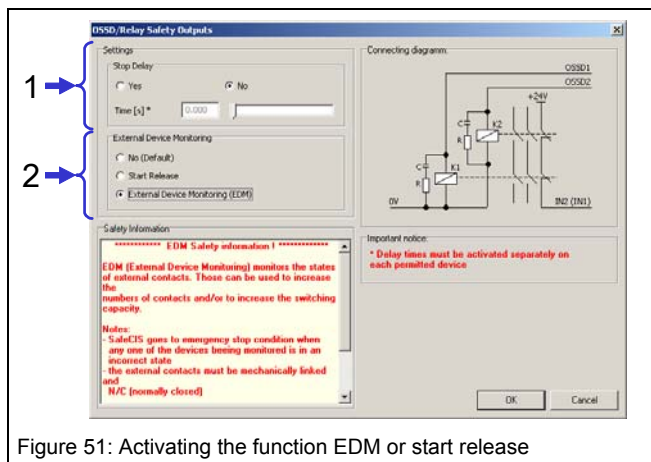


Figure 51: Activating the function EDM or start release

If the EDM field is chosen for external contactor monitoring (2 in Figure 51), this function is active for both the safety outputs OSSD and extension relay module. The EDM function forces the safety outputs of the SafeCIS3 control unit to open immediately if the monitored external NC circuit is not opened within 300 ms. The start release function only allows a start if the NC contact of the external contactor is closed.

In other words: with EDM configured, a successful start is only allowed if the monitored signal is initially "high", as well as this signal going to "low" within 300ms of the SafeCIS3 start. For start release only the status at the beginning is relevant. The monitored signal must be "high" before a start is allowed.

⚠ Important safety notice:

For the configuration of the EDM function, it is also important to follow the safety notes for connections (see Operation manual SafeCIS3 CEDES part number: 104 720).

5.5.12 Function "Stop delay"

This function is activated by simply clicking on the "Yes" box (1, Figure 51) , and a stop delay time can now be defined for the safety output.

⚠ Important safety notice:

This delay time must be activated for the corresponding safety component, in the respective specification window (see chapter 5.5.2, 5.5.3, and 5.5.4). The advantage of this is that one safety component may switch the safety output with no time delay, and a second component will switch the safety output with a time delay. The total reaction time is calculated out of the sum of the delay time [t(delay)], the reaction time of the SafeCIS3 control unit [t(mmLC)], the reaction time of the connected safety component, the reaction time of the external contactor, and the machine stop time.

⚠ Important safety notice:

When configuring a stop delay for a safety light curtain, this time (delay) must be fully considered in the minimum safety distance calculation.

5.6 Muting

5.6.1 General

A light curtain must be "automatically" overridden safely as a temporary measure in muting applications (e.g. a defined object on a conveyor belt should be able to pass a safety field without triggering an emergency stop).

With the help of SafeCIS3 Safety Configurator, the four most important Muting modes can be configured for safety light curtains.

- Two sensor, T-type muting (bidirectional operation)
- Four sensor, T-type muting (bidirectional operation)
- Two sensor, L-type muting (unidirectional operation)
- Two sensor T-type & one muting enable signal (uni- or bi-directional operation)

⚠ Important safety notice:

A detailed description about muting, muting restrictions as well as hints for the installation are given in the standard IEC 62046. Additional hints are mentioned in the attachment A7 of IEC 61496-1.

Each of these modes can be configured

- with and without restart inhibitor (manual + automatic start),
- with and without muting lamp monitoring,
- with and without monitoring of the protective field
- various timing sequences and various maximum muting times
- with and without mute dependant override
- with and without muting sensor output delay

An especially economical solution can be realized with the CEDES Safe400 safety light curtain with two sensors in a T-type design (Figure 52):

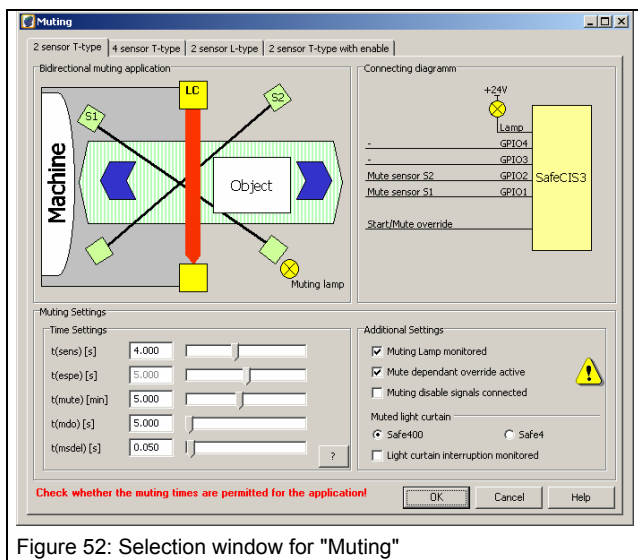


Figure 52: Selection window for "Muting"

5.6.2 Muting lamp

Anyone accessing the protective field of the safety light curtain triggers the deactivation of the dangerous movement. Muting signal display (e.g. a lamp) should be mounted so as to warn an operator in the event that the light curtain is muted (see details in IEC 62046).

Depending on the risk analysis often a muting lamp, monitored by the SafeCIS3 control unit, signals the muting procedure. The size and the brightness of the connected lamp must also be designed as required by the safety analysis.

If configured the SafeCIS3 safety controller monitors the connection of a muting lamp. If this lamp is defective or not connected, the SafeCIS3 controller will not initiate a muting condition.

If an error in the muting sequence has occurred, the muting lamp will blink (ca. 1 Hz), indicating that the muting condition will not be initiated, or has been discontinued.

If the SafeCIS3 controller is configured to not monitor the muting lamp, a connected lamp will still work but it will not be monitored.

5.6.3 Muting sensors

⚠ Important safety notice:

A detailed information about muting sensors (e.g. positioning) is given in the standard IEC 62046.

Mechanical muting sensors have to have an opening contact (i.e. NC; sensor not activated = contact closed = signal high)

Optical muting sensors do not have to be certified according to safety type 2 or 4 of IEC 61496-1/-2. The detection zone of the muting sensors must be within 30° of the horizontal and are mounted at a height suitable to detect a person's leg.

⚠ Important safety notice:

The muting sensors should detect the material on a pallet and not the pallet itself.

Because the material on the pallet may have small openings which disturb the muting sequence the output signal of the muting sensor signals can be configured with an output delay time (see chapter 5.6.5).

5.6.4 Mute override function

Normal activation of the manual start button is only permitted if the muting sensors are not blocked and the protective field to be overridden is not interrupted.

An error in the muting signal sequence, will discontinue the muting condition. If the safety light curtain is then interrupted the SafeCIS3 control units OSSD outputs will switch off (and if connected, the SafeCIS3 extension module relay contacts will open). This normally leads to a stoppage the movement of the material.

In such a case it may not be easy to move the material out of the protective field area. In this situation (protective field interrupted), the start button takes over a mute dependant override function. The conveyor belt may be reactivated temporarily by activating the start button (manual start). The maximum activation time $t(mdo)$ for this override function can be configured and depends on risk analysis of the application.

The mute dependant override function is only available if manual start is configured. Therefore the configuration of a start button is strongly recommended.

The mute dependant override function has to be activated by push button. The push button has to be mounted at a location, where the dangerous area can be overlooked.

The mute dependant override function is automatically terminated after the mute dependant override time $t(mdo)$ has elapsed, or when the safety light curtain is no longer interrupted.

5.6.5 Sensor output delay function

Various positions and sizes of loads on the pallet make it difficult to guarantee a constant muting signal over the entire transport through the safety light curtain. For this reason an off-delay time $t(msdel)$ for the SafeCIS3 muting sensor inputs and the safety light curtain can be configured. The configuration is only allowed depending on the application and risk analysis.

⚠ Important safety notice:

It must be checked that the configuration of a muting sensor output delay does not have influence on the safety of the application. For example, the position of the muting sensors have to be considered.

5.6.6 Muting with enable signal

In many applications muting should only be possible for example when the conveyor belt is running. In case the conveyor belt stops the muting procedure should also stop and the light curtain will return to the normal protective mode. In this example the conveyor run signal is also known as a muting enable signal. A PLC can also give a muting enable signal to the SafeCIS3. Only if this signal is high may muting be activated.

5.6.7 Muting disable signals

For 2 sensor T-type, and 2 sensor L-type muting, the inclusion of a muting disable signal into the muting sequence may be configured.

Two mute disable inputs are configurable. If selected these signals must be "high" in order for a mute condition to take place. In some applications these inputs are used for sensors to detect a person moving into the dangerous area, either to the left or right of the object, during the muting process (e.g. swing doors). If either of these signals is "low" a muting condition will not take place, or the muting condition will stop. A restart of the muting is only possible when both of these signals had been "low" before.

⚠ Important safety notice:

The mute override function overrides the muting disable signals.

5.6.8 Safety light curtain interruption monitoring function

Some applications require that the interruption of the safety light curtain be part of the muting signal sequence. This function may be configured. If the SafeCIS3 should detect an interruption of the safety light curtain it will also monitor

- a. the time from when the muting condition has started until the safety light curtain is interrupted and
- b. the time from when the safety light curtain is no longer interrupted until the muting condition has stopped.

Hereafter this time will be called $t(espe)$.

5.6.9 Muting time recorder

The SafeCIS3 offers the possibility to configure a broad range of different timing sequences. After the installation of a complete muting installation it is often not clear if the configured time values are good enough to guarantee trouble free operation. Small variations (e.g. in object size) may lead to unnecessary machine stoppage. To find out the timing of a given installation it is possible to measure the real timing sequence with a SafeCIS3 control unit (chapter 5.4.2.4).

After measuring, the timing values can be optimized so that the application runs stable, and safety is still fulfilling the requirements of the risk analysis.

5.6.10 Setup: 2 sensor T-type

Figure 53 shows a schematic arrangement for a two sensor, crossed beam, bidirectional muting application: "2 sensor T-type". For this muting mode either the Safe400 and / or Safe4 safety light curtain may be muted.

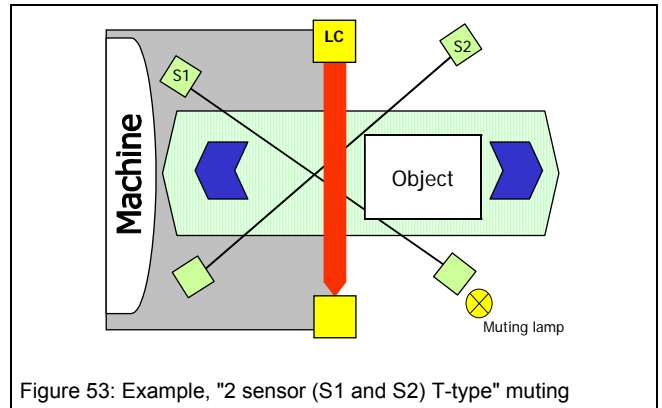


Figure 53: Example, "2 sensor (S1 and S2) T-type" muting

The crossing point of the two light beams should be situated behind the sensing field of the safety light curtain in the direction of the dangerous area.

The height of the crossing point of the two muting sensors should be at the same level as or higher than the lowest beam of the light curtain.

The distance of the crossing point to the protective field of the safety light curtain should be as short as possible.

It should not be possible that a person can enter the dangerous area undetected to the left or right of the object during the muting process.

Figure 54 shows the corresponding timing sequence for such an arrangement.

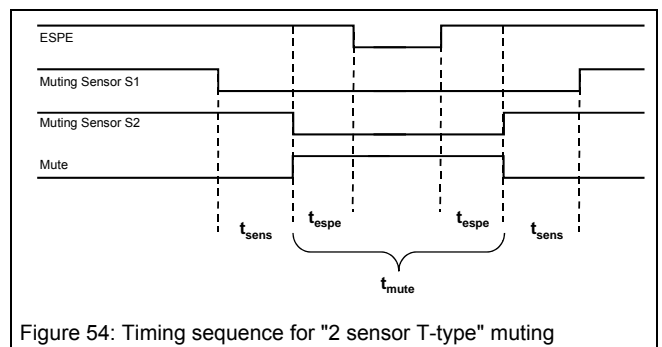


Figure 54: Timing sequence for "2 sensor T-type" muting

Muting of the safety light curtain is achieved only when muting sensor S1 and S2 are activated within the specified time $t(sens)$. Muting sensor 1 before muting sensor 2, or 2 before 1 is both allowed. Both signals however may not arrive at the same time ($t(sens)$ min.). The muting condition will stop after one of these muting sensors is not activated or the

maximum muting time $t(\text{mute})$ is exceeded (muting time out).

The following parameters can be configured in the configuration window (Figure 55) for "2 sensor T-type" muting.

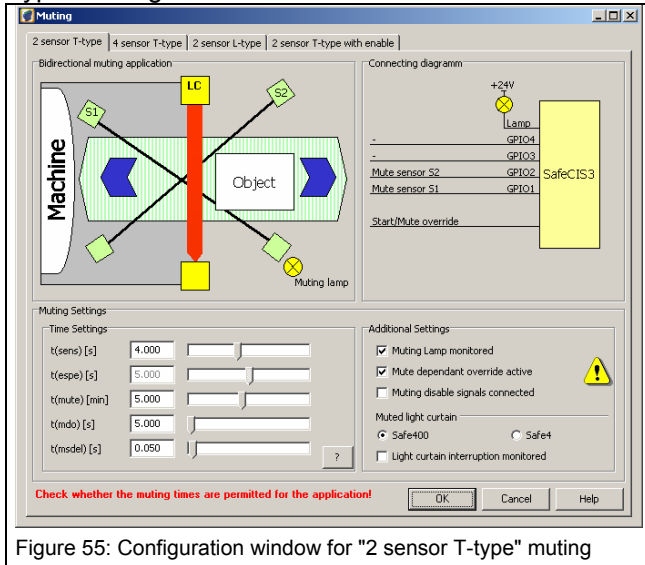


Figure 55: Configuration window for "2 sensor T-type" muting

Parameter	Standard value	Max. / Min. values	Possible settings
T(sense) [Figure 54]	4 s	Min.: 50 ms Max.: 10 s	Max.: N x 0.05 s
T(mute) [Figure 54]	5 min	Min.: 0 ms Max.: 3 days	0-63 s or 0-63 min or 0-63 h 3 days
T(msdel) [5.6.5]	50 ms	Min.: 0 ms Max.: 2.55 s	N x 0.01 s
Muting lamp monitoring [5.6.2]	yes		yes / no
Mute dependant override [5.6.4]	yes		yes / no
T(mdo) [5.6.4]	5 s	Min.: 0 ms Max.: 20 min	N x 5 s
Mute disable signal [5.6.7]	no		yes / no
Safe400 interruption monitoring [5.6.8]	no		yes / no
T(espe) [5.6.8]	5 s	Min.: 50 ms Max.: 10 s	N x 0.05 s

A time $t(\text{sense})$ of 4 s is recommended in IEC 62046.

Figure 56 shows the corresponding wiring diagram of the SafeCIS3 control unit configured with the "2 sensor, T-type" muting mode.

Two mute disable inputs are configurable. If selected these signals must be "high" in order for a mute condition to take place (see chapter 5.6.7).

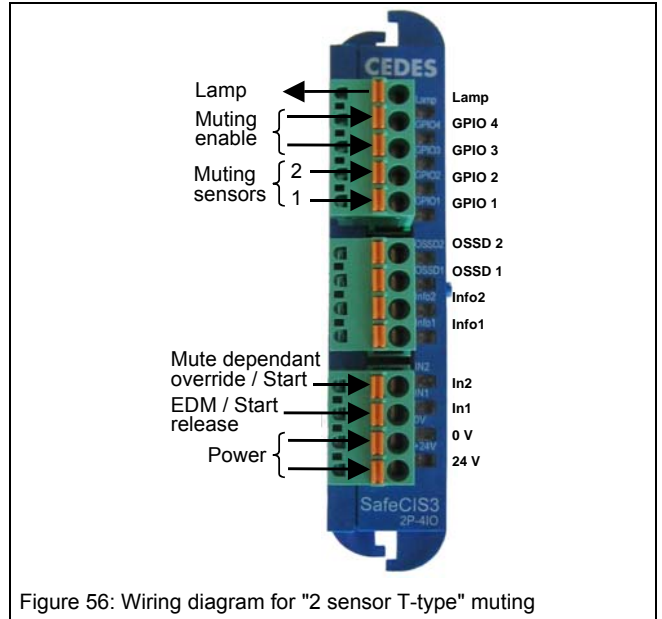


Figure 56: Wiring diagram for "2 sensor T-type" muting

5.6.11 Setup: 4 sensor T-type

Figure 57 shows a schematic arrangement for a four sensor, parallel beam, bidirectional muting application: "4 sensor T-type". For this muting mode only the Safe400 safety light curtain may be muted.

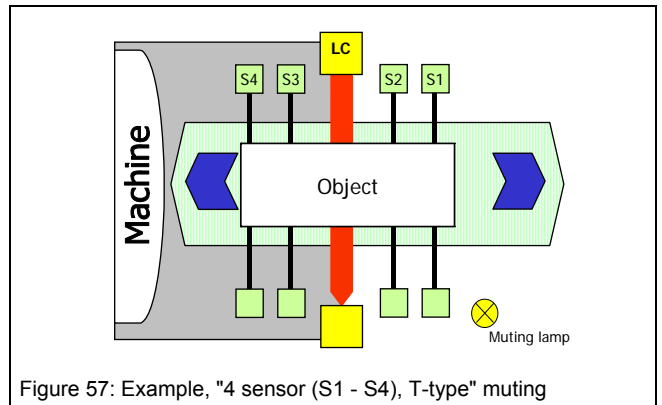


Figure 57: Example, "4 sensor (S1 - S4), T-type" muting

This muting mode is similar to the "2 sensor, T-type w/enable signal" muting (chapter 5.6.6), and should also be considered when the size and position of the pallet load is irregular, or the size of the pallet is much smaller than the width of the conveyor. Due to the two sensor input from either side of the ESPE, an external enable signal (e.g. conveyor run signal) is not necessary. This mode however requires more space than the "2 sensor T-type w/enable signal" muting mode.

The two muting sensors closest to the Safe400 light curtain should be mounted closely so that it is difficult to enter the dangerous zone without being detected by preceding or following a pallet or transport system into the dangerous zone (< 200 mm).

The distance between any two muting sensors should be sufficient so that they cannot be activated simultaneously by a persons leg (> 250 mm).

The distance between sensor S1 and S4 shall be such that a cylindrical object with a diameter of 500 mm with its axis parallel to the protective field cannot activate the muting function when moved in any point of the gate at any speed up to 1.6m/s.

The muting sensors S1 – S4 should detect the objects on pallets and not the pallet itself. When this is impractical additional measures may be necessary to prevent people from entering the zone by sitting on the pallet.

It should not be possible that a person can pass undetected to the left or right of the object during the muting process.

Figure 58 shows the corresponding timing sequence for such an arrangement.

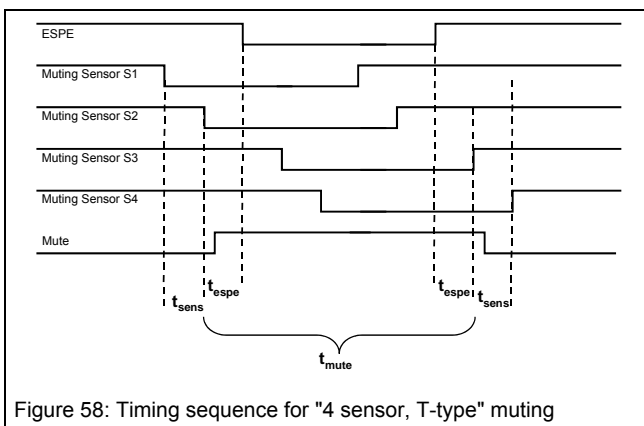


Figure 58: Timing sequence for "4 sensor, T-type" muting

Muting of the Safe400 light curtain is achieved only when muting sensor S1 and S2 are activated within the specified time $t(\text{sens})$. For a successful muting sequence all 4 sensors must be activated for a certain time period. The muting condition will stop when either sensor S3 or S4 is not activated, or the maximal muting time $t(\text{mute})$ is exceeded (muting time out). Since this muting mode is bidirectional, the muting sensor sequence will also function in reverse (i.e. $S4 \Rightarrow S1$).

The "4 sensor T-type" muting mode is timing controlled according to IEC 62046.

The following parameters can be configured in the configuration window (Figure 59) for "4 sensor T-type" muting.

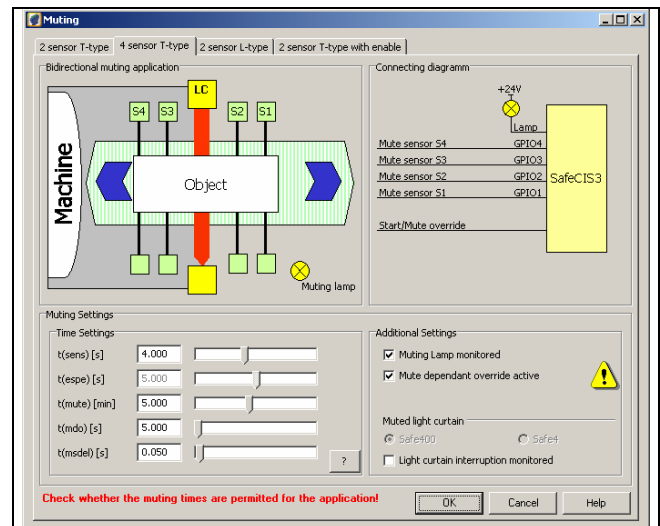


Figure 59: Configuration window for "4 sensor T-type" muting

Parameter	Standard value	Max. / Min. values	Possible settings
T(sens)	4 s	Min.: 50 ms Max.: 10 s	Max.: N x 0.05 s
T(mute)	5 min	Min.: 0 ms Max.: 3 days	0-63 s or 0-63 min or 0-63 h 3 days
T(msdel) [5.6.5]	50 ms	Min.: 0 ms Max.: 2.55 s	N x 0.01 s
Muting lamp monitoring [5.6.2]	yes		yes / no
Mute dependant override [5.6.4]	yes		yes / no
T(mdo) [5.6.4]	5 s	Min.: 0 Max.: 20 min	N x 5 s
Safe400 interruption monitoring [5.6.8]	no		yes / no
T(espe) [5.6.8]	5 s	Min.: 50 ms Max.: 10 s	N x 0.05 s

A time $t(\text{sense})$ of 4 s is recommended in IEC 62046

Figure 60 shows the corresponding wiring diagram of the SafeCIS3 control unit configured with the "4 sensor T-type" muting mode.

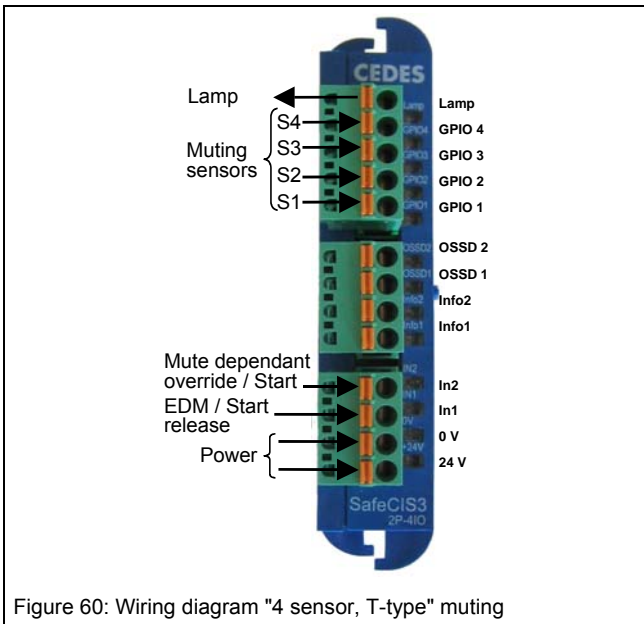


Figure 60: Wiring diagram "4 sensor, T-type" muting

5.6.12 Setup: 2 sensor L-type

Figure 61 shows a schematic arrangement for a two sensor, parallel beam, unidirectional muting application: "2 sensor L-type". For this muting mode either the Safe400 and / or Safe4 safety light curtain may be muted.

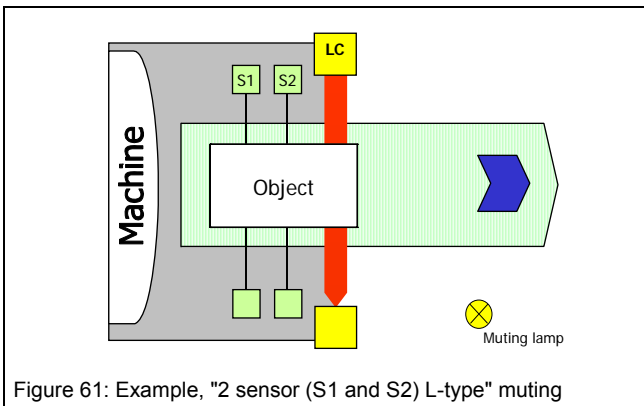


Figure 61: Example, "2 sensor (S1 and S2) L-type" muting

In muting mode is used to allow material to exit the dangerous area while preventing undetected access. This muting mode works only in one direction. The object, coming from the dangerous area, interrupts first the two muting sensors and then the muting of the safety light curtain is active. As the object continues to move through the protective field, muting remains active till the Safe400 is no longer interrupted.

According to IEC 62046:

Muting of the safety light curtain is achieved only when muting sensor S1 and S2 are activated within the specified time $t(sens)$. The muting condition will stop after $t(espe)$ is exceeded, the Safe400 is no longer interrupted or the maximum muting time $t(mute)$ is exceeded (muting time out), which ever occurs first.

Figure 62 shows the corresponding timing for such an arrangement.

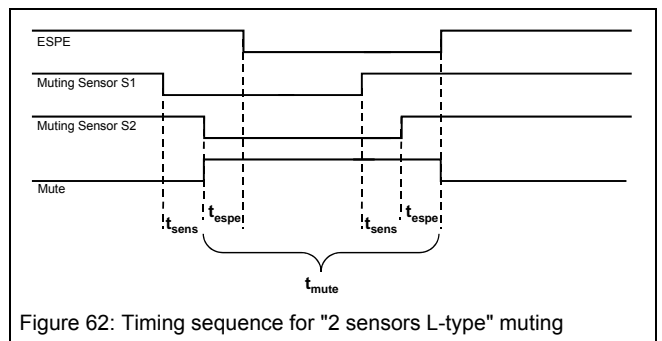


Figure 62: Timing sequence for "2 sensors L-type" muting

It should not be possible that a person can pass undetected to the left or right of the object during the muting process.

The following parameters can be configured in the configuration window (Figure 63) for "2 sensor L-type" muting.

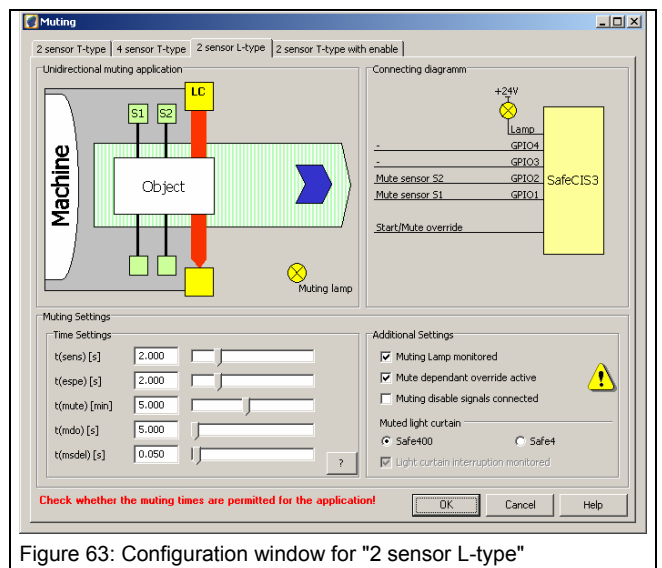


Figure 63: Configuration window for "2 sensor L-type"

Parameter	Standard value	Max. / Min. values	Possible settings
T(sens)	4 s	Min.: 50 ms Max.: 10 s	N x 0.05 s
T(mute)	5 min	Min.: 0 ms Max.: 3 days	0-63 s or 0-63 min or 0-63 h 3 days
T(msdel) [5.6.5]	50 ms	Min.: 0 ms Max.: 2.55 s	N x 0.01 s
Muting lamp monitoring [5.6.2]	yes		yes / no
Mute dependant override [5.6.4]	yes		yes / no
T(mdo) [5.6.4]	5 s	Min.: 0 ms Max.: 20 min	N x 5 s
Mute disable signal [5.6.7]	no		yes / no
Safe400 interruption monitoring [5.6.8]	yes		yes
T(espe) [5.6.8]	5 s	Min.: 50 ms Max.: 10 s	N x 0.05 s

A time $t(\text{sense})$ of 4 s is recommended in the standard IEC 62046

Figure 64 shows the corresponding wiring diagram of the SafeCIS3 control unit configured with the "2 sensor L-type" muting mode.

Two mute disable inputs are configurable. If selected these signals must be "high" in order for a mute condition to take place (see chapter 5.6.7).

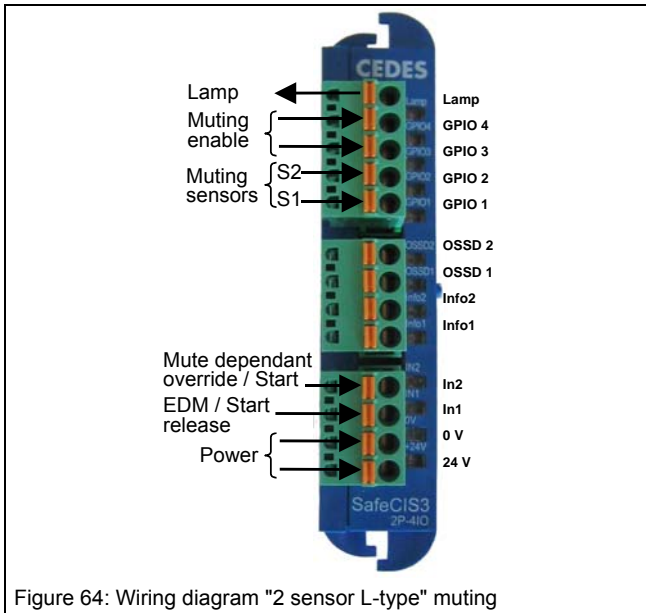


Figure 64: Wiring diagram "2 sensor L-type" muting

5.6.13 Setup: 2 sensor T-type with enable signal

Figure 65 shows a schematic arrangement for a two sensor, parallel beam with enable signal, bidirectional muting application: 2 sensor T-type w/enable signal. For this muting mode only the Safe400 safety light curtain may be muted.

This version of muting should be considered when the size and position of the pallet load is irregular, or the size of the pallet is much smaller than the width of the conveyor. Since only one optical sensor is on either side of the light curtain, this mode requires an additional enable signal in order to initiate the muting sequence (e.g. a conveyor run signal). This signal must be present (i.e. "high") before a successful muting mode will be initiated.

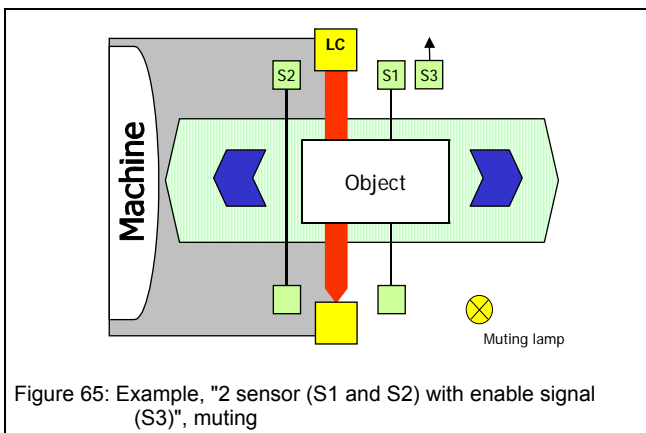


Figure 65: Example, "2 sensor (S1 and S2) with enable signal (S3)", muting

The height of the two muting sensors should be at the same level as or higher than, the lowest beam of the light curtain.

The distance between S1 or S2 sensors to the protection field should be sufficient so that they cannot be activated simultaneously by a operator's leg (> 250 mm).

It should not be possible that a person can pass undetected to the left or right of the object during the muting process.

Figure 66 shows the corresponding timing sequence for such an arrangement.

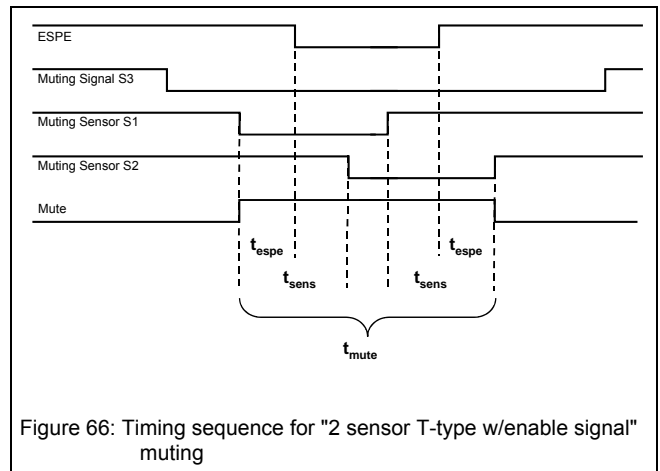


Figure 66: Timing sequence for "2 sensor T-type w/enable signal" muting

Muting of the Safe400 light curtain is achieved only when both "sensor S1 and enable signal S3" or "sensor S2 and enable signal S3" are activated. The muted condition will remain only when muting sensor S1 and S2 are activated within the specified time $t(\text{sens})$. The muting condition will stop after either S3 or "S1 and S2" are not activated, or the maximum muting time $t(\text{mute})$ is exceeded (muting time out).

Only after one muting sequence is finished may a new muting sequence be started. This means that the enable signal S3, must first go "low" before returning to "high", in order for a second object to pass through the light curtain (equivalent to a conveyor stop and restart).

The following parameters can be configured in the configuration window (Figure 67) for "2 sensor T-type w/enable signal" muting.

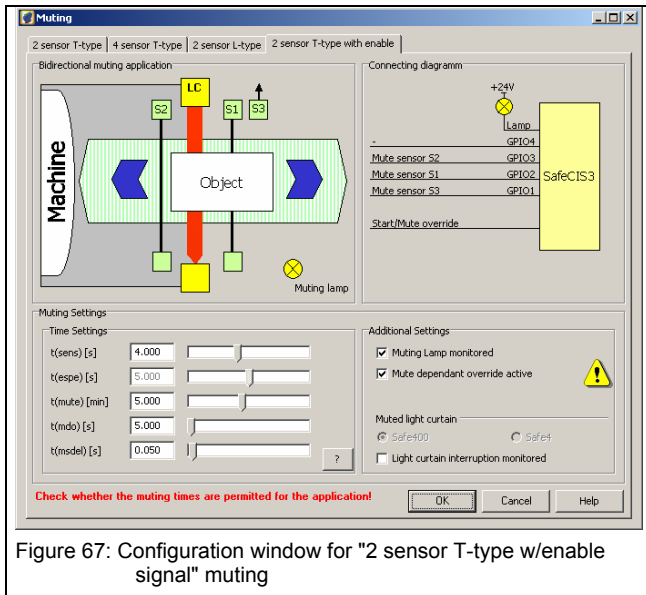


Figure 67: Configuration window for "2 sensor T-type w/enable signal" muting

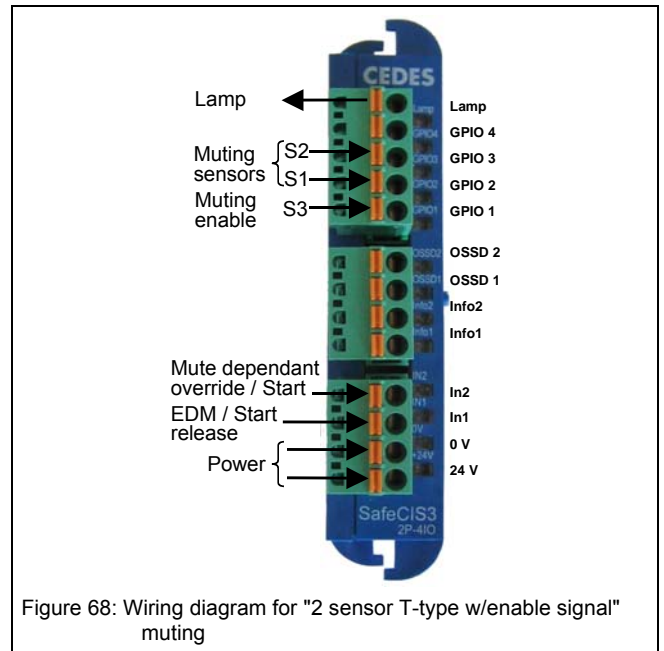


Figure 68: Wiring diagram for "2 sensor T-type w/enable signal" muting

Parameter	Standard value	Max. / Min. values	Possible settings
T(sens)	4 s	Min.: 50 ms Max.: 10 s	T(sens) max.: N x 0.05 s
T(mute)	5 min	Min.: 0 ms Max.: 3 days	0-63 s or 0-63 min or 0-63 h 3 days
T(msdel) [5.6.5]	50 ms	Min.: 0 ms Max.: 2.55 s	N x 0.01 s
Muting lamp monitoring [5.6.2]	yes		yes / no
Mute dependant override [5.6.4]	yes		yes / no
T(mdo) [5.6.4]	5 s	Min.: 0 Max.: 20 min	N x 5 s
Mute disable signal [5.6.7]	no		yes / no
Safe400 interruption monitoring [5.6.8]	no		yes / no
T(espe) [5.6.8]	5 s	Min.: 50 ms Max.: 10 s	N x 0.05 s

Figure 68 shows the corresponding wiring diagram of the SafeCIS3 control unit configured with "2 sensor T-type w/enable signal" muting mode.

5.7 Blanking

Certain applications in practice require that the protective field of the Safe400 light curtains need to be interrupted without the safety outputs activating. A typical example of such an application is a break press.

The control unit SafeCIS3 offers the following categories. Chapter 7 explains in detail what the differences are between these Blanking modes.

- Fixed Blanking
- Floating Blanking

Fixed blanking can be configured by downloading the configuration to the control unit or by teach-in function.

The light curtain protective field may be divided into one to three different areas, whereby each section may be configured with its own distinctive Blanking mode.

5.7.1 Configuring the Blanking Function

After definition of the Safe400 Resolution and protective height in the Safe400 Window (Figure 45), Blanking may be activated and button edit opens the Blanking configuration window.

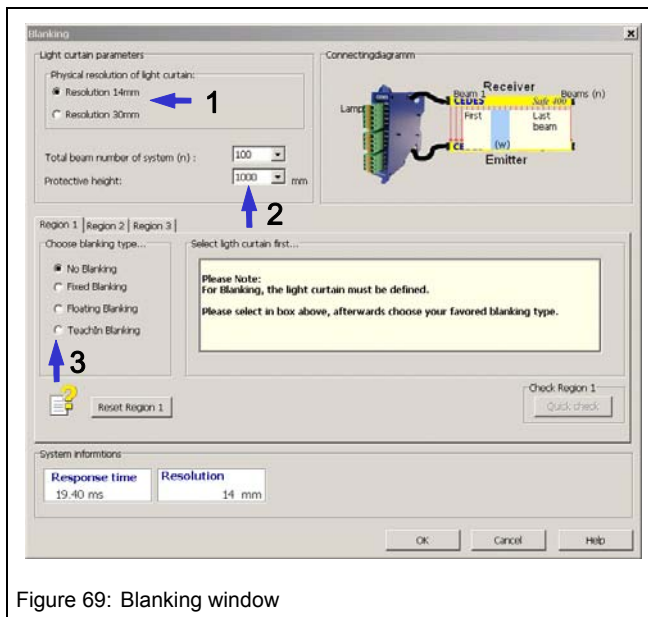


Figure 69: Blanking window

The first step requires the defining of the resolution (Figure 69 -1) and the number of beams or the protective field length of the Safe400 light curtains (2). The length of the protective field as well as the physical resolution can be found on the specification label of the light curtain being configured.

Up to three regions may be configured with a different blanking type using the tabs Region 1, Region 2 and Region 3. Once the Blanking mode for a Region has been fully defined, the "Quick Check" box must always be clicked on. With this step the user will receive confirmation that the entered data is correct.

⚠ Important safety notice:

With the "Quick check", the new response time as well as the new resolution of the safety light curtain will be displayed. These new values must be taken into consideration when calculating the safety distance as well as the mounting position of the safety light curtain. After a new configuration, the person responsible for the machine must test the resolution in order to eliminate dangers attributed to possible inactive zones or insufficient resolution.

Independent of which blanking type has been chosen, the configuration must be finally confirmed by ticking the Blanking active box in the features area of the Safe400 (Figure 43 – 1) window. Only then the configured Blanking function is activated.

⚠ Important safety notice:

The configuration of Blanking will lead to longer reaction times, and possibly also to higher resolutions. These changes must be taken into account when calculating the minimum safety distance. The new reaction time, as well as a possible new resolution, will be shown in the Configuration Control Document.

⚠ Important safety notice:

The operator must ensure that for all Blanking modes, no undetected access is possible into the danger zone via the "blanked" protective field throughout the whole width of the protective field (also left and right of the "blanked" object). This can be achieved, for example, through the use of additional mechanical barriers (Figure 136).

⚠ Important safety notice:

After the Blanking configuration has been carried out, the user is responsible for testing the resolution of the light curtain.

Additionally, the blanked region should be clearly marked, and the protective field should be fully tested with the provided test rods according to the instructions given in the Safe400 technical description document.

5.7.2 Indication of Blanking

If Blanking is configured then a lamp must clearly indicate this to the operator. The SafeCIS3 controller module monitors the connection of a Blanking lamp. If this lamp is defective or not connected, the controller will go immediately into a lockout condition. According risk analysis of the application, the monitoring of the indication lamp may be deactivated (Figure 70 - 6)

5.7.3 Fixed Blanking

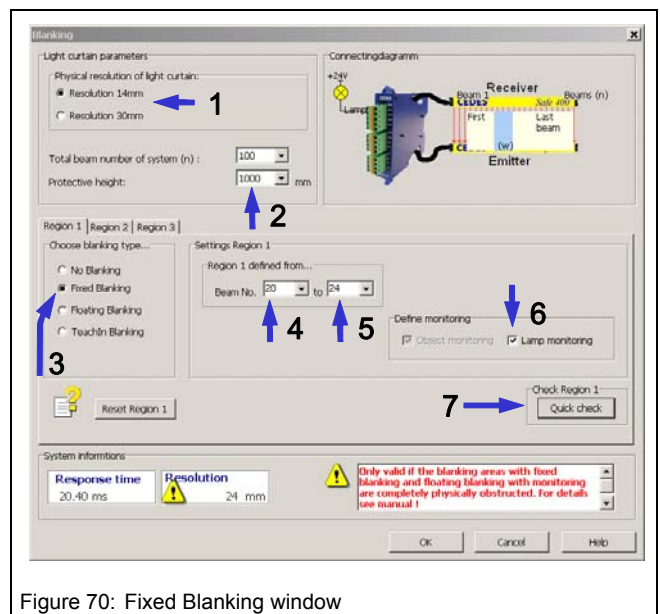


Figure 70: Fixed Blanking window

In the case of "Fixed Blanking", the first (Figure 70 - 4) and last interrupted beams (5) must be defined. and thereafter confirmed with a cursor click on the "Quick check" box. For more detailed information see chapter 7.1.1.

5.7.4 Floating Blanking

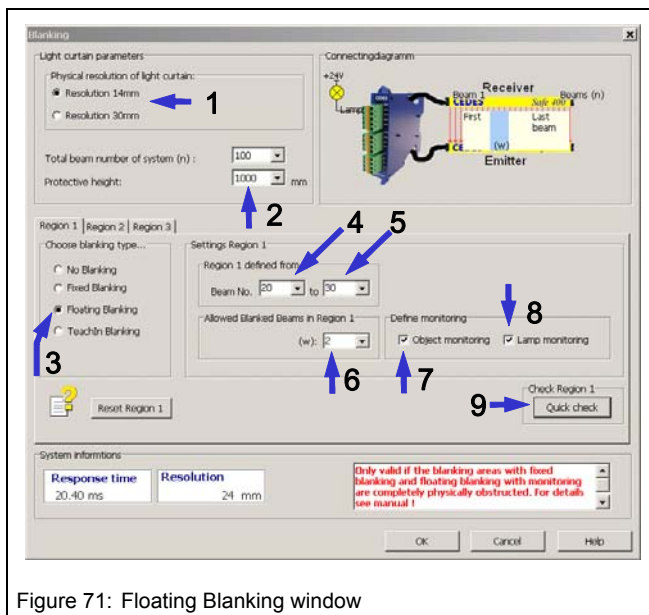


Figure 71: Floating Blanking window

In the case of "Floating Blanking", the area in which the object is allowed to move must first be defined (Figure 71 – 4 and 5). Subsequently the number of interrupted beams for "Floating Blanking" can then be appointed (6). Finally, the user must specify whether this application operates with object monitoring or without object monitoring (7). End the blanking configuration for this region with the Quick Check button. More information about floating blanking describes chapter 7.1.2.

5.8 Download & Upload

5.8.1 PC ⇔ SafeC (Download)

When a configuration is created which meets the requirements of the relevant application, it now needs to be downloaded into the CEDES SafeCIS3 control module.

The following steps must be carried out for a successful download:

1. Attach the OptiLink to the control module (Figure 17).
2. Disconnect the power supply to the SafeC module.
3. Connect the OptiLink to your PC.
4. Select the corresponding COM-Port in menu item Option\Comport Settings (see Figure 27).
5. Select menu item "File" – "PC -> SafeC (Download)".
6. Enter the password and press "OK"-button ().

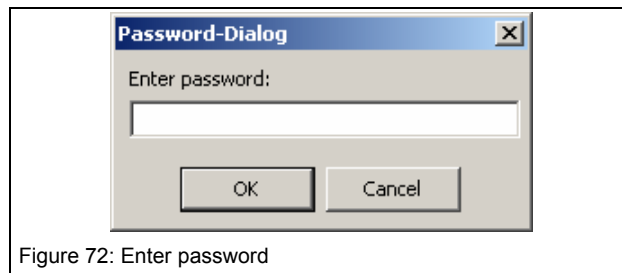


Figure 72: Enter password

7. The window "Controller Description" pops up () and requests the input of the device no. as well as a "designation". The device no. can be found on the label of the control unit which should be configured (). Enter this information and press "OK"-button.

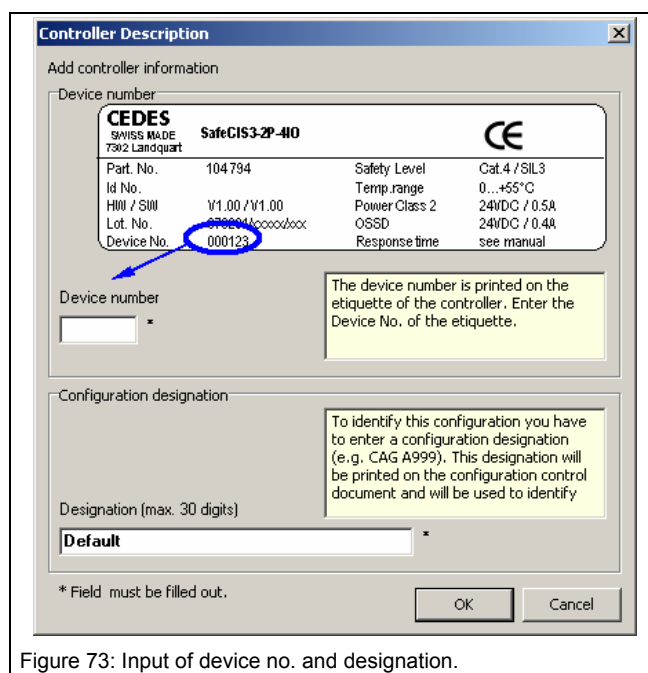


Figure 73: Input of device no. and designation.

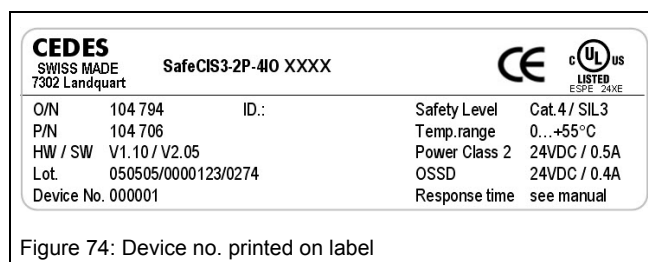


Figure 74: Device no. printed on label

⚠ Important safety notice:

The device number and designation must be entered. These inputs are later given on the configuration control document and guarantees the product identification.

8. A window will appear, which shows the communication from the PC to the SafeC control module.
9. Now reconnect the +24 VDC power supply to the SafeCIS3 control module, and the data transmission will begin

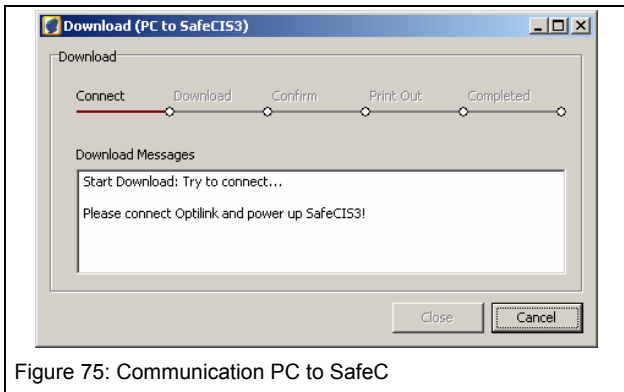


Figure 75: Communication PC to SafeC

10. After the download has started, the window "Configuration control document" will appear on your monitor ().

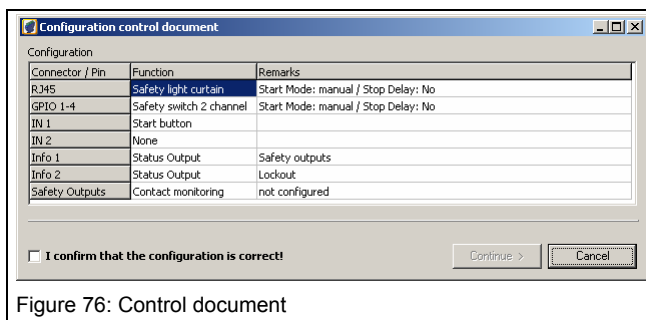


Figure 76: Control document

11. Immediately control this window!
12. Check on the checkbox to confirm the configuration. After this confirmation the 'Continue' Button will be enabled

⚠ Important safety notice:

In case a SafeCIS3 control unit is configured with a new configuration by an authorized person, the reaction times of the control unit may have changed. Therefore it is very important that after each configuration procedure

- a. the new, valid configuration control-document is printed-out (step 14) and put with the corresponding controller so that it is always present for maintenance and service purposes and
- b. the new reaction times are controlled and verified that they adhere to the limits of the risk analysis for the corresponding application.

13. This new configuration will become active, only after the "Continue" button within the "Configuration control document" is selected. If the "Cancel" button is selected, the original (old) SafeCIS3 configuration will remain active.
14. Print "Configuration control document" ().

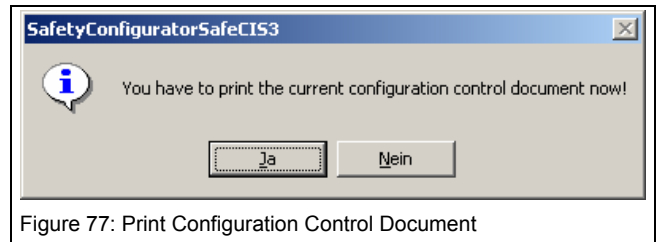


Figure 77: Print Configuration Control Document

15. Sign the Configuration Control Document () and attach the label 'Configuration changed' to the SafeCIS3 control unit () and confirm with "OK".

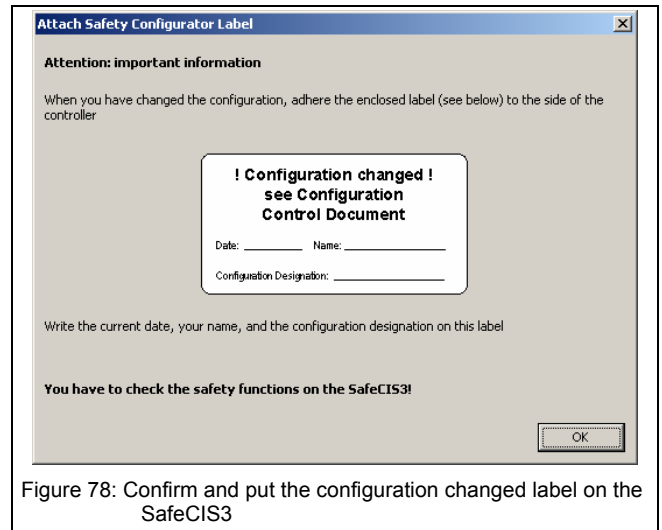


Figure 78: Confirm and put the configuration changed label on the SafeCIS3

16. Now the configuration procedure is finished and the new configuration will be active.
17. Verify download according chapter 1.1.

5.8.2 Verify download

1. Check resolution of Safe400 protection field with test rod according technical description CEDES Safe200 / Safe400 (CEDES part number 103 373).
2. Verify safety distance Safe400 according actual reaction time given in the control document and resolution.
3. Check correct function of all configured safety components.
4. Check configured delay time.
5. Verify "Safety Prevention" or "Muting" function.
6. Sign printed label and configuration control document.
7. Store the configuration control document together with the technical description of the SafeCIS3 (depending on configuration also together with the technical description of Safe4 and Safe400) close to the application (e.g. machine control cabinet).

CEDES Safety & Automation AG Configuration control document

A Rockwell Automation Company

Configuration designation CSA B123 (Configuration1)

CEDES SafeCIS3 safety control units may only be configured by authorized people. This sheet shows the actual system parameters of the configurator and has to be stored together with the manual. The device number has to correspond to the number on the control document. Old control documents have to be exchanged! To receive more information see manual or contact your local CEDES partner.
memInfo

User registration:

Company:	CEDES Safety & Automation AB	City:	Landquart
First Name:	Thomas	Country:	Switzerland
Name:	Getzmann	Phone:	+41 81 307 82 00
Address:		Fax:	+41 81 307 82 01
Zip code:	7302	Email:	csa-info@ra.rockwell.com

Current set up

Installed hardware:	SafeCIS3-2P-4IO
Attached Safe400 light curtain	Order Code not specified
Safe400: Number of beams:	60
Safe400: Response time t(LC):	20.16 ms
Controller response time t(C):	4.00 ms
Stop delay time t(delay):	0.00 ms
Interrupt ignore time t(ignore):	0.00 ms
Response time for safety component on GPIO t(GPIO):	0.00 ms
Response time for extension modul t(em):	6.00 ms
Maximum OSSD response time for Safe400 light curtain:	
t(totLCOSSD)=t(C)+t(LC)+t(delay):	24.16 ms
Maximum relay extension module response time for Safe400 light curtain:	
t(totLCEXT)=t(C)+t(LC)+t(delay)+t(em):	30.16 ms

Configuration

Filename (Configuration file):	Configuration1
Configuration designation	CSA B123
Device No.	000123

Connector / Pin	Function	Remarks
RJ45	Safety light curtain	Start Mode: manual / Stop Delay: No / Additional filter: 2
GPIO1/2	None	
GPIO3/4	None	
IN1	Start button	
IN2	None	
Info1	Status Output	Safety outputs
Info2	Status Output	Lockout
Safety Outputs	Contact monitoring	not configured

(ChA: OSSD outputs, ChB: Relay outputs)

Additional safety information

Safety category (EN954):	4
SIL level (EN/IEC 61508):	3
Minimal off time:	82 ms

24.04.2009 / Signature: _____

Figure 79: Configuration control document for SafeCIS3

5.8.3 SafeCIS3 ⇔ PC (Upload)

In order to control the configuration of a CEDES SafeC 200 or SafeC 400 control module, the configuration data may be read out as follows:

1. Attach the OptiLink to the controller.
2. Disconnect the power supply to the SafeCIS3 controller.
3. Connect the OptiLink to the PC USB interface.
4. Select the COM-Port (Figure 27)
5. Select Menu item "PC -> SafeC (Upload)" (1 in Figure 26).
6. A window will appear which shows the communication from the PC to the SafeC control module.
7. Now connect the +24 VDC power supply to the SafeCIS3 control module, and the data transmission will start
8. After completion of the data transmission, a window will appear to confirm if the communication was successful.
9. In the "Design" window, all of the configuration data is now available and can be verified.

- Safety Relay SafeC 200 / 400
- Height measuring light curtain Object100

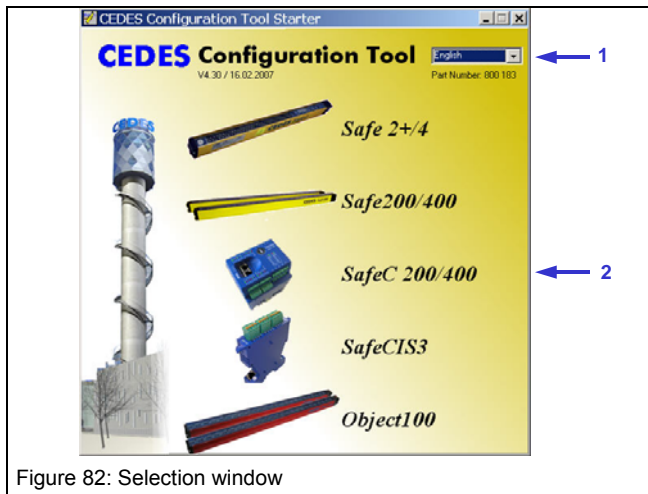


Figure 82: Selection window

First select your preferred language with the pull-down option "language" in the top right corner of the window. Then select the SafeC 200/400 product family.

When the user information not are entered yet (e.g. first start-up), window (Figure 83) requests for it. Change the password in window Figure 41 and enter user information in window Figure 42.

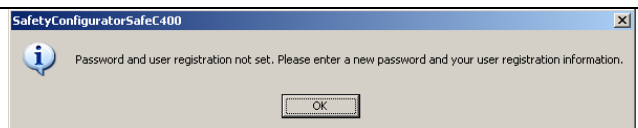


Figure 83: Message to enter the user information

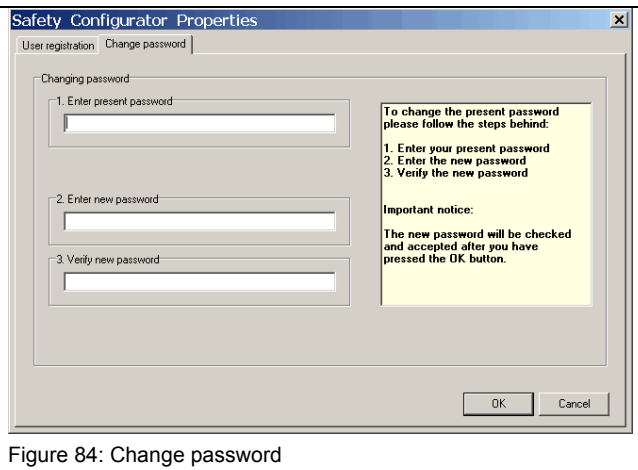


Figure 84: Change password

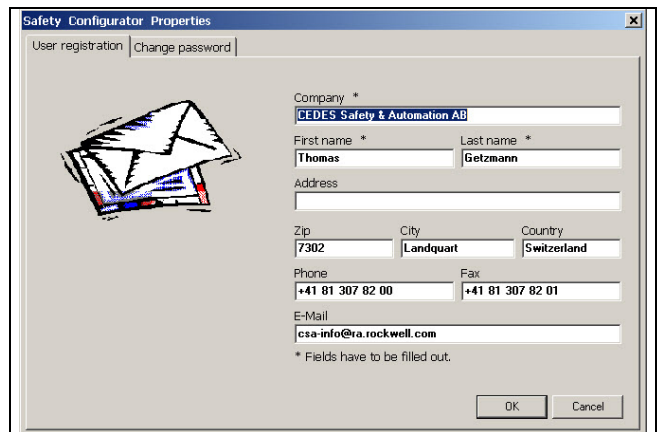


Figure 85: Input of user information

Next you will see the "Welcome Window". In this window you will see a note referring to important safety information. You can read this information by simply clicking on the flashing warning sign. By clicking on "Ok" you accept this safety information, and the program will continue.



Figure 86: "Welcome window"

Thereafter the main window will appear. In the main window you have the menu bar (Figure 87), as well as the following three tab sheets available for selection:

1. Design
2. Diagnosis
3. Application Info

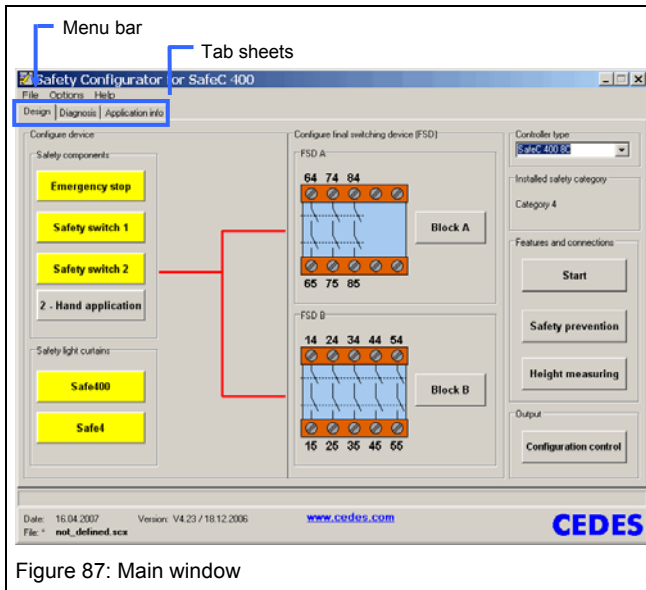


Figure 87: Main window

6.4 The menu bar

The menu bar contains three pull-down menus:

1. File
2. Options
3. Help

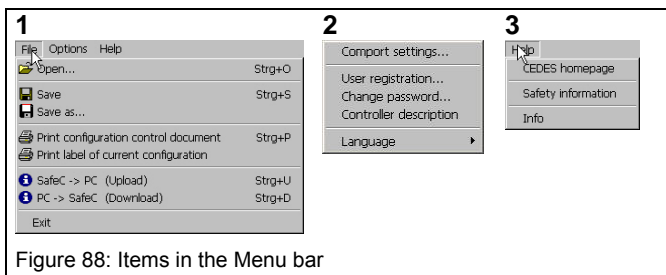


Figure 88: Items in the Menu bar

6.4.1 Menu "File"

Menu "Open"

Opens an existing configuration file according to the given String and Data name. "*.scx" is defined as the standard extension for the configuration data name.

Menu "Save"

Saves the current configuration under the most recent name and location.

Menu "Save as"

Saves the current configuration under a new name and the given location.

Menu "Print configuration control document"

Creates a Configuration Control Document according to the current configuration.

Menu "Print configuration control document"

Creates a label according to the current configuration.

Menu "SafeC ⇌ PC (Upload)"

Loads the current SafeC 200 / SafeC 400 control unit configuration into the PC (chapter 6.6).

Menu "PC ⇌ SafeC (Download)"

Loads the current configuration from the PC, into the SafeC 200 / SafeC 400 control unit (chapter 8.5).

Menu "Exit"

Ends the "Configuration Tool" program.

6.4.2 Menu "Options"

Menu "Com Port settings"

Settings for the interface parameters, the settings should be controlled after every new program start.

Normal interface parameters	
Baud rate	19200
Data bits	8
Stop bits	2
Parity	none
Flow-control	none

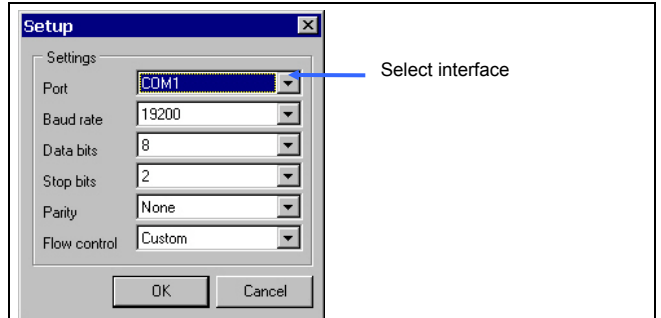


Figure 89: Interface parameters

Menu "User registration"

This menu button opens the window "User registration" (Figure 90). This information is needed to complete a configuration.

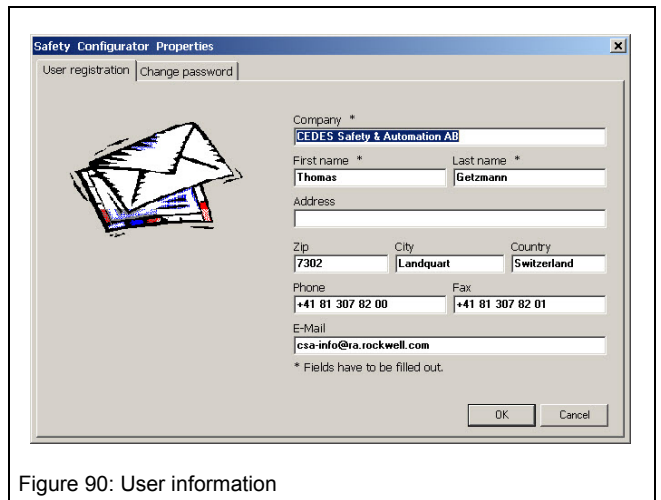


Figure 90: User information

Data entered in the "User registration" fields will be used to complete the information printed in the Configuration Control Document. Both fields "Customer Device number" and "Reference code" should be completed for each download (chapter 6.6). As a basic rule, the personal user registration information is necessary for each configuration.

Menu "Change password"

This option allows the existing password to be changed (Figure 91). The password as well as the OptiLink should only be made available to authorized personnel who are permitted to carry out new configurations. When installing the software, care should be taken to change the password as soon as

possible so that any possibility of unauthorized usage can be eliminated.

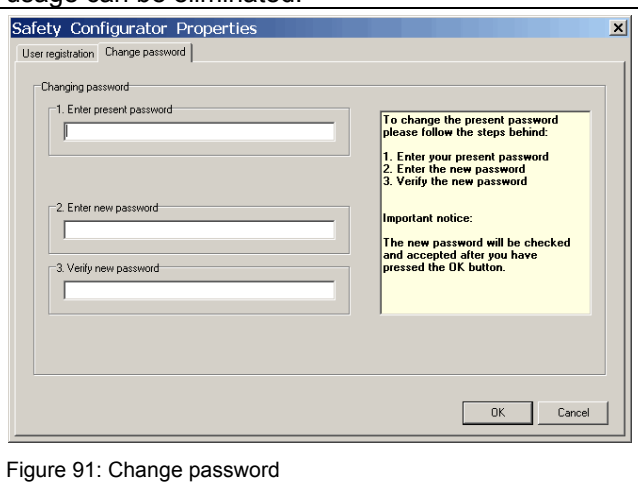


Figure 91: Change password

When the SafeC 200 / SafeC 400 controller units are delivered the factory default password is "CEDES" (capital letters!). A lost password can be recovered by your CEDES partner. In such a case, please contact your nearest CEDES office.

Menu Controller description

To identify identically configured systems (software < V 1.15), a device number between 0 and 255 can be entered. This number is stored in the device and can be read out with the OptiLink.

Units with software version V 1.15 have a unique six-figure device number (Device No) on the type plate.

The field 'Designation' can be used to allocate a well-defined identifier string for the configuration. This identifier will be printed on the configuration label.

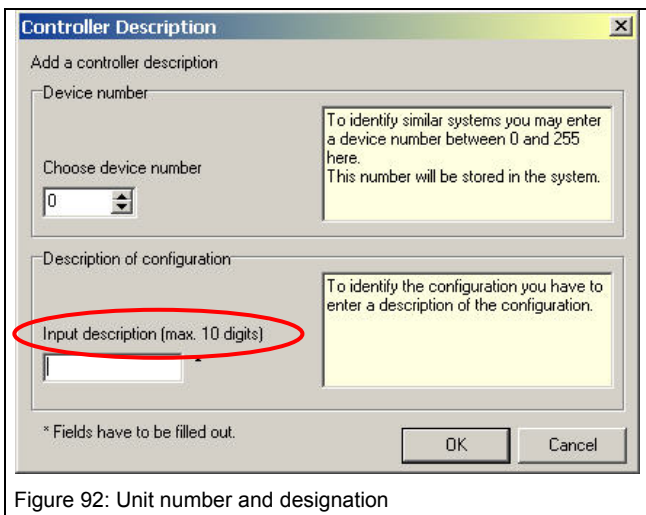


Figure 92: Unit number and designation

Menu "Language"

Here the preferred language is selected.

6.4.3 Menu "Help"

Menu "CEDES home page"

Opens the installed Internet-Browser and establishes a connection to the CEDES home page.

Menu "Safety-Information"

Important safety information for installing and operating the software.

Menu "Info"

Displays the welcome window.

6.5 Main window

In the main window, three tab sheets are available to choose from:

1. Design
2. Diagnosis
3. Application info

By clicking on one of the tab sheets, you can move into the corresponding area.

"Design"

The configuration of a SafeC controller is made in the "Design" window. By selecting the controller type, the safety category 2 or 4 (according to EN ISO 13849-1) is selected by the controller family SafeC 200 or SafeC 400. The chosen controller type must comply with the hardware to be configured.

When uploading a configuration (chapter 6.7), the controller type is automatically selected according to the uploaded hardware.

⚠ Important safety notice:

The safety category is defined by the hardware. It is prohibited to integrate a SafeC 200 safety controller, category 2 according to EN ISO 13849, into a category 4 application!

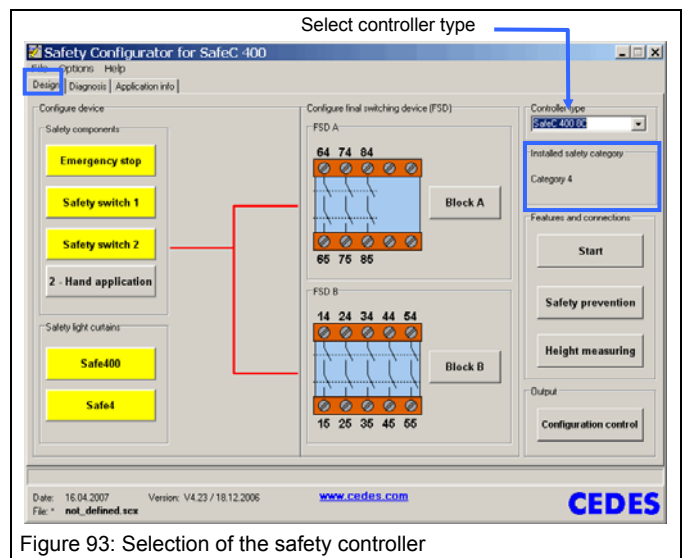


Figure 93: Selection of the safety controller

Safety components configuration

By clicking on the boxes in the areas "Safety components" or "Safety light curtains" the specification window will be opened for the connectable safety components. All specification windows are set up similarly. They show the connection terminals, give important safety information, and allow the user to change all important configuration data.

By moving the cursor over one of the yellow fields in the "Safety components" or "Safety light curtains" area, a red line will graphically indicate if this safety

component has an effect on output block A and / or B.

If a safety component field is gray instead of yellow, this means that this component has no effect on either output block A or B.

If one of the lines displays an exclamation mark, this means that a stop delay would be activated for this component and the switching path.

In the lower portion of this window, there is an information field, which gives information about the possibilities available at the current cursor location.

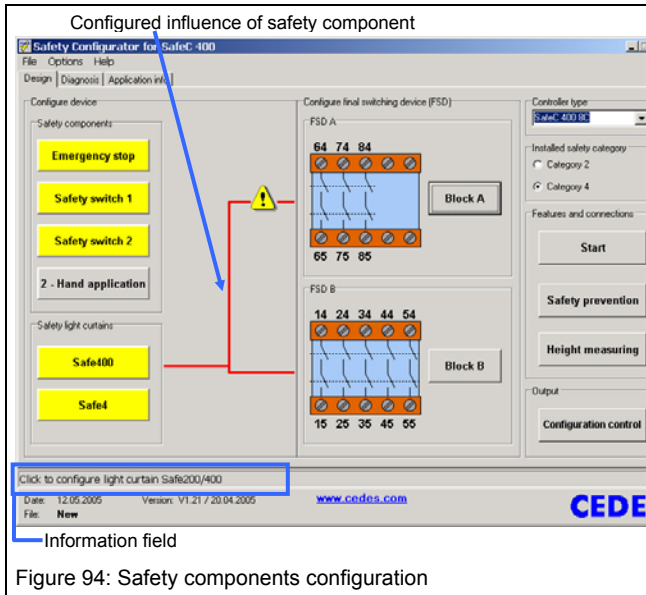


Figure 94: Safety components configuration

The schematic representation of the output blocks (FSD) on the right-hand side, give information about the type and status:

- Relay: The output block is active and defined as a relay block.
- PNP: The output block is active and defined as a PNP output block.
- Gray: The output block is inactive.

The output blocks become automatically active if at least one safety component is operating on the respective output block. If there are no components operating on the output block then it is automatically defined as inactive.

6.5.1 Specification window for Block A + B

By clicking on the "Block A" or "Block B" buttons, the corresponding configuration window is opened, which allows settings, which effect the respective block, to be customized:

- Hardware type (Relays / PNP)
- External Device Monitoring (EDM)
- Stop delay

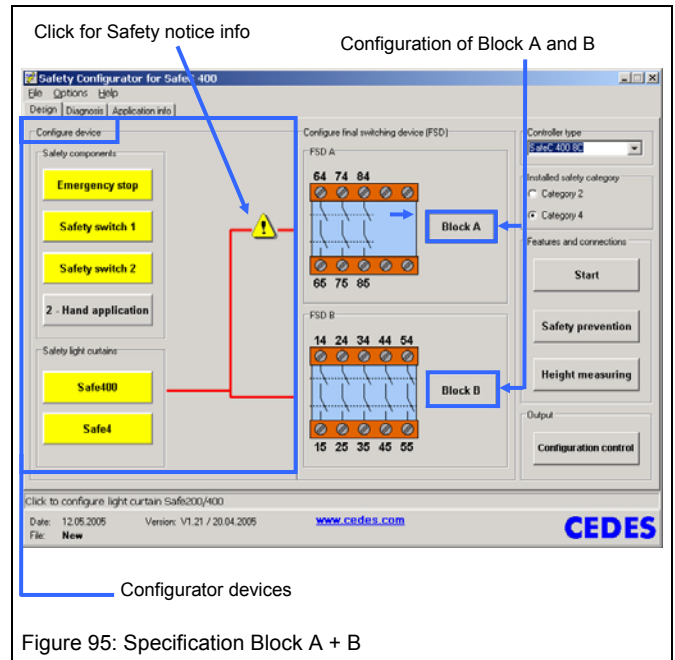


Figure 95: Specification Block A + B

Hardware type (Relay / PNP)

The hardware type defines the hardware of the output blocks. Relays and PNP's are available. The hardware type of both output blocks must correspond with the relevant block types of the controller being configured. For controllers equipped with only one output block, the hardware type of the block not equipped plays no role, however it must be inactive, i.e. no safety components are permitted to operate this block.

External Device Monitoring (EDM)

High-energy applications with very high power ratings require switching circuits with corresponding switching capacities. If the switching capacity of the integrated blocks A and / or B are insufficient, then external force guided, power contactors must be used, whose function is monitored using contact feedback. This function is called EDM (= External Device Monitoring).

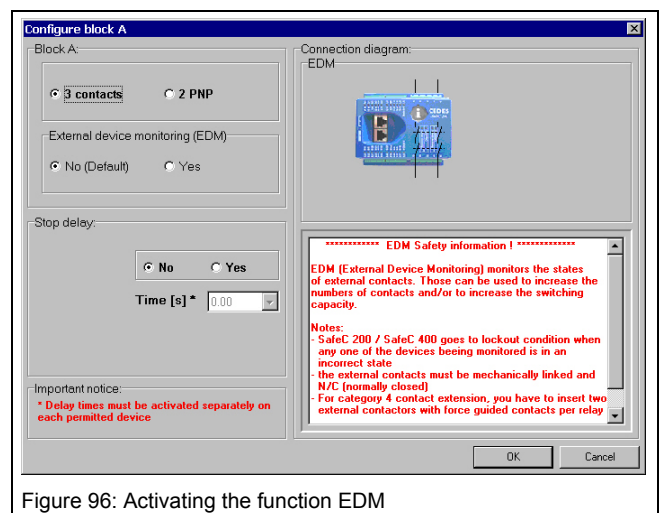


Figure 96: Activating the function EDM

If "Yes" is chosen in the EDM field, the contactor monitoring for the relevant block is active. The EDM function only allows a start if the NC contact of the

external force guided power contactor is closed. Additionally the EDM function forces the output block to immediately open if the monitored circuit is not opened within 300 ms of the output block closing.

Notice:

If the EDM function is not active and there is still a dynamic signal being detected at the respective EDM input, then the corresponding output block will also open. The SafeC 200 or SafeC 400 control unit assumes in such a case, that the contact monitoring was inadvertently deactivated.

⚠ Important safety notice:

For the configuration of the EDM function, it is also important to follow the safety notes for connections (see Technical Description SafeC 200 / SafeC 400 CEDES document number: 103 415).

Function "Stop delay"

This function is activated by simply clicking on the "Yes" box, and a stop delay can now be appointed for this output block.

⚠ Important safety notice:

This delay time must be verified at the corresponding safety component, i.e. a time delay will only take place when it is activated at the respective safety component. The advantage of this is that one safety component may switch block A with no delay, and a second component will switch block A with a delay. The total reaction time is calculated out of the sum of the maximum stop delay, and the reaction time of the SafeC 200 or SafeC 400 control unit.

⚠ Important safety notice:

When configuring a stop delay for a safety light curtain, this time (delay) must be completely considered in the minimum safety distance calculation.

6.5.2 Configurator devices

Currently, six specification windows for individual safety components are available:

- "Emergency Stop"
- "Safety switch 1"
- "Safety switch 2"
- "Two-hand application"
- "Safe200 / Safe400"
- "Safe2+ / Safe4"

Generally the individual specification windows for the safety components are structured the same way. This means that the settings for block A and B must be defined. In particular this deals with the settings:

- Which block (FSD) is affected when this safety component is activated?
- Should a stop delay be active for this block?
- What happens when the safety components are closed again after an interruption? Should the contacts in block A and / or B automatically close, or only after pressing a connected start button?

Is the possibility of an override, using the "Safety prevention switch", active or not active for this safety component?

⚠ Important safety notice:

When configuring the start mode and / or using the "Safety prevention switch", the general safety notices found in "Technical Description SafeC 200 / SafeC 400" (CEDES document number: 103 415) must be followed!

All safety notices for the respective safety components can also be found by clicking on the following icons!



Specification window "Emergency Stop"

In the "Emergency Stop" specification window, the output blocks, the corresponding start mode, as well as potential stop delay times can all be configured. "Safety prevention" cannot be activated because, in accordance with the regulations, an emergency stop must always be available.

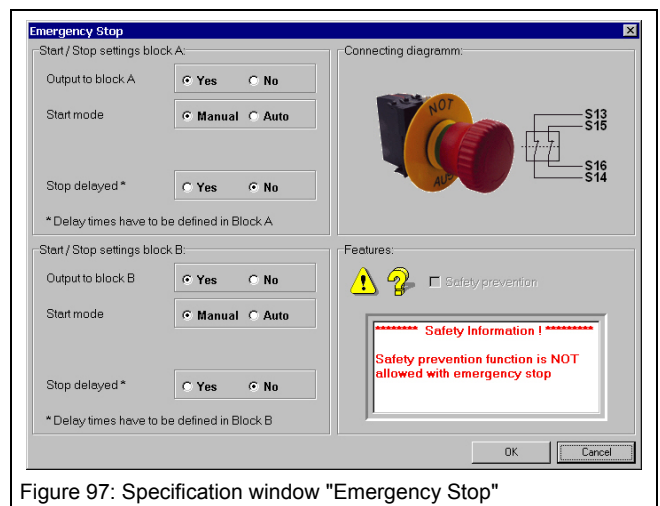


Figure 97: Specification window "Emergency Stop"

Specification window "Safety switch"

In both specification windows "Safety switch 1" and "Safety switch 2", the output blocks, the corresponding start mode, as well as potential stop delay times, may be configured.

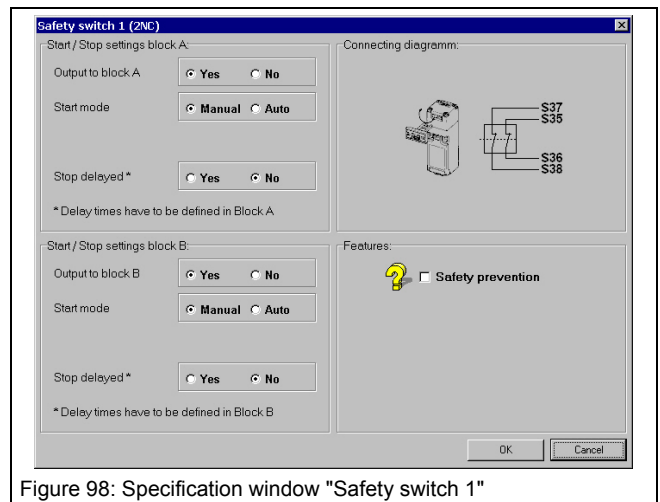


Figure 98: Specification window "Safety switch 1"

Likewise, it must be determined whether the safety function of the safety switch may be overridden for a period of time through use of the "Safety prevention switch". The override function of this "Safety prevention switch" is only permitted for applications for which the risk analysis according to EN 1050 and EN 12100 -1/-2 permits for the muting of a safety component.

Specification window "2-hand application"

To configure a two-hand console on a SafeC 400 control module, according to EN 574, the specification window "2-Hand Application" must be opened. According to the Standards, a two-hand start is not defined for safety category 2. Therefore a two-hand start is only possible with a CEDES SafeC 400 control unit.

Note:

A two-hand application is only possible when safety switch 2 is fully deactivated. This means that safety switch 2 may not be active for either block A (FSD A) or block B (FSD B).

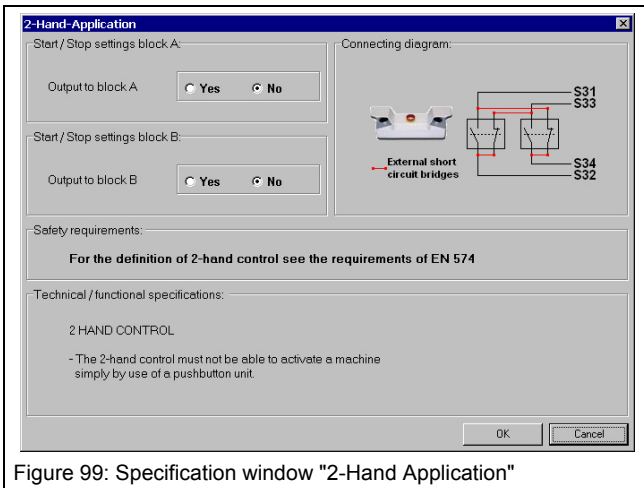


Figure 99: Specification window "2-Hand Application"

If the two-hand application is only active for one output block, then the contacts in this block will close when the two-hand console is correctly operated. Therefore the installation of a manual start button for this block is not necessary

Specification window "Safe2+ / Safe4"

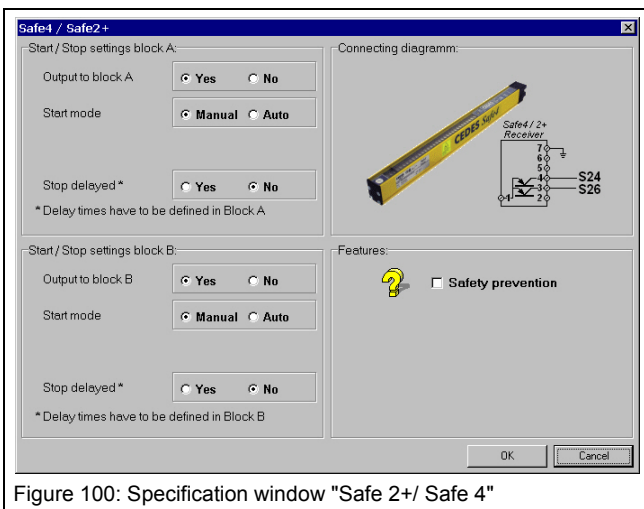


Figure 100: Specification window "Safe 2+ / Safe 4"

In order to configure a Safe2+ or Safe4 light curtain the specification window Safe4 (for safety category 4) or Safe2+ (for safety category 2) must be opened.

Similar to the previously described specification windows, the output blocks, the corresponding start mode, as well as potential stop delay times, must be configured. Additionally, it must be determined if the safety function of the safety light curtain may be overridden for a period of time through use of the "Safety prevention" switch. This override function is only allowed after a thorough safety analysis according to EN ISO 13849-1 and EN 12100 is completed.

Specification window "Safe200 / Safe400"

In order to configure a Safe200 or Safe400 light curtain, the specification window Safe200 (for safety category 2) or Safe400 (for safety category 4), must be opened.

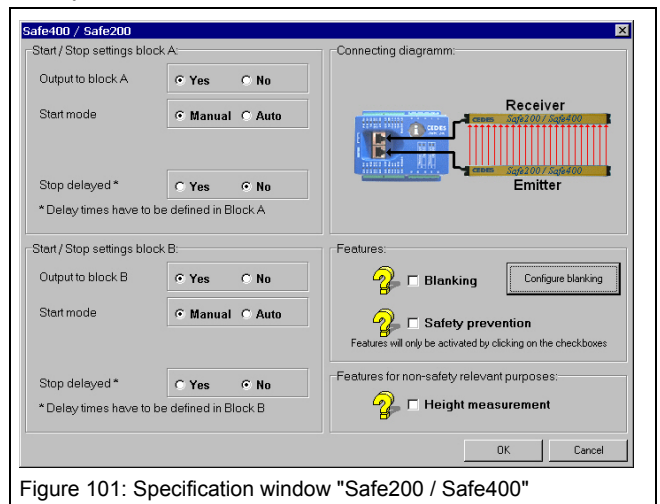


Figure 101: Specification window "Safe200 / Safe400"

Similar to the previously described specification windows, the output blocks, the corresponding start mode, as well as potential stop delay times must be configured. Additionally, it must be determined if the safety function of the safety light curtain may be overridden for a period of time through use of the "Safety prevention" switch. This override function, like the other safety components, is only allowed after a thorough safety analysis according to EN ISO 13849-1 and EN 12100 -1/-2 is completed.

6.5.3 Function "Blanking"

Certain applications in practice require that the protective field of the Safe200 or Safe400 light curtains need to be interrupted without the safety contacts in output block A or B opening. A typical example of such an application is a break press.

"Blanking" modes are broken down into the following three categories:

- Fixed Blanking
- Floating Blanking
- Reduced resolution

Chapter 7 explains in detail what the differences are between these Blanking modes.

With help of the Configuration Tool all three Blanking modes can be configured for CEDES Safe200 or Safe400 light curtains. A further specialty of the Configuration Tool is that each light curtain may be divided into 4 different areas, whereby each section may be configured with its own distinctive Blanking mode.

⚠ Important safety notice:

The configuration of Blanking will lead to longer reaction times, and possibly also to higher resolutions. These changes must be taken into account when calculating the minimum safety distance. The new reaction time, as well as a possible new resolution, will be shown in the Configuration Tool.

Configuring the Blanking Function

By clicking on the field "Configure blanking", a configuration window "Define Blanking parameters" will open.

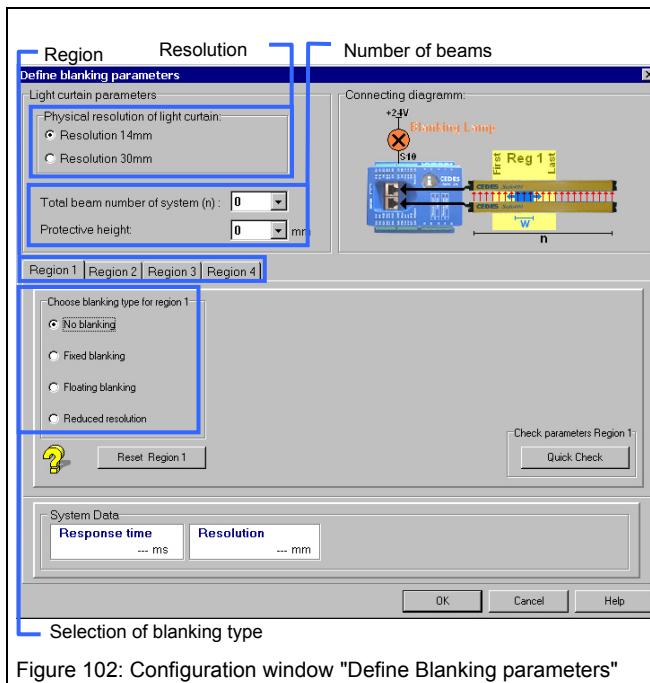


Figure 102: Configuration window "Define Blanking parameters"

⚠ Important safety notice:

After the Blanking configuration has been carried out, the user is responsible for testing the resolution of the light curtain.

The first step requires the defining of the resolution and the number of beams, or the protective field length of the Safe200 / Safe400 light curtains.

The length of the protective field as well as the physical resolution can be found on the specification label of the light curtain being configured.

Thereafter the Blanking mode may be configured for "Region" 1.

In the case of "Fixed Blanking", the first and last interrupted beams must be defined, and thereafter confirmed with a cursor click on the "Quick check" box. For more detailed information see chapter 7.1.1.

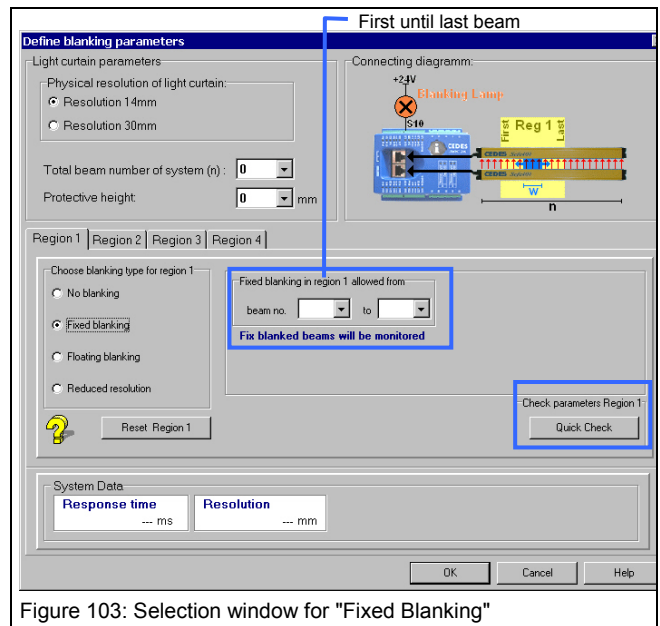


Figure 103: Selection window for "Fixed Blanking"

In the case of "Floating Blanking", the area in which the object is allowed to move must first be defined. Subsequently the number of interrupted beams for "Floating Blanking" can then be appointed. Finally, the user must specify whether this application operates with object monitoring ("with monitoring") or without object monitoring ("no monitoring", see also chapter 7.1.2).

The value "max. object size without detection" corresponds to the maximum size of object which can pass through the protective field without being detected. This means that an object with a larger diameter may cause the corresponding output to switch, but an object with a smaller diameter will not be detected.

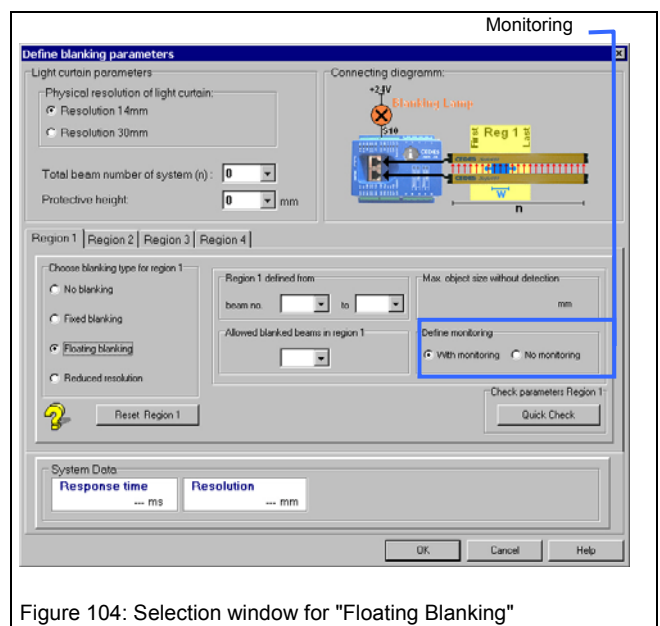


Figure 104: Selection window for "Floating Blanking"

In the case of "Reduced Resolution", the area in which the object is allowed to move must first be defined. Subsequently the number of interrupted beams for "Reduced Resolution" can then be appointed.

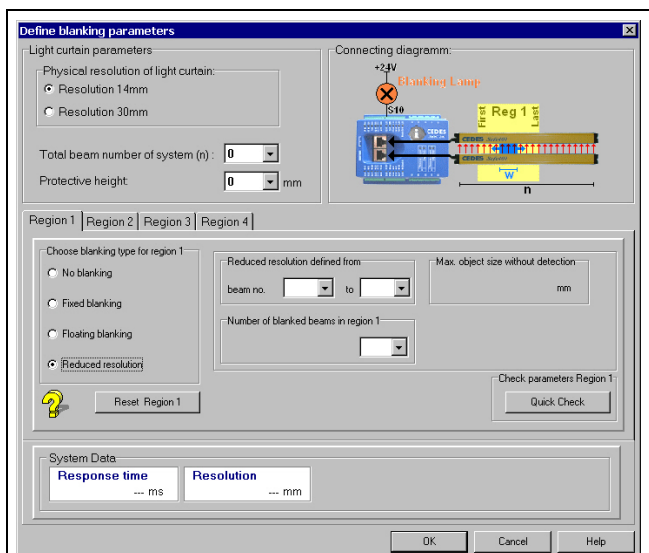


Figure 105: Selection window for "Reduced Resolution"

This number may reach a maximum of five beams (in the case of a 14 mm resolution light curtain, see also chapter 7.1.3). The value "max. object size without detection" corresponds to the maximum size of the object which can pass through the protective field without being detected.

Once Region 1 is defined according to the requirements of the application, this process can be concluded, or Region 2 can then be configured with a new Blanking mode. Thus, the protective field of every CEDES Safe200 / Safe400 safety light curtain can be configured with up to 4 Regions, each configured with a different Blanking mode. Once the Blanking mode for a Region has been fully defined, the "Quick Check" box must always be clicked on. With this step the user will receive confirmation that the entered data is correct.

⚠ Important safety notice:

With the "Quick check", the new response time as well as the new resolution of the safety light curtain will be displayed. These new values must be taken into consideration when calculating the safety distance as well as the mounting position of the safety light curtain. After a new configuration, the person responsible for the machine must test the resolution in order to eliminate dangers attributed to possible inactive zones or insufficient resolution.

Independent of which Blanking mode or Blanking type has been chosen, the configuration must be finally confirmed by ticking the Blanking box in the features area of the Safe200 / Safe400 window. Only then will the configured Blanking function be activated.

6.5.4 Function "Measurement"

Next to the technical safety functions, the CEDES Safe200 / Safe400 light curtain may also be used simultaneously for height measurements. If the height measurement function is configured, then when the light curtain is interrupted, the first beam and the last beam information will be transmitted via the RS 485 interface.

The function "Measurement" has no influence on the response time, but does have an influence on the restart time. After a protective field interruption, the corresponding beam information will first be transmitted over the RS 485 interface, and then the monitored area will once again become active.

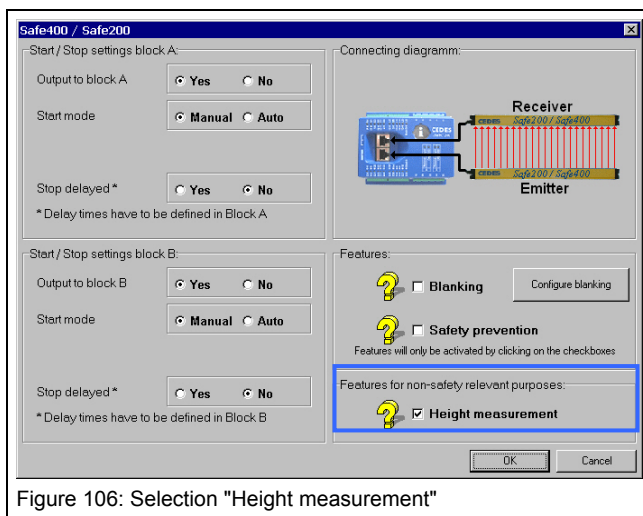


Figure 106: Selection "Height measurement"

6.5.5 Diagnosis

In order to carry out a diagnosis, the following steps must be made:

1. Connect the OptiLink
2. If not already done, start the program Configuration Tool and choose the "Diagnosis" tab (Figure 107 and Figure 108).
3. Select the appropriate COM interface from the menu bar, under: Options \Comport settings COM1 ... COM4.

The program immediately detects the application and displays the transmitted data on the monitor. As soon as communication is established between the PC and the CEDES SafeC 200 /SafeC 400 controller, two different functions may be selected:

- Protective field viewer
- Service information
- History recorder

Switch between these parts by choosing the corresponding register mark.

Protective field viewer

This function graphically shows the interrupted area of the protective field. The numbers displayed in this window represent the first and the last interrupted beams.

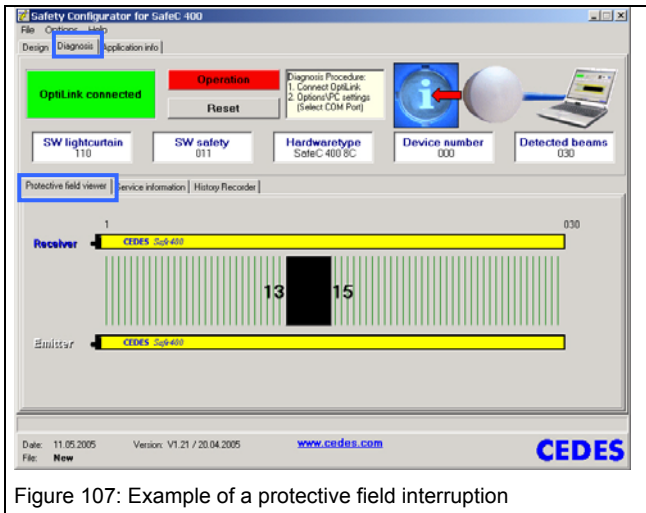


Figure 107: Example of a protective field interruption

Service information

For diagnosis of a CEDES SafeC 200 / SafeC 400 control module, a short description of the error type can be found in the "Service Information". External and internal errors, as well as necessary corrective actions, will be displayed here.

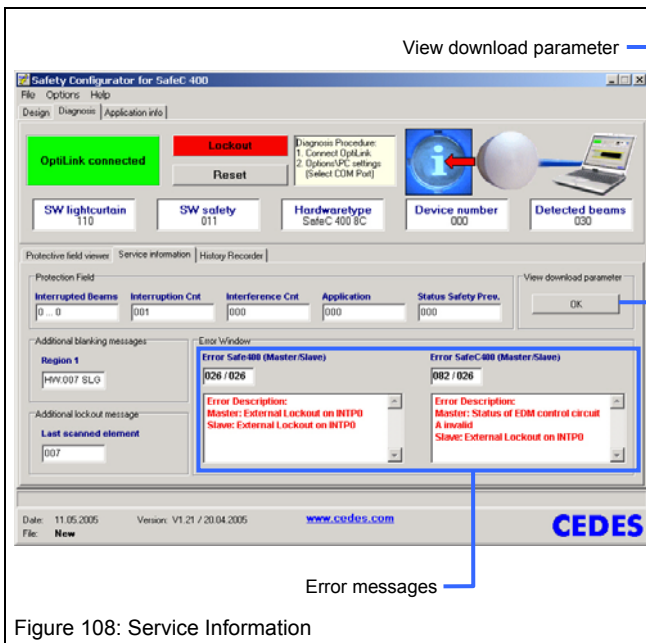


Figure 108: Service Information

By clicking on "View download parameter", a fourth tab sheet "Configuration parameter" (Figure 110) will open. The window of this tab sheet contains two additional tab sheets; "View real time communication" and "View configuration parameter". The tab sheet "View real time communication" contains a protocol viewer, which displays the unfiltered information sent by the SafeC controller in protocol form.

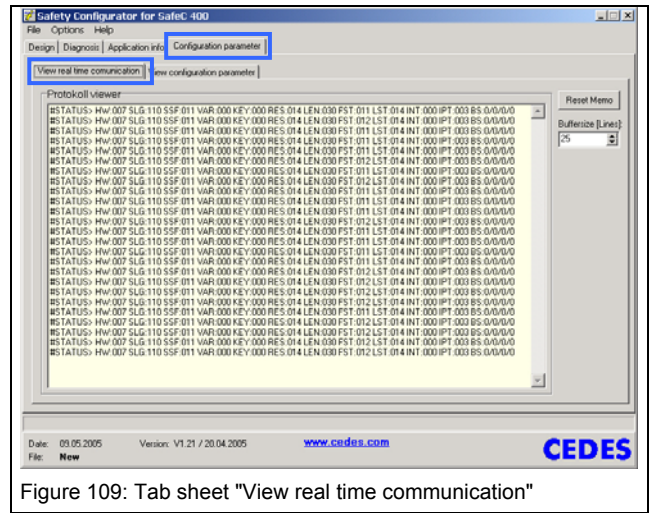


Figure 109: Tab sheet "View real time communication"

The tab sheet "View configuration parameter" contains all the configuration parameter values from the current configuration (Figure 110).

Contact your CEDES partner in order to receive more information regarding the tab sheet "Configuration parameter".

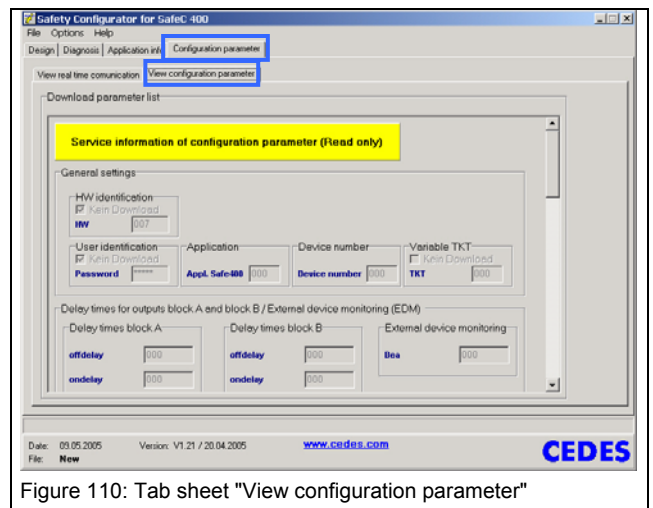


Figure 110: Tab sheet "View configuration parameter"

6.5.6 Application info

This part of the program calculates the safety distances for applications with vertically mounted light curtains Safe 200 / 400. The corresponding calculations are carried out according to the standards EN 999 (1998) and EN 61496-1, -2. These results can be printed and included as part of the complete risk analysis documentation (all calculations are tested and certified by TÜV Rheinland).

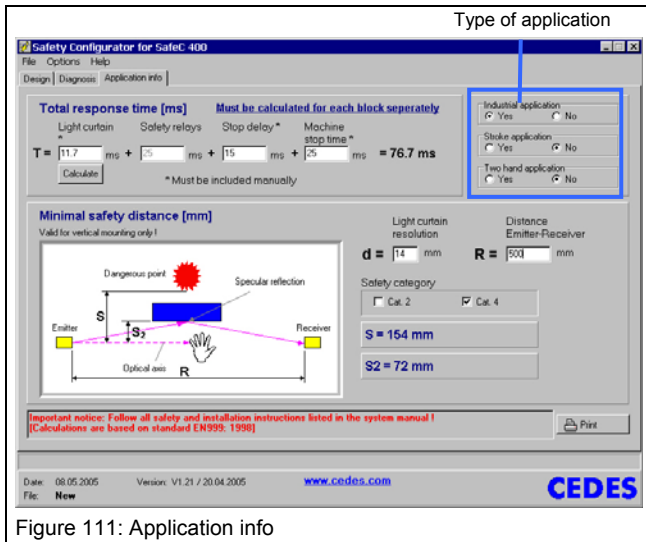


Figure 111: Application info

To start, the type of application must be specified.

The Configuration Tool offers three choices of application:

1. **"Industrial Application; Yes or No"**
Choose "Yes" if the application is industrial. Select "No" if the application is not industrial (this means that children also have access to the application).
2. **"Stroke Application; Yes or No"**
Choose "Yes" if the application starts automatically after a preset number of interruptions of the protective field occurs (e.g. presses). Select "No" if the application is not a stroke application
3. **"Two Hand Application; Yes or No"**
Choose "Yes" if the application is started with a two hand start button. Choose "No" if not

The following information is necessary in order to start the calculations:

- The response time of the light curtain [ms].
- The response time for the SafeC 200 / SafeC 400 control module [ms] (if nothing else is noted on the product label, then this is 25 ms).
- The configured stop delay for the respective output block [ms].
- The machine stopping time [ms]. This "time" must consider the total length of time, from the moment the SafeC 200 / SafeC 400 relay blocks open, until the machine stops. The momentum of the machine, for example, must also be taken into consideration when calculating this stopping time.

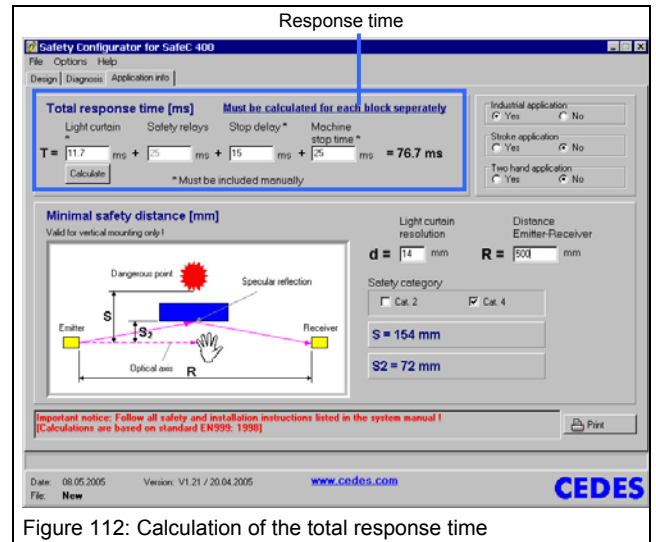


Figure 112: Calculation of the total response time

The response time for a SafeC 200 / SafeC 400 control module is already entered as 25 ms.

For information regarding the response time of a Safe200 / Safe400 safety light curtain, click the cursor on the "Calculate" button. The window "Define Blanking parameters" will open, and depending on the application, the necessary Blanking mode can be specified. Upon completion of the light curtain specification, the response time and the resolution will automatically be entered into the "Application info" window.

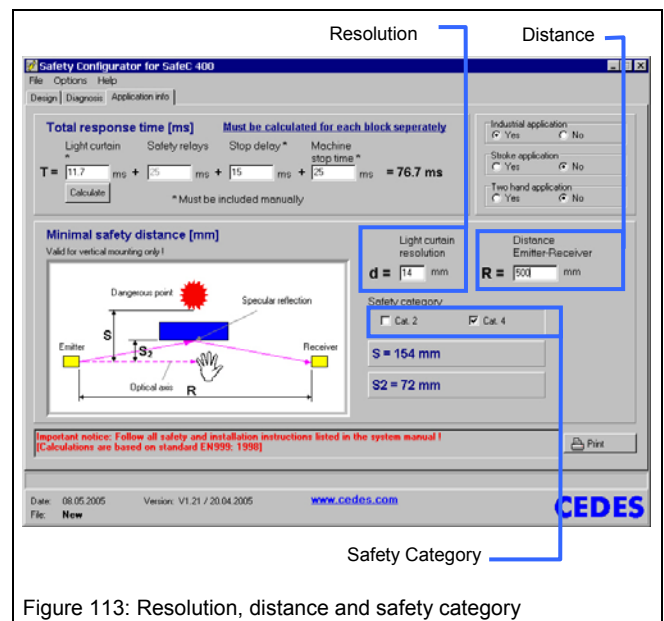


Figure 113: Resolution, distance and safety category

To complete the calculations, the following data must also be entered:

1. The distance between emitter and receiver [mm]
2. The safety category

If all the data is entered, the following result will be displayed:

- The minimum safety distance between the protective field and the danger point (S [mm]), for vertical mounting.
- The minimum distance to a reflective surface (S2 [mm])

⚠ Important safety notice:

Depending on the application, respectively configuration, the calculations must be made for both output Block A and Block B.

Notice:

Consult the Safe200 / Safe400 technical description document (CEDES document number: 103 373) or your nearest CEDES partner, in order to receive more information regarding these calculations.

In order to see what formula are used to calculate the safety distances, simply position the cursor over the corresponding result. After a short period of time in this position, the corresponding formula will be displayed.

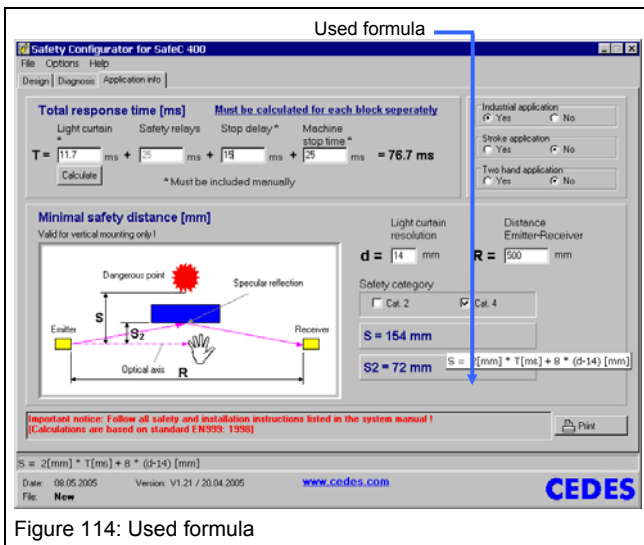


Figure 114: Used formula

6.6 PC ⇔ SafeC (Download)

When a configuration is created which meets the requirements of the relevant application, it now needs to be downloaded into the CEDES SafeC 200 or SafeC 400 control module.

1. Attach the OptiLink to the control module.
2. Connect the OptiLink to corresponding plug in your PC.
3. Select the COM-Port in menu item Option, Comport Settings. Normally COM1=RS232, COMx = USB (see Figure 15).
4. Disconnect voltage supply to SafeC Unit

5. Select menu item "PC ⇔ SafeC (Download)" (chapter 6.4.1)
6. Enter password

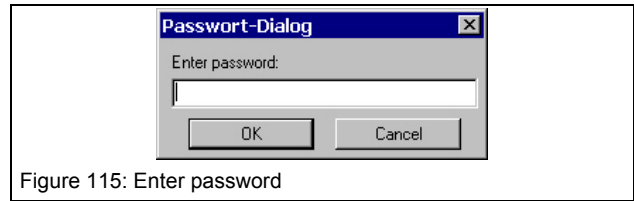


Figure 115: Enter password

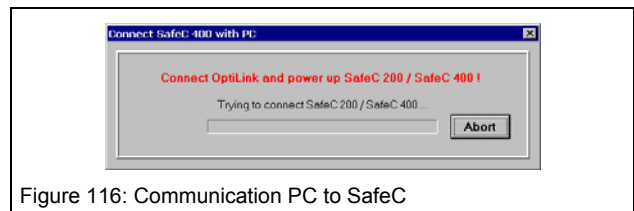


Figure 116: Communication PC to SafeC

7. Now reconnect the SafeC Control Unit voltage supply and data transfer begins.
8. Progress of communication from PC to the SafeC Controller Module can be seen in the progress bar shown in Figure 116.

Downloading and designating the configuration differs between units later than version V1.15 and earlier versions. The next two chapters describe the respective procedures.

6.6.1 Download to SafeC x00 SW < V1.15

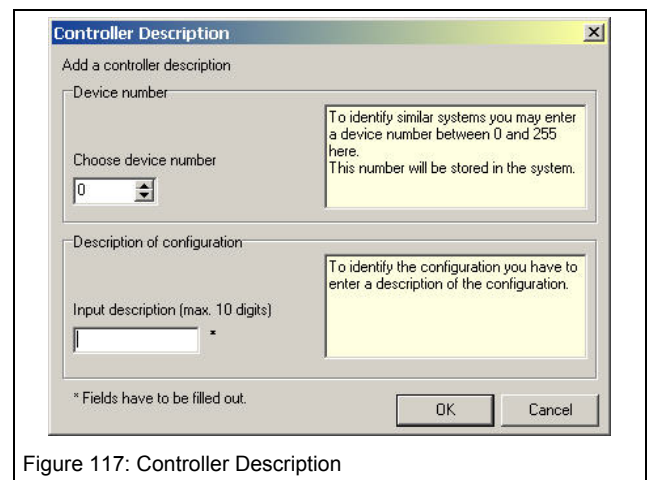


Figure 117: Controller Description

9. Choose a device number (optional) and a controller designation. The device number is also clearly identifiable as the "VAR" value on the Configuration control document and the Configuration control label.
10. The window that follows displays the progress of communication from the PC to the SafeC Controller module.

After download, the window "Configuration control document" will appear on your monitor.

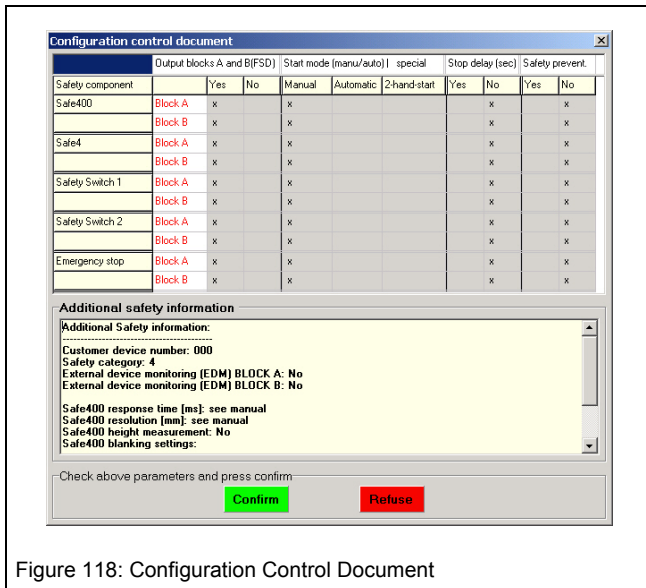


Figure 118: Configuration Control Document

11. Immediately control this document!
12. This new configuration will become active, only after the "Confirm" button within the "Configuration control document" is selected. If the "Refuse" button is selected, the original (old) SafeC configuration will remain active.

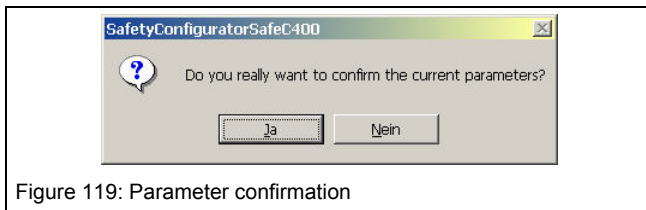


Figure 119: Parameter confirmation

13. The configuration is activated following confirmation.

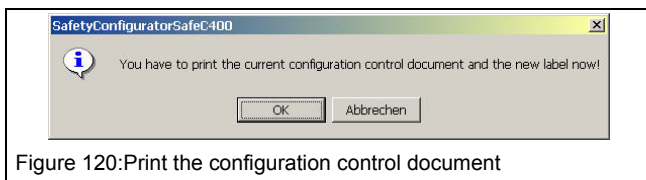


Figure 120: Print the configuration control document

14. Before printing out the Configuration Control Document check the User Information and confirm with "OK". The document is printed.

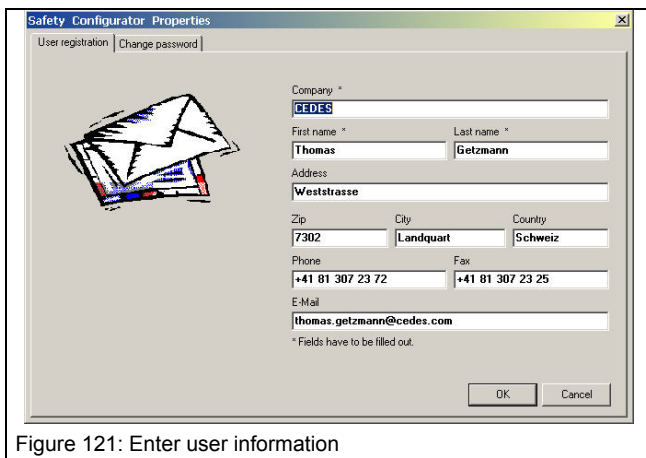


Figure 121: Enter user information

15. Now detach the blank unprinted adhesive label from the yellow backing tape and attach it in the rectangle provided and replace the control printout in the printer.

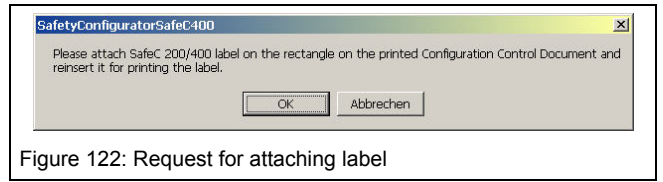


Figure 122: Request for attaching label

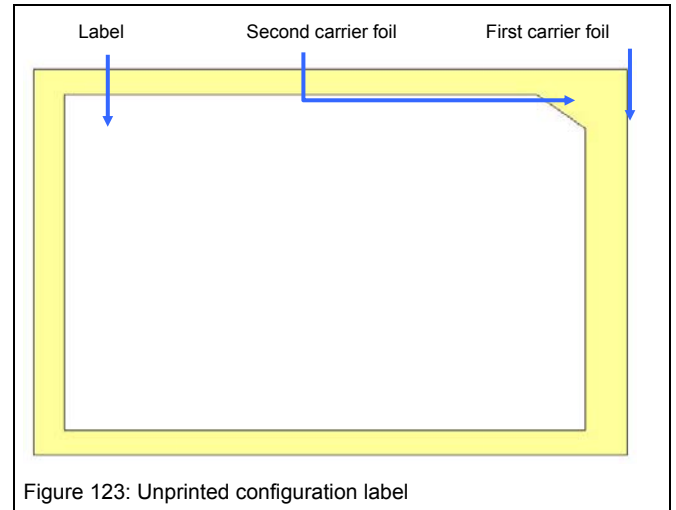


Figure 123: Unprinted configuration label

16. Confirming the message shown in Figure 122 prints the label.
17. Only now is the configuration accepted by the SafeC. The information window shown in Figure 124 shows confirmation of successful activation.

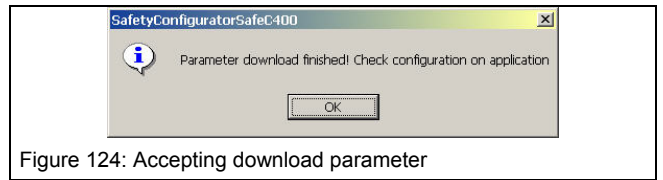


Figure 124: Accepting download parameter

18. Attach the printed and signed adhesive label to the side of the freshly configured CEDES control unit. Remove any earlier configuration labels and control printouts.

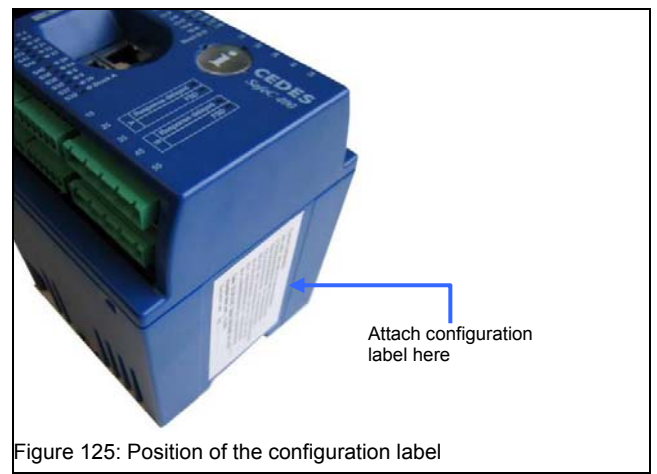


Figure 125: Position of the configuration label

19. Check the configuration as described in chapter 7.6.3.

6.6.2 Download to SafeC x00 SW ≥ V1.15

After the data have been transferred to the controller Figure 127 shows the request to enter the Device Number.

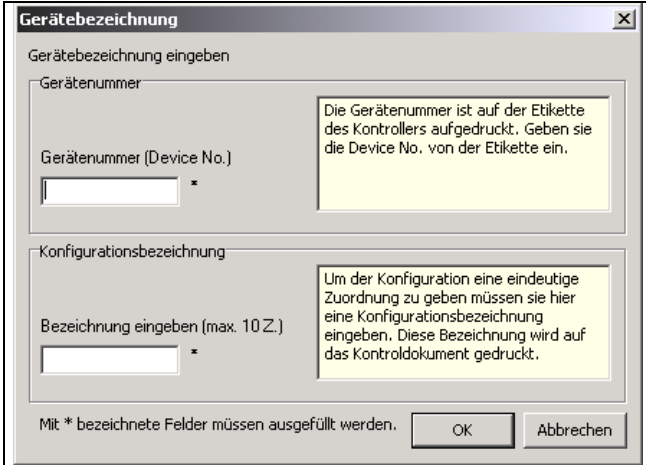


Figure 126: Enter Device ID and configuration designation

9. Enter the Device No. on the nameplate and the description of the configuration (e.g. CAG A001)

The Device Number is to be found on the nameplate.

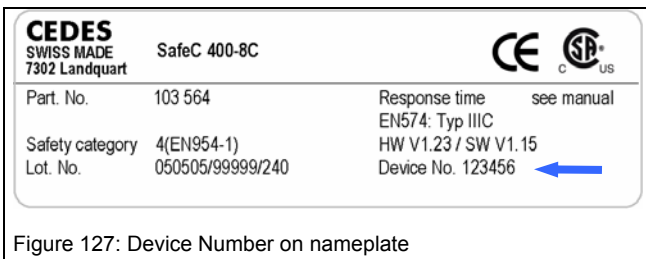


Figure 127: Device Number on nameplate

⚠ Important Safety Note:

It is essential that the Device No. is entered. This information appears in the Configuration Control Document and is used to clearly identify the device.

Data transmission is ended when the configuration is displayed.

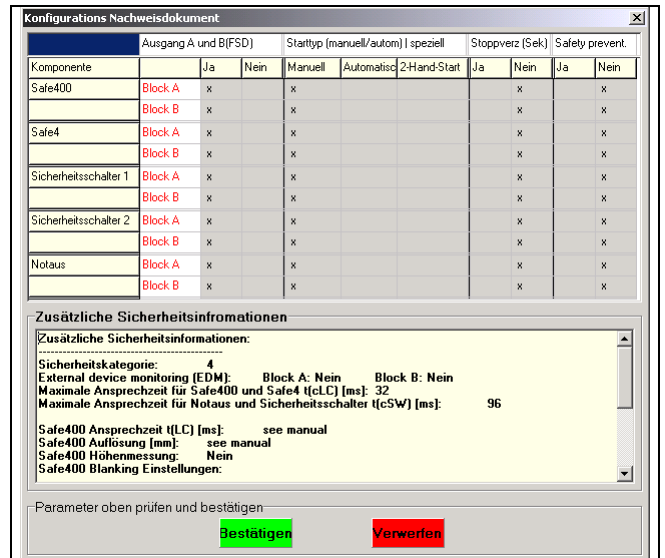


Figure 128: Configuration check display

- 10. Check this configuration printout thoroughly!
- 11. By clicking on "Confirm" the configuration check is confirmed. If it is declined ("Reject") the previous old SafeC configuration remains active.

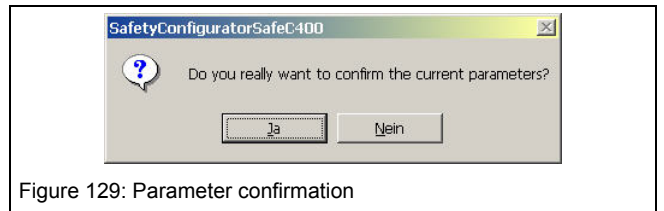


Figure 129: Parameter confirmation

- 12. Activation of the configuration is confirmed with "Yes".
- 13. The configuration must now be printed out on the Configuration Control Document.

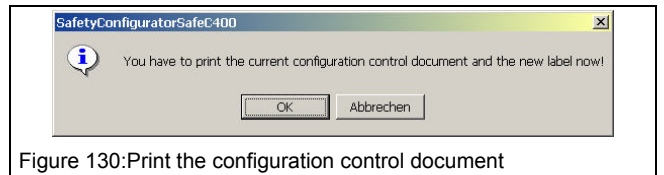


Figure 130: Print the configuration control document

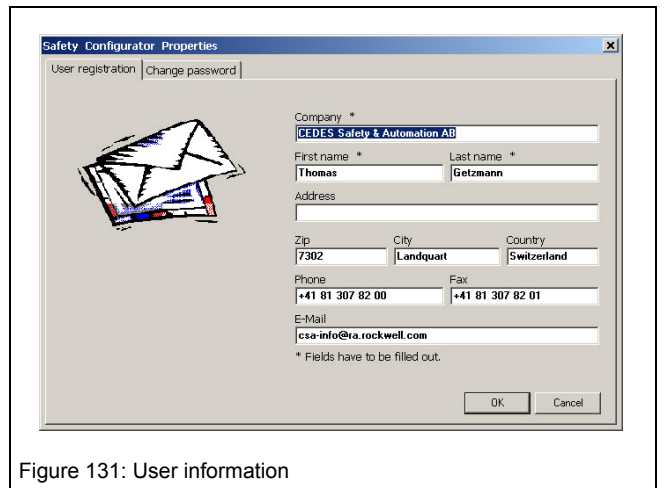


Figure 131: User information

Important Safety Note

If the evaluator processor unit is reconfigured by authorized personnel using the OptiLink the reaction time $t(R\text{-Total})$ may be extended depending on the configuration. For that reason it is very important, that after every reconfiguration that

- a. the current Configuration Control Document is attached to the controller concerned and is accessible to the user and
- b. the new gate shut-off time matches the machine's threshold values given in the risk analysis.

14. Only now is the configuration accepted by the SafeC. Status information appears in a window that opens.
15. Align the "Configuration changed" label with the date and name and stick it on the side of the unit. Confirm this action and continue by clicking "OK".

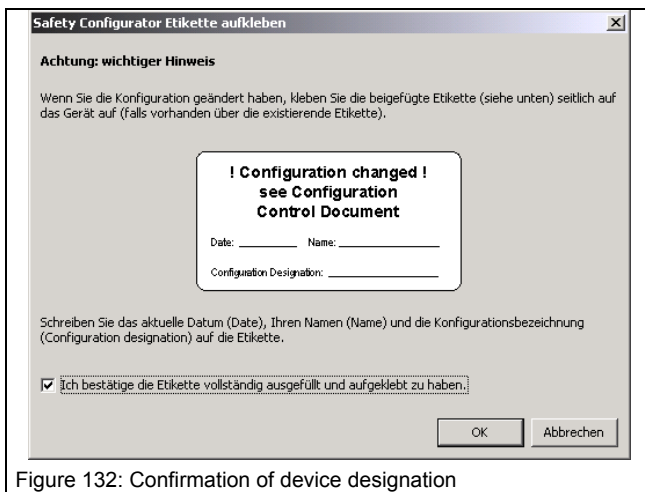


Figure 132: Confirmation of device designation

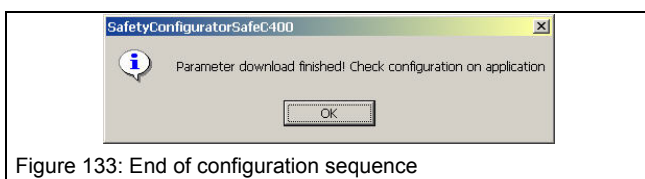


Figure 133: End of configuration sequence

16. Check configuration as described in chapter 1.1.

6.6.3 Verify download

1. Using the test probes check the safety light curtain's protection field resolution (CEDES Safe200 / Safe400 instructions).
2. Adjust Safe200 or Safe400 safety gap to current reaction time and resolution.
3. Check proper functioning of all safety components.
4. Check configured time intervals.
5. Verify all "Safety Prevention" functions, i.e. the function of **all** safety components with "Safety Prevention" switch both activated and deactivated.
6. When configuring a blanking model the user is responsible for checking the resolution of the light curtain and the safety interval in accordance with reaction time and resolution.
7. Sign the printed label and control printout.
8. When configuring a blanking model the label from Safe200 or Safe400 light curtain accessories pack must be filled out and attached in a visible position on the light curtain (remove any earlier blanking labels).
9. Keep the configuration printout together with the SafeC 200 or SafeC 400 technical Specification in a safe place in the vicinity (e.g. switchboard).

Configuration control document
Attach label here

CEDES SafeC 200 / SafeC 400 safety control units may only be configured by authorized people. This sheet shows the actual system parameters of the configurator and has to be stored together with the manual. Control unit has to be labeled with the device number. Old control documents have to be exchanged! To receive more information see manual or contact your local CEDES partner.

Current configuration
 APL:000 VAR:000 DTA:000/000/000/000
 DTB:000/000/000/000 BWS:000/000/000/000
 ONA:000/000/000/000 OS1:000/000/000/000
 OS2:000/000/000/000 SUE:000/000/000/007
 BEA:000 MUT:000/000/000/000 EXT:000/000/000/000
 SF4:000/000/000/000 OVR:000 TKT:000 HW:007
 BLK:0/000/000/000/000 BLK:1/000/000/000/000
 BLK:2/000/000/000/000 BLK:3/000/000/000/000

Please attach SafeC 200/400 label on this rectangle and reinsert for printing the label.
 Label printing:
 Menu
 File / Print label of current configuration

Date: 09.05.2005 Safety SW Multi5 JMu
 Reaction time (sec.): < 0.025
 Name: John Sig:

Reference Code: JMu
 Installed hardware: SafeC 400 8C

User registration:
 Company: CEDES AG
 First Name: Musteruser
 Name: John
 Address: Weststrasse
 Zip code: 7302

City: Landquart
 Country: Switzerland
 Phone: +41 81 307 23 72
 Fax: +41 81 307 23 25
 Email: john.musteruser@cedes.com

Safety component	<u>Output blocks A and B(FSD)</u>		<u>Start mode (manu/auto) special</u>			<u>Stop delay (sec)</u>		<u>Safety prevent.</u>	
	Yes	No	Manual	Automatic	2-hand-start	Yes	No	Yes	No
Safe400	Block A	x	x				x		x
	Block B	x	x				x		x
Safe4	Block A	x	x				x		x
	Block B	x	x				x		x
Safety Switch 1	Block A	x	x				x		x
	Block B	x	x				x		x
Safety Switch 2	Block A	x	x				x		x
	Block B	x	x				x		x
Emergency stop	Block A	x	x				x		x
	Block B	x	x				x		x

Additional Safety information:
 Customer device number: 000
 Safety category: 4
 External device monitoring (EDM) BLOCK A: No
 External device monitoring (EDM) BLOCK B: No

Safe400 response time [ms]: see manual
 Safe400 resolution [mm]: see manual
 Safe400 height measurement: No
 Safe400 blanking settings:
 -> REGION 1: no blanking defined
 -> REGION 2: no blanking defined
 -> REGION 3: no blanking defined
 -> REGION 4: no blanking defined

09.05.2005 / Signature: _____

Configuration printout 09.05.2005 15:08:41 Page 1 of 1

Figure 134: Configuration Control Document for SafeC x00 with SW < V1.15

CEDES AG
www.cedes.com

Configuration control document

CEDES SafeC 200 / SafeC 400 safety control units may only be configured by authorized people. This sheet shows the actual system parameters of the configurator and has to be stored together with the manual. Control unit has to be labeled with the device number. Old control documents have to be exchanged! To receive more information see manual or contact your local CEDES partner.

Configuration designation CAG A001

Device No. 123456

Installed hardware: SafeC 400 8C

Filename (Configurationfile): CAG 001.scx

User registration:

Company: CEDES
First Name: Thomas
Name: Getzmann
Address: Science Park
Zip code: 7302

City: Landquart
Country: Schweiz
Phone: +41 81 307 23 72
Fax: +41 81 307 23 25
Email: thomas.getzmann@cedes.com

Safety component	Output blocks A and B(FSD)		Start mode (manu/auto) special			Stop delay (sec) t(delay) [ms]		Safety prevent.	
	Block A	Block B	Manual	Automatic	2-hand-start	Yes	No	Yes	No
Safe400	x	x	x				x		x

Safe4	x	x	x				x		x

Safety Switch 1	x	x	x				x		x

Safety Switch 2	x	x	x				x		x

Emergency stop	x	x	x				x		x

Additional Safety information:

Safety category: 4
 External device monitoring (EDM): Block A: No Block B: No
 Max. response time for Safe400 and Safe4 t(cLC) [ms]: 32
 Max. response time for Emergency Stop and Safety Switch t(cSW) [ms]: 96
 Safe400 response time t(LC) [ms]: see manual
 Safe400 resolution [mm]: see manual
 Safe400 height measurement: No
 Safe400 blanking settings:
 -> REGION 1: no blanking defined
 -> REGION 2: no blanking defined
 -> REGION 3: no blanking defined
 -> REGION 4: no blanking defined

Attention:

Max. reaction time for Safe400 and Safe4 light curtain = t(LC) + t(cLC) + t(delay)
 Max. reaction time for Emergency Stop and Safety Switch = t(cSW) + t(delay)

14.11.2006 / Signature: _____

Figure 135: Configuration Control Document for SafeC x00 with SW ≥ V1.15

6.7 SafeC ⇒ PC (Upload)

In order to control the configuration of a CEDES SafeC 200 or SafeC 400 control module, the configuration data may be read out as follows:

1. Attach the OptiLink to the controller.
2. Disconnect the power supply to the SafeC controller.
3. Connect the OptiLink to the PC RS 232 interface.
4. Select the COM-Port (chapter 6.4.2)
5. Select Menu item "PC -> SafeC (Upload)" (chapter 6.4).
6. A window will appear which shows the communication from the PC to the SafeC control module (Figure 116).
7. Now connect the +24 VDC power supply to the SafeC control module, and the data transmission will start
8. After completion of the data transmission, a window will appear to confirm if the communication was successful.
9. In the "Design" window, all of the configuration data is now available and can be verified.

7. Blanking modes

Generally, "Blanking" is understood to mean the fading-out of designated beams. Certain applications cannot be protected in any other way. If, for example normal operation of a machine requires that material be permanently fed into the dangerous part of the machine, then a portion of the protective field will always be interrupted, but the machine should nevertheless continue to operate.

The protection with Blanking must come from a detailed risk analysis. Those responsible must ensure that in spite of Blanking, the safety of the machine operator is adequately accounted for. When necessary, additional protective measures must be taken to adequately shield the dangerous area. All Blanking modes create "holes" in the protective field. These "holes" must be considered separately in the risk analysis.

With the help of the Configuration Tool, the three most important Blanking modes can be configured for the CEDES Safe200 / Safe400 safety light curtain.

Table 1: Blanking modes

Mode	Monitoring	Beam tolerance	Explanation
Fixed Blanking	With	+0 /-1 beam	One object, constant number of beams, at one defined location
Floating Blanking	With	+0 /-1 beam	One object, constant number of beams, anywhere within the defined blanking region.
	Without	+0 /- max. number	One or multiple objects, up to the maximum number of beams, anywhere within the defined blanking region.
Reduced resolution	Without	+0 /- max. number	One or multiple objects, up to the maximum number of beams at each different location within the defined blanking region.

A more detailed explanation of these Blanking modes follows.

The following general rules must be understood:

- Different Blanking regions may not overlap.
- Regions without a Blanking mode, also with standard safety, will automatically be configured.
- Each configured region must be confirmed with the "Quick check" button, before the configuration of the next region can take place.
- The calculation of a new response time and a new resolution occur after the "Quick check" confirmation.
- The maximum object size without detection is also calculated after the "Quick check" confirmation.
- Blanking will only be configured if the corresponding Safe 400 window is activated.
- After a successful configuration, the Blanking function will only be active when a Blanking lamp is attached. The Blanking lamp must be mounted near the protective field, clearly visible to the operator
- A configured Blanking function is visible on the SafeC controller through a red LED (2 ⊗).

⚠ Important safety notice:

The operator must ensure that for all Blanking modes, no undetected access is possible into the danger zone via the "blanked" protective field throughout the whole width of the protective field (also left and right of the "blanked" object). This can be achieved, for example, through the use of additional mechanical barriers (Figure 136).

Additionally, the blanked region should be clearly marked, and the protective field should be fully tested with the provided test rods according to the instructions given in the Safe200 / Safe400 Technical Description document.

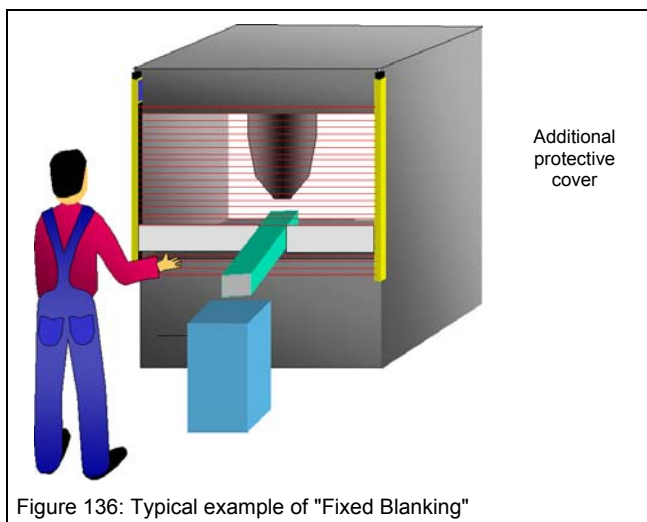


Figure 136: Typical example of "Fixed Blanking"

7.1.1 Fixed Blanking

Fixed Blanking is understood to be a continuous blanking of a defined number of adjacent beams, at a specified location in the protective field. For all other beams, normal safety operation is active. Only the specified beams need to be blanked, i.e. the blanking of the protective area will be constantly monitored ("with monitoring"). Due to vibrations often present in industrial applications, the number of interrupted beams is allowed to be reduced by 1. A local adjustment of this "tolerance" value is not possible.

Notice:

There must be at least two adjacent beams blocked, in order to configure fixed Blanking.

Example:

A Safe400 light curtain has 60 beams, which for a 14 mm resolution light curtain means a protective height of 600 mm. In one application for example, beam numbers 10 to 15 (six beams) must be blanked. In this case, it is not allowed for beams 11 to 16, nor 9 to 14 to be interrupted. However it is allowed for the beams 10 to 14 (five beams), or 11 to 15 (five beams) to be interrupted, and the configured output blocks (FSD) remain closed.

The following condition would also not be allowed

- Beam 10 to 12 blanked
- Beam 13 not blanked
- Beam 14 and 15 blanked

A typical example of fixed Blanking is the exit ramp on an automatic punch press. The punched part is transported out of the dangerous zone into a container. The ramp passes through the protective field, and without "Blanking" would cause the machine to stop. The position of this ramp is monitored. During a tool change, the position of this ramp might vary slightly. This new position must be newly configured and must be set up to be safety compliant.

⚠ Important safety notice:

For all Blanking modes, the user must ensure that no undetected entry into the dangerous area is possible through the blanked area of the protective field (i.e. left and right of the object being blanked). This can be achieved for example by mounting additional mechanical barriers (Figure 136).

Additionally, the blanked region should be clearly marked, and the protective field should be fully tested with the provided test rods according to the instructions given in the Safe200 / Safe400 Technical Description document. The user must ensure that the number of blanked beams (i.e. the size of the object interrupting the protective field) will not be reduced during operation. If this is not possible, there is a risk that the resolution, at the edge of the "Fixed Blanking" area will be increased by 10 mm (for a light curtain with 14 mm resolution). This must be considered when calculating the safety distance.

7.1.2 Floating Blanking

Floating Blanking is understood to be a blocking of a certain number of beams anywhere in the protective field. The specified number of blocked beams may not be exceeded. The blanked area(s) may move throughout a defined region of the light curtain. The remaining beams within this region maintain the normal safety operation.

According to safety regulations, two floating Blanking modes are permitted: "with monitoring" and "without monitoring".

"With monitoring" means that the specified number of interrupted beams must be located next to each other and are always interrupted. Due to vibrations often present in industrial applications, the number of interrupted beams in this mode is allowed to be reduced by 1.

Notice:

At least two beams must be defined, in order to configure fixed Blanking with monitoring.

"Without monitoring" means that the specified number of interrupted beams may be interrupted, but do not have to be. The specified number of interrupted beams may not be located next to each other.

Example:

A Safe400 light curtain has 60 beams, which for a 14 mm resolution light curtain, means 600 mm protective height. In one application with monitoring, an object must interrupt six adjacent beams, somewhere within the specified protective field region. The process requires that the object interrupting the light beams, can move around throughout the protective field. At one point in time, beams 10 to 15 are interrupted, and at another point in time, beams 20 to 25 are interrupted. Due to this movement, fixed Blanking is not acceptable.

Floating Blanking "with monitoring" allows for a defined number of neighbouring beams to be interrupted anywhere within the specified protected field or predefined region. This number of beams may only be interrupted once at a time, and must effect only neighbouring beams.

If in this example beams 10 to 15 and also beam 20, were interrupted, this would not be permitted and would lead to the configured output blocks (FSD) going to the open state.

The following condition would also not be allowed:

- Beam 10 to 12 interrupted
- Beam 13 not interrupted
- Beam 14 to 15 interrupted

This is because the interrupted beams do not lie next to each other.

Typical application examples for "Floating Blanking" are applications where the transport of material occurs between the working area and the dangerous area, e.g. a roll of metal sheeting that is fed into a punch press, and depending on the position of the roll will interrupt a different area of the protective field (Figure 137).

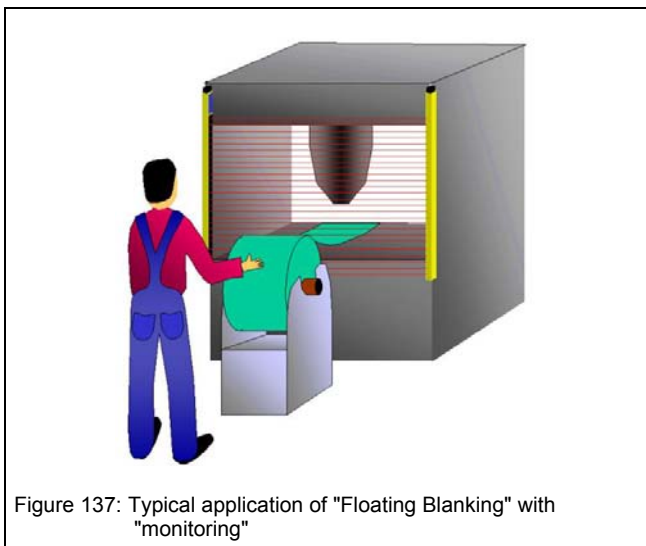


Figure 137: Typical application of "Floating Blanking" with "monitoring"

⚠ Important safety notice:

During "Floating Blanking without monitoring", protective field "holes" can occur. This means at times when no material or insufficient material is being transported through the protective field, there is a danger that the operator can reach through the protective field without deactivating the machine.

7.1.3 Reduced Resolution

Reduced Resolution is understood to be a blanking of the protective field up to a maximum number of five neighbouring beams anywhere within the protective field. Up to this maximum number of beams, multiple interruptions may take place within the configured blanking region. The maximum number of neighbouring beams however may not be exceeded or the configured output blocks (FSD) will open.

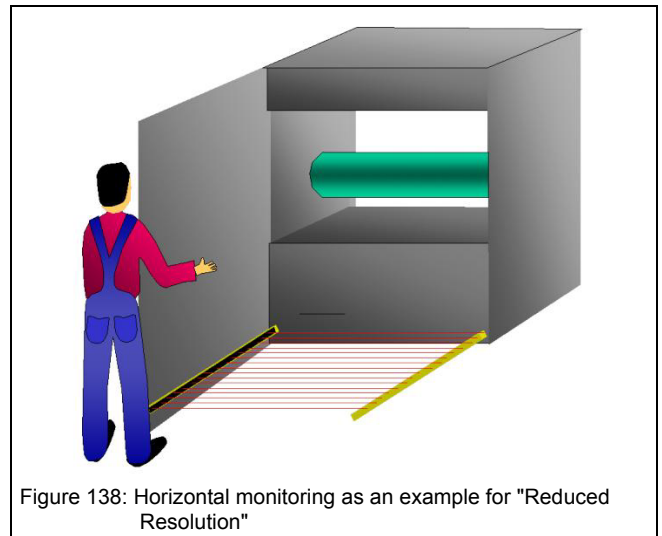


Figure 138: Horizontal monitoring as an example for "Reduced Resolution"

With "Reduced Resolution" there is no distinction between "with monitoring", and "without monitoring".

Example:

A Safe 400 light curtain has 60 beams, which for a 14 mm resolution light curtain, means 600 mm protective height. Fluff or shavings, with a maximum diameter equivalent to 5 beams, are permitted to fall through the protective field.

This means that in this application a maximum of five neighbouring beams may be interrupted by an object and still not be detected. The manufacturing process in this application is such that objects fall through the protective field area. At a given point in time, beams 10 to 14 could be interrupted, and at another point in time beams 20 to 24 could be interrupted. In this application it is also possible that two objects, which are not beside one another, will fall through the protective field at the same time. Due to this process (timing), Floating Blanking would not be appropriate. The "Reduced Resolution" operating mode has clear advantages here.

Example:

"Reduced Resolution" with five beams means for example, that beams 10 to 14 (five beams) are allowed to be interrupted. At another point in time, it is permitted for beams 11 to 15 to be blanked, or yet another point in time beams 20 to 24.

It is also permitted to simultaneously block beams 10 to 15 with one object, and for example beams 18, and 19, with a second object.

The following condition would also be permitted:

- Beam 10 to 12 interrupted
- Beam 13 not interrupted
- Beam 14 to 15 interrupted
- Beam 16 not interrupted
- Beam 17 to 20 interrupted

This is allowed because the interrupted beams are not all adjacent to each other and because no individual object is larger than the maximum five beams.

7.1.4 Combining Blanking modes

As described in chapter 6.5.3 the protective field of a single Safe200 / Safe400 light curtain may be split up and configured into four different regions. From a safety technical point of view, it is especially critical that the resolution is inspected at the cross over point from one protective field region to the next, as well as the borders or edges of each region. The CEDES software Configuration Tool takes into account these cross over areas when calculating the resolution and provides, as a result, the largest (resolution) for the complete light curtain system.

7.1.5 Indication of Blanking

If Blanking is configured then a lamp must clearly indicate this to the operator. The SafeC controller module monitors the connection of a Blanking lamp. If this lamp is defective or not connected, the SafeC controller will go immediately into a lockout condition (see also: Technical Description SafeC 200 / SafeC 400, CEDES part No. 103 415).

8. Troubleshooting

8.1 OptiLink Communication Error

By troubles in communication using USB OptiLink or doing installation of the USB driver software there may be conflicts with other USB driver software.

To de-install a driver software follow the following steps:

- Select 'Windows-Start' - 'Settings' - 'Control panel'
- Select 'Software'
- In the window 'Software' there are listed the installed software, including USB driver software. The example of Figure 139 shows a USB driver software of the type 'CP210X USB to UART Bridge'.
- For removing select 'Change/Remove' and follow the instructions

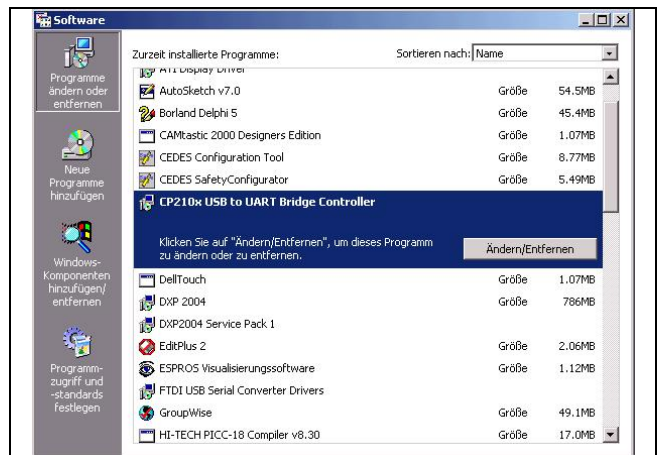


Figure 139: Remove of driver software

