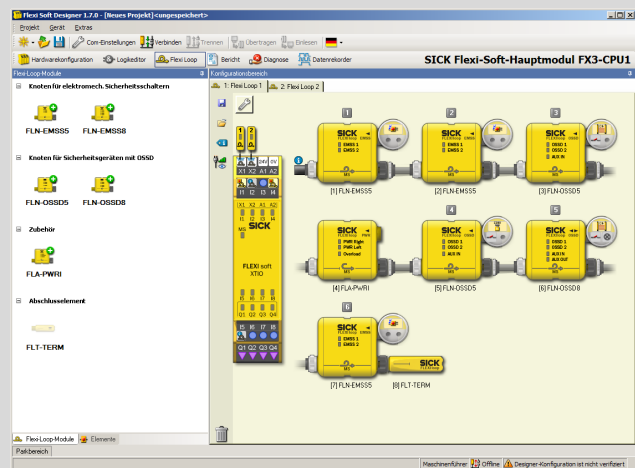# Flexi Loop in Flexi Soft Designer

Configuration software

SICK
Sensor Intelligence.

Described product

Flexi Loop in Flexi Soft Designer

Configuration software

Manufacturer

SICK AG
Erwin-Sick-Str. 1
79183 Waldkirch
Germany

Legal information

Original document

This document is an original document of SICK AG.

Contents

1 About this document

1.1 Purpose of this document

These operating instructions contain the information required to configure the Flexi Loop safe series connection in Flexi Soft Designer.

These operating instructions are to be made available to all those who work with the Flexi Loop safe series connection.

1.2 Scope

These operating instructions apply to the Flexi Soft Designer configuration software version 1.9.1 in conjunction with the safe series connection Flexi Loop in Flexi Soft Designer, firmware versions V1.00-V1.02

These operating instructions are included with SICK part number 8014521 (all available language versions of this document).

Furthermore, the following documents contain information about the safe series connection:

Table 1: Available documents

Document	Title	Part number
Operating instructions	Flexi Loop Safe Series Connection Hardware	8015834
Operating instructions	Flexi Soft modular safety controller hardware	8012999
Operating instructions	Flexi Classic Modular Safety Controller	8011562
Operating instructions	Flexi Soft in the Flexi Soft Designer Configuration Software	8012998
Competence brochure	Guide for Safe Machinery	8008007

1.3 Target groups and structure of these operating instructions

These operating instructions are intended for the following target groups: project developers (planners, developers, designers) and maintenance personnel.

The structure of these operating instructions is based on the life cycle phases of the safe series connection: configuration, and troubleshooting.

In many applications, therefore, the target groups consist of the manufacturer and the operator of the machine in which the safe series connection is integrated:

Table 2: Assignment of target groups

Area of responsibility	Target group	Special chapters of these operating instructions [1]
Manufacturer	Project developers (planners, developers, designers)	"Configuration", page 9
Operators	Maintenance personnel	"Troubleshooting", page 25

[1] Chapters not listed here are intended for all target groups. All target groups must follow all of the safety and warning instructions in all chapters of the operating instructions!

In other applications, the operating entity is also the manufacturer of the machine, with the target groups being assigned accordingly.

1.4 Additional information

www.sick.com

The following information is available on the Internet:

- This document in other languages
- Data sheets and application examples
- CAD data and dimensional drawings
- Certificates (e.g. EU declaration of conformity)
- Guide for Safe Machinery Six steps to a safe machine

1.5 Symbols and document conventions

The following symbols and conventions are used in this document:

Safety notes and other notes

DANGER
Indicates a situation presenting imminent danger, which will lead to death or serious injuries if not prevented.

WARNING
Indicates a situation presenting possible danger, which may lead to death or serious injuries if not prevented.

CAUTION
Indicates a situation presenting possible danger, which may lead to moderate or minor injuries if not prevented.

NOTICE
Indicates a situation presenting possible danger, which may lead to property damage if not prevented.

NOTE
Indicates useful tips and recommendations.

Instructions to action

▶ The arrow denotes instructions to action.

1. The sequence of instructions for action is numbered.
2. Follow the order in which the numbered instructions are given.
✓ The check mark denotes the result of an instruction.

2 Safety information

2.1 Intended use

The Flexi Loop safe series connection is an extension for the Flexi Soft and Flexi Classic safety controllers.

The Flexi Loop safe series connection must only be used within the limits of the prescribed and specified technical data and operating conditions at all times.

Incorrect use, improper modification, or tampering with the Flexi Loop safe series connection will invalidate any warranty offered by SICK AG. Furthermore, SICK AG shall not accept any responsibility or liability for any resulting damage and consequential damage.

2.2 Requirements on the qualification of the personnel

Only qualified safety personnel are permitted to configure, commission, and maintain the safe series connection.

Project planning

For project planning, a person is considered competent when he/she has expertise and experience in the selection and use of protective devices on machines and is familiar with the relevant technical rules and national work safety regulations.

Configuration

For configuration, a person is considered competent when he/she has the expertise and experience in the relevant field and is sufficiently familiar with the application of the protective device on the machine that he/she can assess its work safety aspects.

Commissioning

For commissioning, a person is considered competent when he/she has the expertise and experience in the relevant field and is sufficiently familiar with the application of the protective device on the machine that he/she can assess its operational safety status.

Operation and maintenance

For operation and maintenance, a person is considered competent when he/she has the expertise and experience in the relevant field and is sufficiently familiar with the application of the protective device on the machine and has been instructed by the machine operator in its operation.

3   Product description

3.1   Operating principle of Flexi Loop and Flexi Soft

Overview

The safe I/O modules form the interface to the safety controller. The data traffic of the safe series connection is integrated into the data traffic of the safety controller.

Safe cut-off path

The safety information of the connected switches and sensors is summed and transmitted quickly and safely to the safety controller.
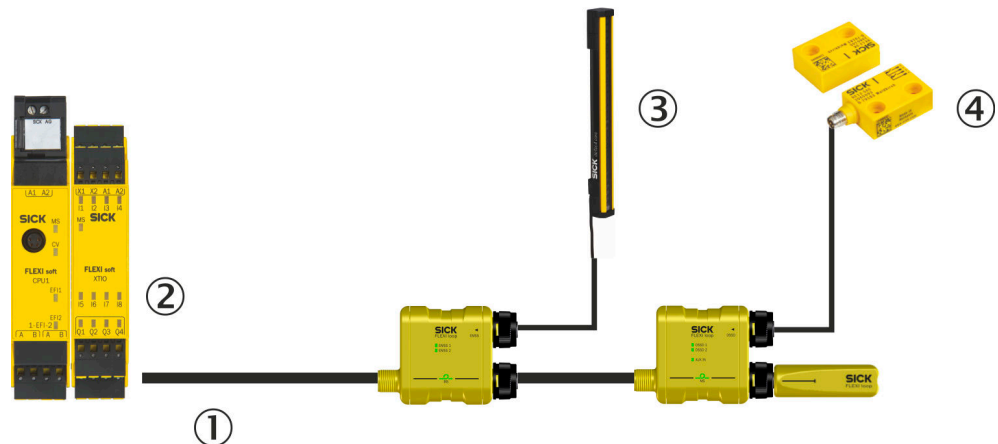
Figure 1: Safe cut-off path

①   Safe cut-off path
②   I/O module for the Flexi Soft safety controller
③   Safety sensors with monitored semiconductor output (OSSD)
④   Electro-mechanical safety switch (EMSS)

Diagnostic information

In addition, non-safe diagnostic information about the states within the safe series connection and the Flexi Loop nodes is transmitted to the safety controller.

Further processing of information in the logic editor

The safety information and the non-safe diagnostic information can be processed further in the logic of the safety controller or, for example, forwarded to a PLC via a gateway.

Figure 2: Further processing of information

① Gateway
② Diagnostic information

Further topics

-

3.2 Flexi Loop in Flexi Soft Designer

You can set up the safe series connection in Flexi Soft Designer.

4 Configuration

4.1 Safety

⚠️ **WARNING**

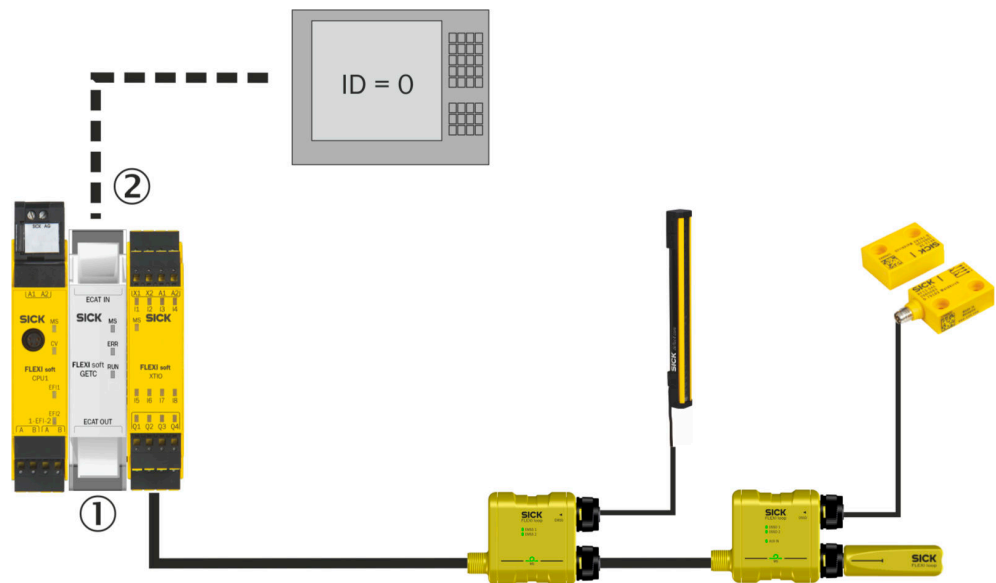Ineffectiveness of the protective device due to incorrect configuration

In the case of non-compliance, it is possible that the dangerous state of the machine may not be stopped or not stopped in a timely manner.

▶ Check the effectiveness of the protective device after any change to the configuration.

⚠️ **WARNING**

Ineffectiveness of the protective device due to use of diagnostic information for safety applications

The intended safety level may not be achieved in the event of non-compliance.

▶ Use only the individual safety bit of the cut-off path for safety applications.

4.2 User interface

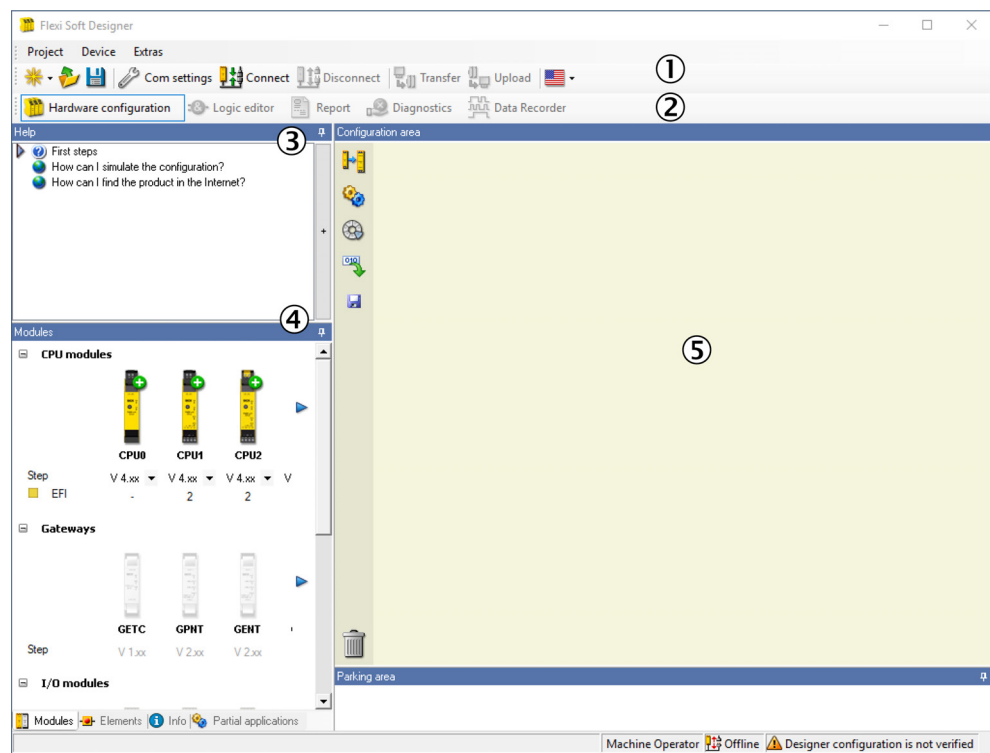This chapter gives information about how to use the software's controls.

Figure 3: Software controls

① Menu bar
② Navigation
③ Help window
④ Catalog
⑤ Configuration area

4.3 Hardware configuration

This section describes the functions of the safe series connection which can be selected via software. Some of the functions can be combined.

4.3.1 Starting the configuration

To configure, there are two possible procedures:

- Create a new project,
  e. g., to completely reconfigure a safety controller with connected safe series connection.
- Open an existing project file,
  e. g., to add a safe series connection.

4.3.2 Flexi Loop configuration

4.3.2.1 Prerequisites

In order to use a safe series connection on a Flexi Soft, you need a main module and at least one safe I/O module. The modules have to be placed in the configuration area of the software. The following requirements apply to the modules:

Main modules

- FX3-CPUx with firmware V3.xx or higher
- FX3-CPUx with firmware V3.01 or higher if you wish to use the DIAG Flexi Loop accessory.
- FX3-CPUx with firmware V4.xx or higher for advanced diagnostics of the main module (e.g., automated cable break detection) and the DIAG Flexi Loop accessory (e.g., display of configuration errors).

At least one expansion module

- FX3-XTIO with firmware V3.xx or higher
- FX3-XTDI with firmware V3.xx or higher
- FX3-XTDS with firmware V3.xx or higher

4.3.2.2 Select Flexi-Loop line and connections on the I/O module

Approach

1. Switch to the **Elements** selection window in the software catalog.
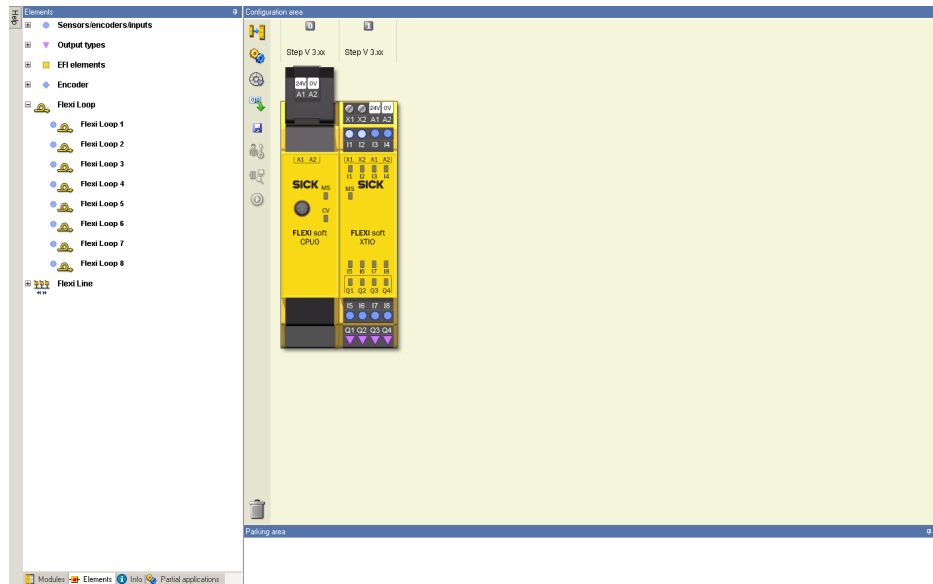2. Select **Flexi Loop**.
3. Select a Flexi Loop line.

Figure 4: Selection of the Flexi Loop line

✓ If you drag the Flexi Loop string over suitable free inputs or outputs in the configuration area using the mouse, the inputs or outputs will illuminate green.

4. Drop the Flexi Loop line on a suitable position.

✓ The device symbol then becomes integrated into the view at this point. The software automatically takes account of how many inputs or outputs are required.

Complementary information

Flexi Loop line
- Up to eight safe series connections can be connected to a safety controller.
- A maximum of two safe series connection can be connected to one extension module.
- Each of these two safe series connections forms a Flexi Loop line in the software.
- In the Elements configuration area, you can select the Flexi Loop line. These are numbered from one to eight. The numbers are permanently assigned. If you use the eighth Flexi Loop line, the eight will always appear as the identification number in the following settings.

I/O module connections
- A safe series connection requires a test output (X) and safe inputs (I). The connections are labeled as follows.

      Output with the Flexi Loop symbol

      Safe input with the safe bit

      Input with the data line

- When you position a Flexi Loop element, you define which terminals of an extension module communicate with the Flexi Loop protocol. The utilized test output Xn as well as all safe inputs assigned to this test output are no longer available for the connection of further tested input elements, e.g., safety switches.

4.3.2.3   Assemble a Safe Series Connection

Approach

1. Select **Flexi Loop** in the navigation.
   If there are additional interfaces (e.g., gateways) in the hardware configuration, a selection list appears in the navigation under **Interfaces**. Select Flexi Loop here.

✓ The window changes to the Flexi Loop configuration.

✓ The expansion module to which the safe series connection is connected is shown on the right in the **configuration area**.

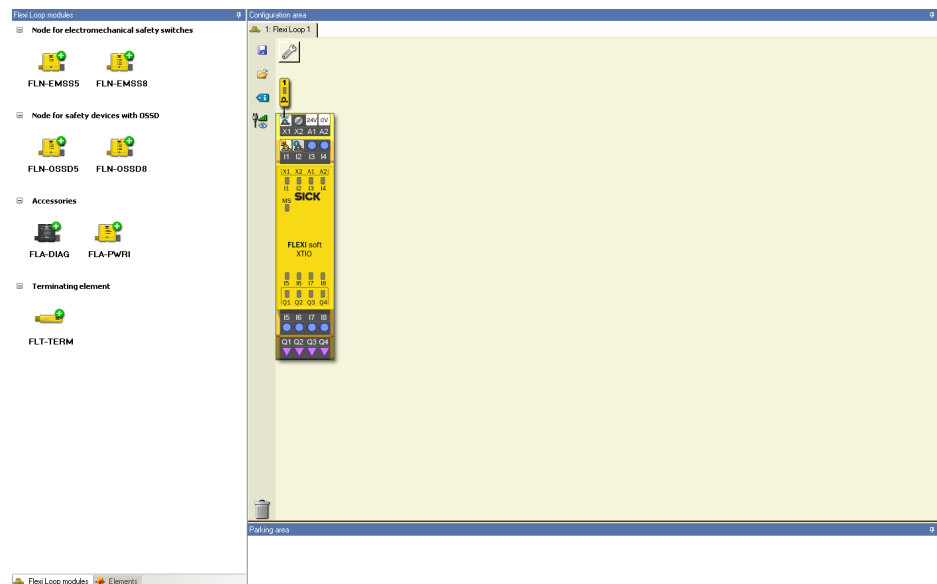2. Select the desired Flexi Loop node or Flexi Loop accessory.

Figure 5: Selection of a Flexi Loop node

3. Pull the Flexi Loop node and the Flexi Loop accessory to the right of the I/O module. Alternatively, you can select the Flexi Loop module by clicking on the Flexi Loop node or the Flexi-Loop accessory.

✓ The Flexi Loop node or Flexi Loop accessory is magnified.

4. Pull further Flexi Loop node or Flexi Loop accessory to the right of the first Flexi Loop node. Alternatively, you can select the Flexi Loop module by clicking on the Flexi Loop node or the Flexi-Loop accessory.

5. Finish the last Flexi Loop node with a terminator.

Complementary information

A safe series connection can contain up to 32 Flexi Loop nodes. Each Flexi Loop node automatically receives a node number. Counting starts at the first Flexi Loop node connected to the I/O module and ends at the Flexi Loop node to which the terminator is connected. The logical numbering is shown via the Flexi Loop node.

You can install power feed and diagnostic accessories between the Flexi Loop nodes. These accessories are not assigned a logical number. Therefore, each Flexi Loop node and each Flexi Loop accessory is additionally assigned a physical number. However, this number has no impact on the maximum number of nodes. The physical numbering is shown below the Flexi Loop node.

4.3.2.4   Configure Flexi Loop nodes or accessories

▶ Right-click each node and select **Properties** from the context menu.
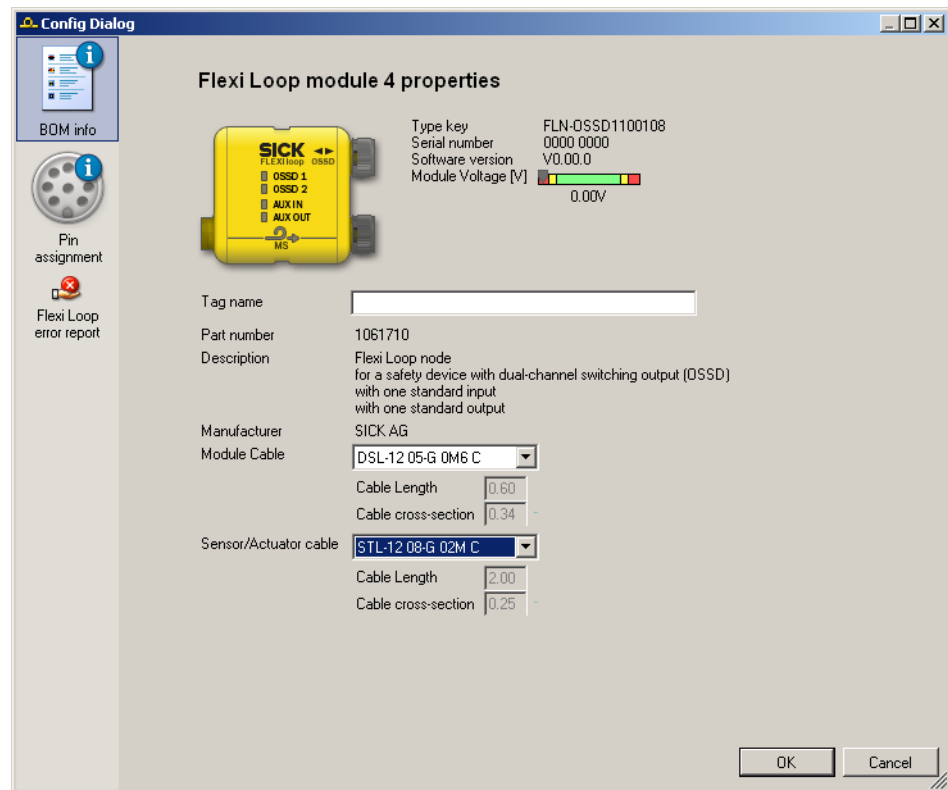
✓ The configuration dialog opens.

Figure 6: Configuration dialog

Assign name and properties (optional)

1. Enter a name for the respective node in the **Tag Name** field. Use meaningful names. The tag name is displayed in the logic editor and helps you to identify the input or output signal.
2. In the **Module cable** field, select a cable or **Custom** and enter the cable length and wire cross-section.
3. In the **Sensor/actuator** field, select a cable from or **Custom** and enter the cable length and wire cross-section.

Pin assignment

▶   Click on **Pin assignment** in the configuration dialog on the left.
✓   The pin assignment for the related female connectors is displayed.

Flexi Loop error report

If errors have occurred, a Flexi Loop error report button appears on the left.

▶   Click on **Flexi Loop error report** in the configuration dialog on the left.
✓   The errors that have occurred are displayed.

4.3.2.5   Disabling tamper protection

Important information

⚠️ **WARNING**

Ineffectiveness of the protective device due to removal or bridging of Flexi Loop nodes

In the case of non-compliance, it is possible that the dangerous state of the machine may not be stopped or not stopped in a timely manner.

▶   Only deactivate manipulation protection when it is absolutely necessary to realize the application.

▶   In this case, take other steps (e.g. protected cable laying) to prevent possible manipulation.

Approach

1.   In the configuration area, click on the **Flexi Loop settings** button.

Figure 7: Flexi Loop settings button

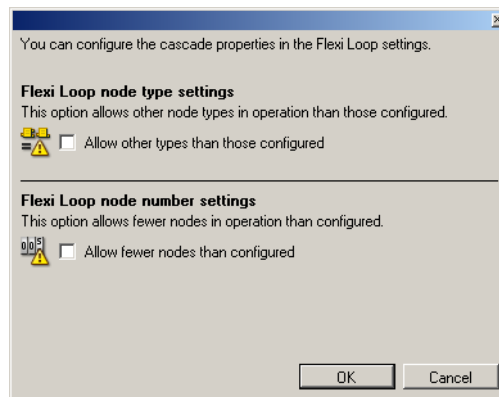✓   The dialog for deactivating the manipulation protection opens.

Figure 8: Deactivating the manipulation protection

2.   Activate the desired options.
  ○   For each position within a safe series connection, the utilized node type is saved. This prevents Flexi Loop nodes from being able to be exchanged for other types.
      Allowing types other than those configured disables this manipulation protection. This can be helpful when setting up modular systems.
  ○   The number of configured Flexi Loop nodes within a safe series connection is saved. This will prevent Flexi Loop nodes from being able to be removed or added, or that Flexi Loop nodes can be bridged and the safe series connection then switched on again.
      Allowing fewer nodes than configured disables this manipulation protection. You can then set up modular systems, for example, in which the maximum number of modules configured, but a smaller number of modules is allowed.
3.   Click on **OK**.

4.3.3   Connecting sensors and switches

1.   Switch to the Elements selection window in the software catalog.
2.   Select an element.
✓   If you move the element over suitable free inputs or outputs, the inputs or outputs will illuminate green. The software automatically takes into account the necessary

number of inputs or outputs.
3. Drop the element at an appropriate position.
✓   The device symbol then becomes integrated into the view at this point.

Move the element
▶   Move the element with the mouse to other suitable inputs/outputs.
▶   Alternatively, move the element to the **park area**.

Delete element
▶   Drag the element with the mouse to the **recycle bin**in the configuration area.
▶   Alternatively, right-click on the device icon and click **Delete** in the context menu.

4.3.3.1 Assigning tag names for the connected elements

1. Double-click on an element.
✓   The window for setting the elements opens.
2. Assign a **tag name** (identifying names for the element). Use meaningful names. The tag names are displayed in the logic editor and are helpful for configuration.

4.3.3.2 Export and import of safe series connections

You can export the configuration of a Flexi Loop string and, for instance, import it into another project. In this way you can copy a Flexi Loop string once configured.

Figure 9: Button to export the configuration

Figure 10: Button to import the configuration

4.3.4 Power balance

The VDC voltage has to be in the range of 16.8 … 30 V DC at each input of a Flexi Loop node and a Flexi Loop accessory.

The voltage drop depends on the following factors:
•   Number of Flexi Loop nodes (own current consumption)
•   Current consumption of the connected sensors and actuators
•   Length of the cables
•   Cross section of the conductors
•   Ambient temperature

The safe series connection is divided into segment, section, and line (see the "Flexi Loop Safe Series Connection Hardware" operating instructions, Item No. 8015834). The software offers the possibility to calculate the voltage drop in the sections of a line offline or to measure it online.

4.3.4.1 Configure Flexi-Loop module cables

1. Right-click on the individual Flexi Loop nodes in the configuration area and select **Properties** from the context menu.
✓   The configuration dialog opens.
2. Select or define the module wiring.
3. Select or define the cables for the supply voltage for power feed accessories PWRI and select the sensor/actuator cable for Flexi Loop nodes EMSS or OSSD.
4. State the cable length in m.
5. Enter the wire cross-section in mm^2.

4.3.4.2   Calculate the voltage drop and current consumption

Important information

> **NOTE**
> The value to be entered for the input voltage and the input current calculated are valid for one section. A section extends from an incoming power supply to the next power supply accessory or as far as the terminator.

Approach

1. To switch to the energy balance, click on the button shown.

Figure 11: Button to open the configuration dialog

✓   The software displays the energy balance.
2. Select the ambient temperature and enter the input voltage.
3. Open the detailed view of the modules.
4. If necessary, adapt the data of the module cables and sensor/actuator lines.
5. Enter the permitted input voltage range of the sensor or actuator.
6. Enter the current consumption of the sensor or actuator.
7. Click on **Calculate**.
✓   The software calculates the voltage drop and current consumption.
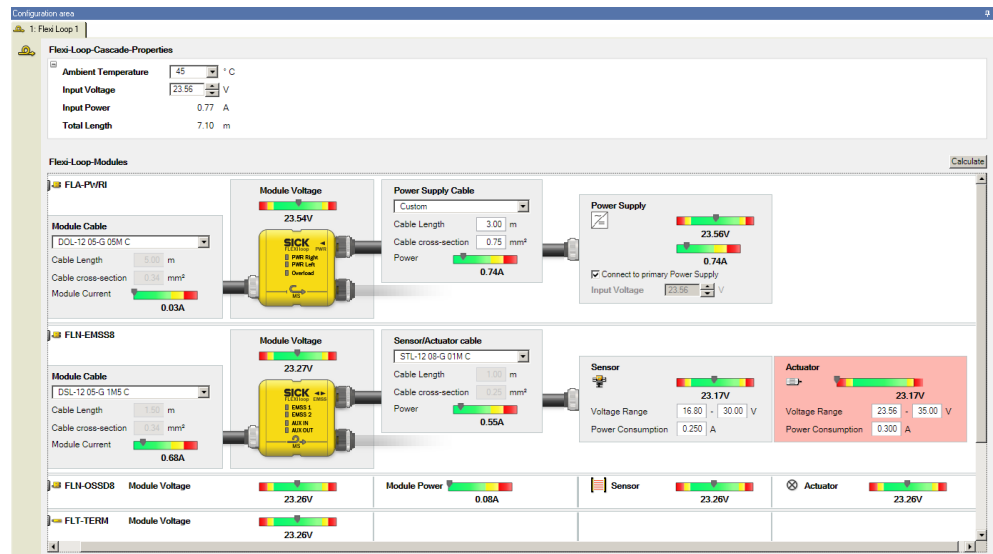

Figure 12: Calculated energy balance

①   Total input current and length of the Flexi Loop string
②   Module current
③   Module voltage
④   Current consumption sensor and actuator
⑤   Voltage on the sensor
⑥   Element with critical value

Complementary information

In the **"Input current"** field, the software displays the sum of all currents flowing directly or via the power feed accessories into the Flexi Loop line.

4.4 Configuration in the logic editor

If the safe series connection is configured and the sensors, switches and actuators are connected, then the safe series connection can be used in the logic editor.

Please note that due to the signal propagation times, a non-safe Flexi Loop input signal at AUX_IN may be longer in the Flexi Soft logic (longer pulse duration) than the original signal. The same applies for the Flexi Loop output signals at AUX_OUT.

4.4.1 Safe cut-off path

The safety information of the connected switches and sensors is summed and transmitted quickly and safely to the safety controller.

This state is represented in the logic editor of the software by a single safe bit **Flexi Loop: safe input**. It is only with this bit that the following cut-off paths for the machines and systems to be monitored may be implemented.

- The bit is only 1 as long as a shutdown or an error has not occurred in any of the Flexi Loop nodes.
- The bit changes to 0 within the response time stated in the technical data if a shutdown has occurred or an error has occurred on one of the sensors or switches.

> **ⓘ NOTE**
> When you hover the mouse over an element, its full name and additional information about the element is displayed.

4.4.2 Non-safe inputs and outputs

The non-safe inputs AUX_IN and outputs AUX_OUT are polled or set cyclically. The input or output signals are, therefore, available quickly in the logic or at the output. Exact response times are specified in the "Flexi Loop Safe Series Connection Hardware" operating instructions, Item No. 8015834.
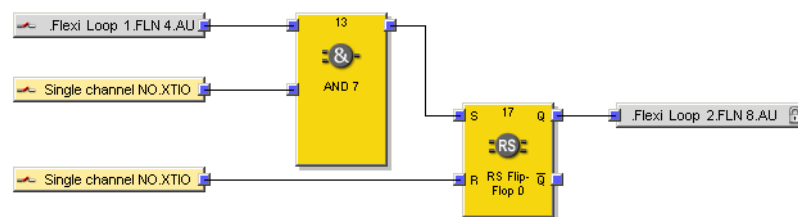

Figure 13: Non-safe inputs and outputs in the logic editor

① Non-safe input
② Non-safe output

The non-safe inputs and outputs are represented using the following bits (gray) in the logic:

- AUX_IN (**single-channel normally open...** in the example)
  - The bit is 1 if the non-safe input is active.
  - The bit is 0 if the non-safe input is inactive.
- AUX_OUT (**Lock.Fl...** in the example)
  - The bit is 1 if the non-safe output is active.
  - The bit is 0 if the non-safe output is inactive.

4.4.3 Diagnostic information for the safe series connection

Non-safe diagnostic information is transmitted to the safety controller via the states within the safe series connection.
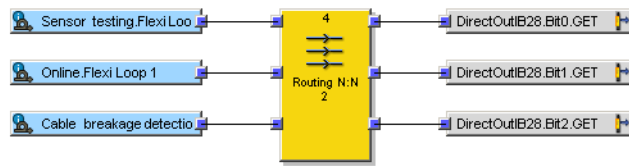

Figure 14: Diagnostic information in the logic editor

The information is represented using the following bits (blue) in the logic:

- Sensor testing: Indicates whether testing of all of the switches and sensors connected to the safe series connection has been completed without errors.
  - The bit is 1 as long as the sensor test is successful on all the sensors and switches connected to the Flexi Loop nodes.
  - The bit is 0 if a static or dynamic error has occurred on one of the sensors or switches.
- Online: Indicates whether communication is active inside the safe series connection.
  - The bit is 1 if the communication is running within the safe series connection.
  - The bit is 0 if the communication of the safe series connection is interrupted.
- Cable break detection: Indicates whether the safe series connection between two FLN nodes has been interrupted.
  - The bit is 1 if the safe series connection between two FLN nodes has been interrupted.
  - The bit is 0 if there is no break.

4.4.4 Diagnostics information on the individual Flexi Loop nodes

If the safe series connection is **online**, the following non-safe diagnostic information (blue) is provided by each Flexi Loop node.
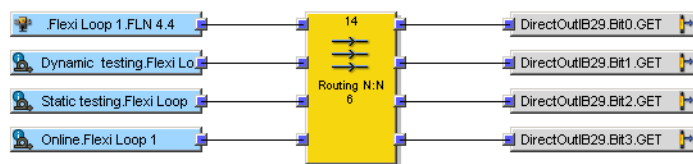

Figure 15: Diagnostic information for the individual Flexi Loop nodes in the logic editor

- Tag name of the element connected: The bit indicates the status of the sensors or switches connected. It is used to evaluate which Flexi Loop node has shut down.
  - The bit is 1 if there is no shutdown on the Flexi Loop node.
  - The bit is 0 if there is a shutdown.
- Dynamic testing: The bit indicates discrepancy or sequence errors on the sensors or switches connected.
  - The bit is 1 if no error occurred.
  - The bit is 0 if there is a discrepancy or sequence error.
- Static testing: The bit indicates electrical faults such as a cross-circuit or short-circuit on the sensors or switches connected.
  - The bit is 1 if no error occurred.
  - The bit is 0 if there is a cross-circuit or short-circuit.

- Node detected: The bit shows whether the Flexi Loop node is actually physically present.
  - The bit is 1 if the Flexi Loop node is present.
  - The bit is 0 if the Flexi Loop node is missing.

The safety information and the non-safe information can be processed further in the logic of the safety controller or, for example, forwarded to a PLC via a gateway.

i **NOTE**

If the safe series connection is offline, all four bits are invalid unless the safe series connection is in the broken cable state.

In the case of a cable break, the node bit is set as follows:

- The bit is 1 if the node is still in the intact area of the safe series connection.
- The bit is 0 if the node is outside the intact range of the safe series connection.

4.4.5 Output options

Important information

⚠ **WARNING**

Unexpected machine start-up due to deactivation of output monitoring

If this is not observed, a system or machine may start unexpectedly.

▶ If the AUX_IN input is used for resetting, **never** deactivate the output monitoring!

Output options

The following output options are available for the Flexi Loop node:

- flashing mode 1 and 2 for each node
  - Flashing mode 1 causes lamps connected to AUX_OUT to flash at 1 Hz if the output is active.
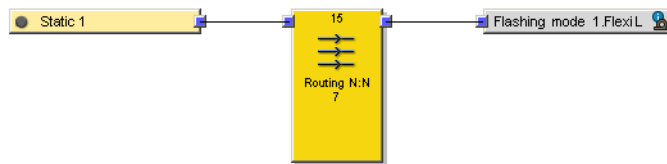 - Flashing mode 2 causes lamps connected to AUX_OUT to flash at 2 Hz if the output is active.

Figure 16: Activation of the flashing mode

- output monitoring
  On a Flexi Loop node with AUX_OUT and AUX_IN the output state is coupled to the input state by default. This feature means that the state of the output cannot change as long as the input is switched (in this way a flashing mode set is suppressed).

Set the bit if you wish to use the output AUX_OUT independently of the status of the input AUX_IN. This can be necessary in the case of solenoid interlocks, for example (see "Implement of a solenoid interlock", page 21).
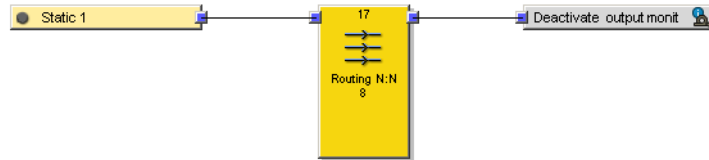
Figure 17: Deactivate the output monitoring

4.4.6 Reset and restart with the Flexi Soft safety controller

Important information

⚠️ **WARNING**
Unexpected machine start-up by using the same inputs

If this is not observed, a system or machine may start unexpectedly.

▶ Do not connect the restart command device input to the same safe series connection as the reset button input.

Approach

1. Use a **Reset** function block in the software to reset the protective devices.
2. Connect one or more reset buttons to the non-safe inputs (AUX_IN) of the Flexi Loop nodes FLN-EMSS1100108 or FLN-OSSD1100108.
3. If you use other non-safe inputs (AUX_IN) of the Flexi Loop nodes for purposes other than resetting, ensure that they do not meet any reset condition [1].
4. Use a **Restart** function block downstream for restarting the machine.
5. Signal propagation times via Flexi Loop communication always result in longer signal times (pulse durations) in the Flexi Soft logic.

ℹ️ **NOTE**
Please note that due to the signal propagation times, a Flexi Loop input signal may be longer in the Flexi Soft logic (longer pulse duration) than the original signal. The same applies for the Flexi Loop output signals at AUX_OUT.

6. Set the minimum **reset run time** of the **Reset** and **Restart** function blocks to 100 ms.

---

[1] Reset is achieved by pressing and releasing the reset button. This action generates a high-active pulse lasting at least 100 ms but no longer than 30 s
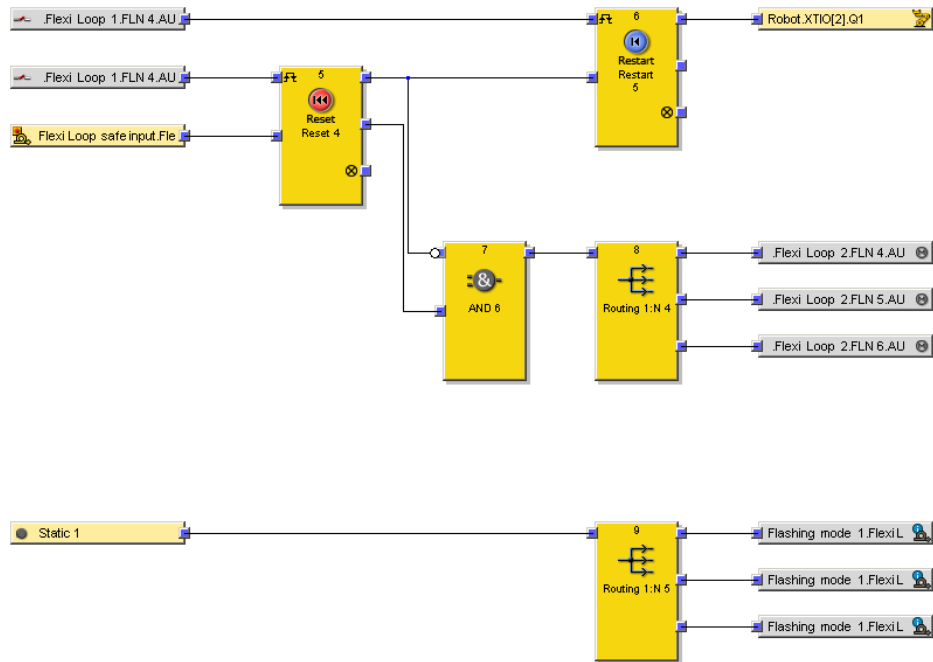
Figure 18: Realization of reset and restart as well as flashing mode in the logic editor

The implementation of reset and restart is shown at the top of the example.

The implementation of the flash mode is shown at the bottom of the example.

Flashing on Reset required

To display message signals (such as lamps) at the non-safe outputs of the Flexi Loop nodes, use the output options **Blink Mode 1** and **Blink Mode 2** of the Flexi Loop nodes. The **Reset required** output of the **Reset** function block cannot be used for this purpose, due to the signal propagation times.

In the previous example, **flash mode 1** for all three Flexi Loop nodes is switched on through the **logic 1** input bit and the **routing** function block.

The actual condition **Reset required** is implemented by the AND connection of the **enable condition** and the negation of the **enabling**.

4.4.7   Implement of a solenoid interlock

The **switch with dual-channel lock** (consisting of safety switch and lock) and **single-channel normally open** (actuator feedback signal) elements are connected to the Flexi Loop node.
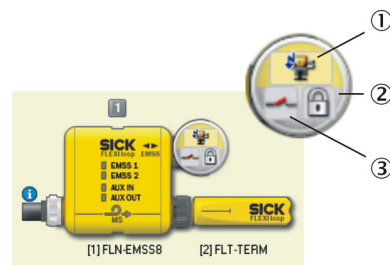

Figure 19: Elements on the EMSS node

①   In = safety switch

②   Out = locking device

③   In = single-channel N/O contact

In the logic editor, the **Flexi Loop safe input** safe input bit (safe cut-off signal for the corresponding Flexi Loop line) and the **single-channel normally open** non-safe input bit (for the actuator) must be processed in the application.

The **safety switch** diagnostic bit for the EMSS node can also be processed. It is by means of this process that the cut-off information is assigned to the corresponding node.
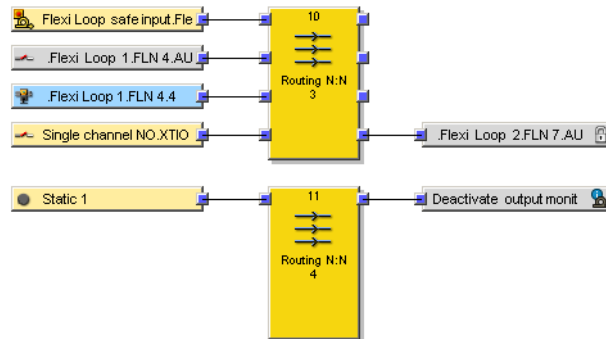

Figure 20: Locking device in the logic editor

The output bit **Interlock with locking** must be controlled by the application to lock the locking device.

Output monitoring must be deactivated with a **logic 1** input bit (see "Output options", page 19).

4.5 Assemble a Safe Series Connection

Prerequisites

- You ahve to be connected to the device.

Transfer configuration

1. Click the **Transfer** button on the menu bar.
✓ The transfer starts and a progress bar shows the progress.
   Next, you can start the main module.
2. Click **Yes**.
✓ The Flexi Loop nodes and the Flexi Loop accessories are displayed in the software during operation.
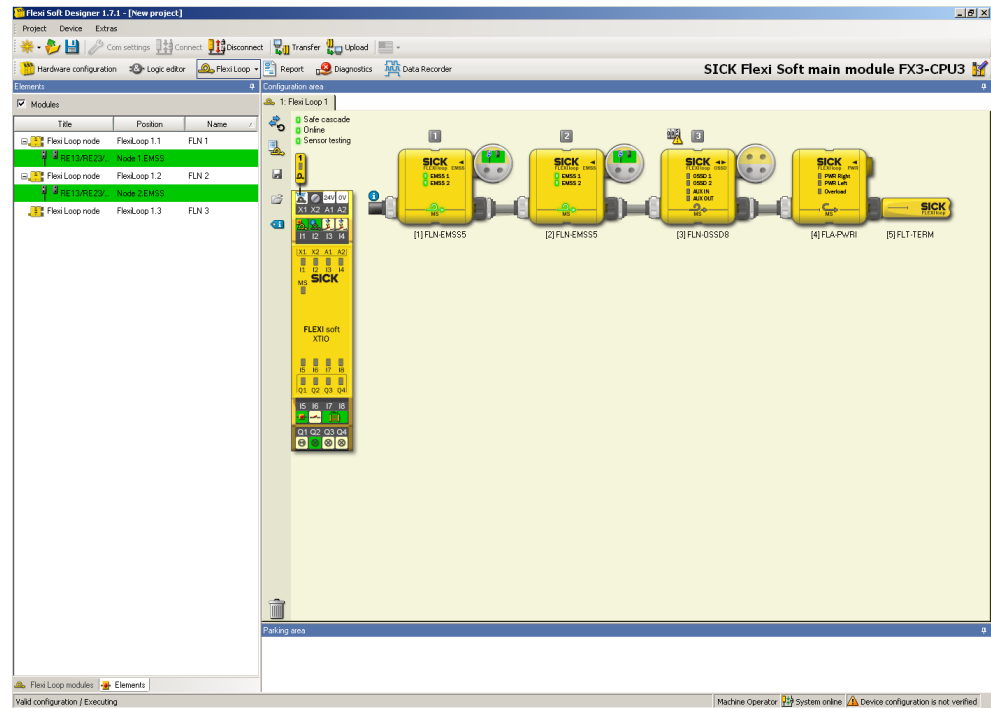
Figure 21: Assemble a Safe Series Connection

In the **Flexi Loop** window you can see the LED statuses of the Flexi Loop node and the Flexi Loop accessory. In the catalog, you can see the connected elements in tabular form.

Restarting

Figure 22: Restart button

With the illustrated button, you can restart the safe series connection.

Diagnostics

Figure 23: Diagnostics button

With the illustrated button, you can start the diagnosis of the safe series connection.

Use the diagnostics if the Flexi Loop line is interrupted at any point. The software determines the number of nodes that are still functioning.

When you start the diagnostics, the safe series connection switches off.

4.6   Connection to gateways

The data can be transferred to the higher-level controller over the respective gateway via Data Set 1.

Within Data Set 1, you will find the bytes of the safe series connection under **Available Data** > **Flexi Loop**.

Via record set 1, 50 bytes can be transferred and mapped into the data telegrams of the gateways within the software interface.

4.7 Report

The **Report** window contains information about the corresponding project, including a list of all configuration settings and wiring instructions.

NOTE
The report is an important part of the documentation of the safety-related validation of a machine or a system.

The report contains a **Flexi Loop** option under **Configuration** in the selection tree.

If this option is enabled, when the report is viewed, data is also generated for the secure series connection, the module to which the secure series connection is connected, and each individual Flexi Loop node and Flexi Loop accessory.

The "Flexi Soft in the Flexi Soft Designer Configuration Software" operating instructions contain extensive information about using the report.

5 Troubleshooting

5.1 In the event of faults or errors

⚠️ **WARNING**

Ineffectiveness of the protective device

In the case of non-compliance, it is possible that the dangerous state of the machine may not be stopped or not stopped in a timely manner.

▶ Set the machine out of operation if the fault cannot be clearly assigned and the fault cannot be safely rectified.

❗ **NOTICE**

▶ Disconnect from the voltage supply before making any changes.
▶ Restart the system after restoring a lost connection or repairing a cable break.

5.2 SICK support

If you cannot remedy the error with the help of the information provided in this chapter, please contact your SICK subsidiary.

5.3 Diagnostics using Flexi Soft

Once you have completed your project and have established a connection to your Flexi Soft system, you have the option in the software of performing diagnostics on your system. The top half of the **Diagnostics** window has a list of all the messages, information, warnings, and error messages in your system, including the Flexi Loop nodes.

If you click one of the entries in the list, details on the selected message are displayed in the bottom half of the window.

The "Flexi Soft in the Flexi Soft Designer Configuration Software" operating instructions contain extensive information about diagnostics.

6 List of figures

7 List of tables

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