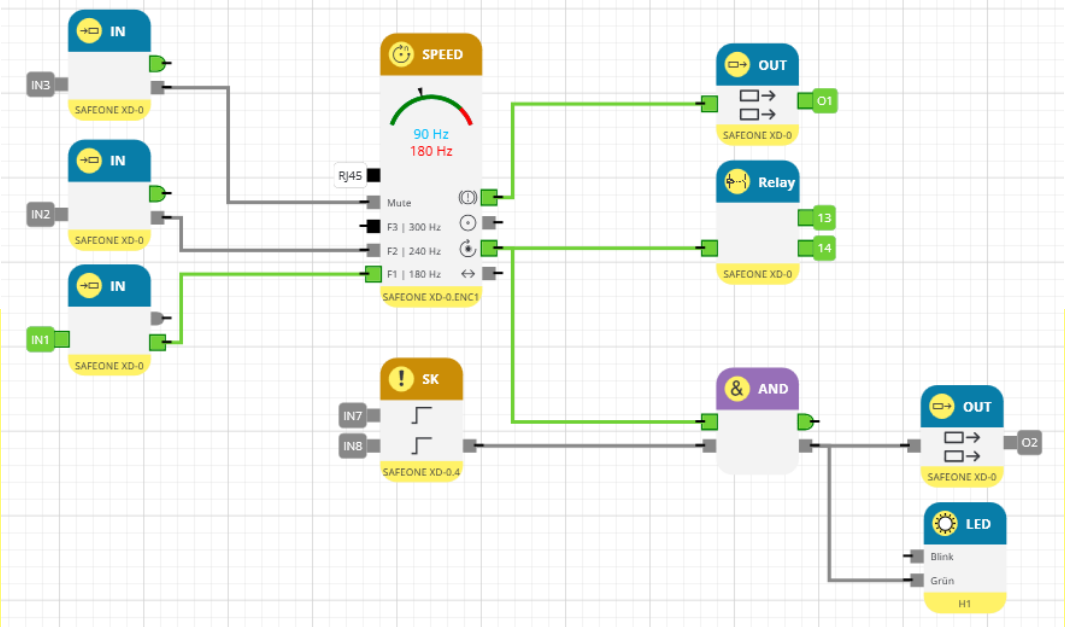
GO:BEYOND®.logic

SAFEONE XD/XS

Configuration Software

Manual



Configuration Software for SAFEONE XD/XS

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Legal notice

Manual:	Manual
Target audience:	Electricians, electrical systems designers
Originator:	DINA Elektronik GmbH
File name:	GOBEYOND.logic_SAFEONE XD_XS_EN_ v01.docx
Language:	ENG
Publication date:	6. August 2026

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1 Document structure

1.1 Conventions

Information having special significance is emphasized in this documentation using icons, typography or wording.

1.2 Emphasizing notes

The following icons identify notes:

	Hazard type (for example, WARNING): Triangular icons identify the hazard degree in warning notes.
	Hazard type (for example, electric shock – dangerous voltage): Triangular icons identify the hazard type in warning notes.
	Note: Additional information to improve understanding.
	Tip: Additional information to optimize the sequence of operations.

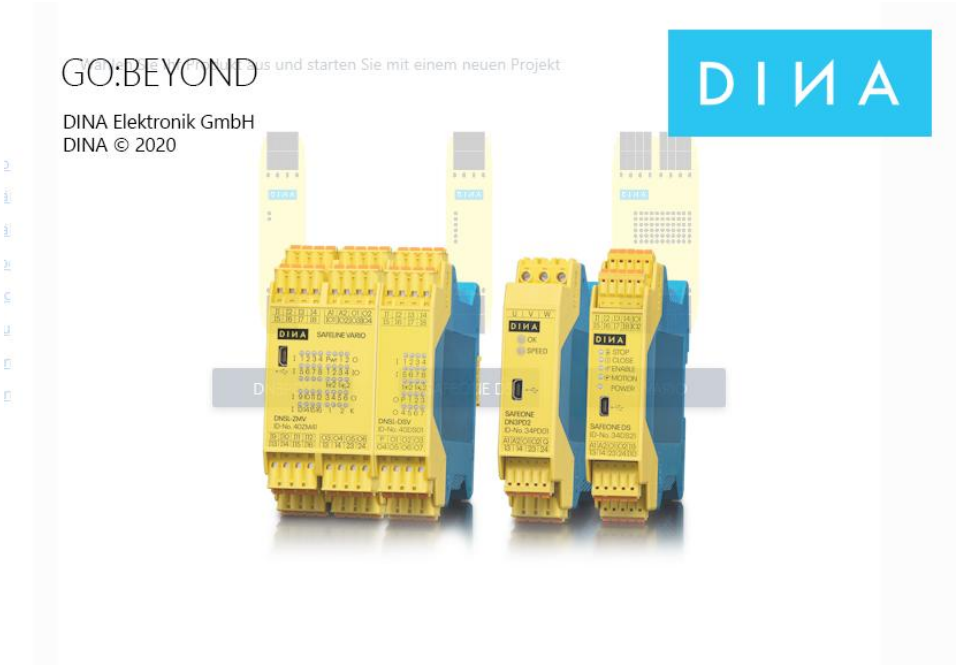
1.3 Typographical emphasis of paragraphs

The following typographical emphasis identifies paragraphs with a special function:

►	Identifies an instruction.
◄	Identifies an expected reaction.
▼	Identifies an unexpected reaction.
■	Identifies a bullet point.

GO:BEYOND®.logic

The tool that quickly brings your user applications to life



2 Product description

GO:BEYOND®.logic visual configuration software can be used to create safety projects for SAFEONE XD and SAFEONE XS products.

Among other things, it features an extensive library containing both standard and safety modules. This makes it possible not only to connect SAFEONE module inputs and outputs to each other as required for the application in question, but also to implement safety functions such as emergency stops and speed monitoring.

In addition, it uses parameter tables, ensuring maximum versatility and flexibility.

Finally, projects can be transferred by using the USB port on the corresponding module. This makes it possible to run comprehensive online diagnostics afterwards.

2.1 Version control table / revision record

GO:BEYOND®.logic-Version	Date	Additions / Changes
2.5.0.0	May, 2026	First version

3 Installation

3.1 System requirements

GO:BEYOND®.logic configuration software is compatible with the following operating systems:

- Windows 10
- Windows 11
- Hard disk space: Min. 1 GB
- RAM: Min. 2 GB
- Display: 1920 x 1080 resolution
- Scaling: 100%
- Interface: USB

3.2 Installing the configuration software

You can download the configuration software from the Download Area at **www.dina.de**

► Make sure to always use the latest software version.

To install the software, follow the steps below:

► Download the software to your computer.

► Start the installation routine.

► Follow the instructions in the Installation Wizard.

► You can select the language you want under “Settings” in the start screen.

3.3 Connecting the device to your computer

The safety relay and the configuration software communicate with each other through their respective USB ports.

Simply use an appropriate connection cable to connect the safety relay to your computer.

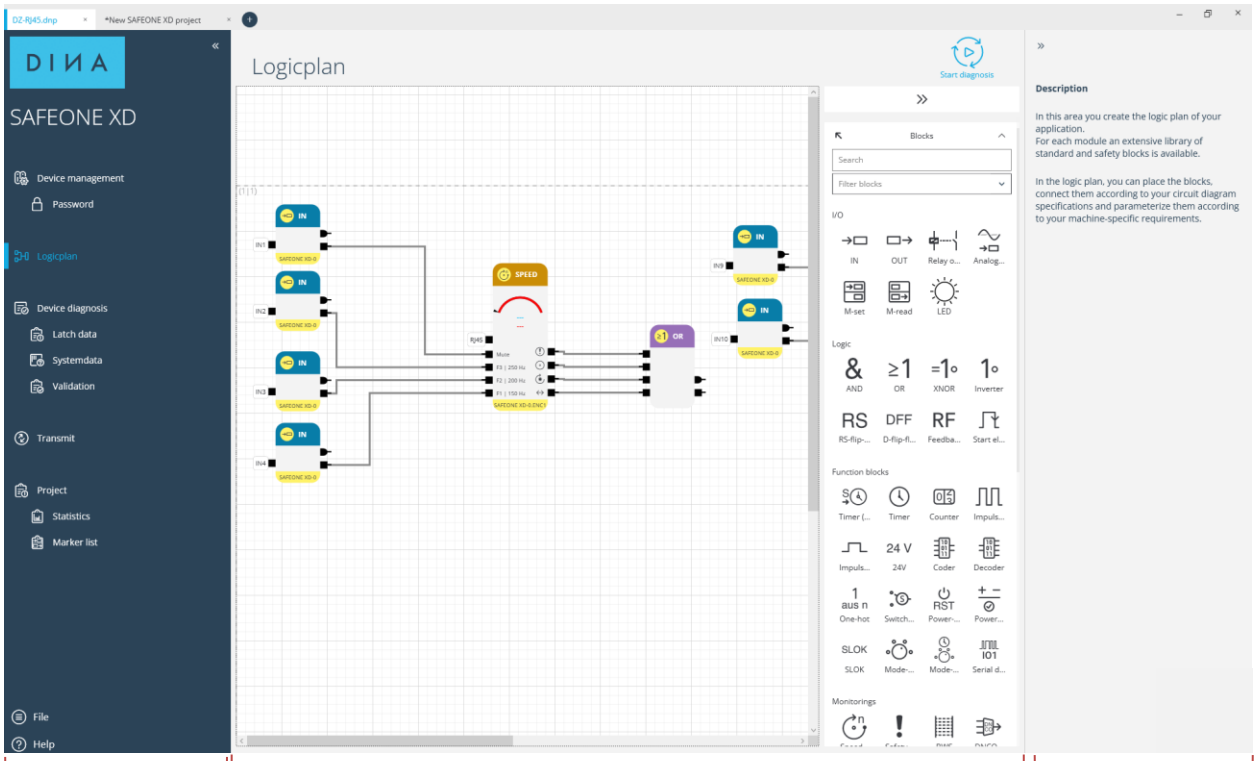
The USB port is compatible with standard USB cables.

Tip

You can increase the transfer speed by reducing the wait time to 1 ms in the Interface settings (Advanced connection settings – BM settings).

4 User interface

The configuration software features the following user interface:



Navigation pane

You can access the following screens by using the navigation pane:

- Device management — Device settings, password management
- Logicplan — Used to create logic diagrams
- Device diagnosis — Used for validation and to view online values, error messages, and shutdown-relevant data
- Transmit — Used to enable and disable the port and transfer the application
- Project — Project notes, statistics, marker list
- File — Used to create a new project, save the current project, import a project from a different plug-in, print out the current project, or close the current project
- Help — Help menu

Editor and action panes

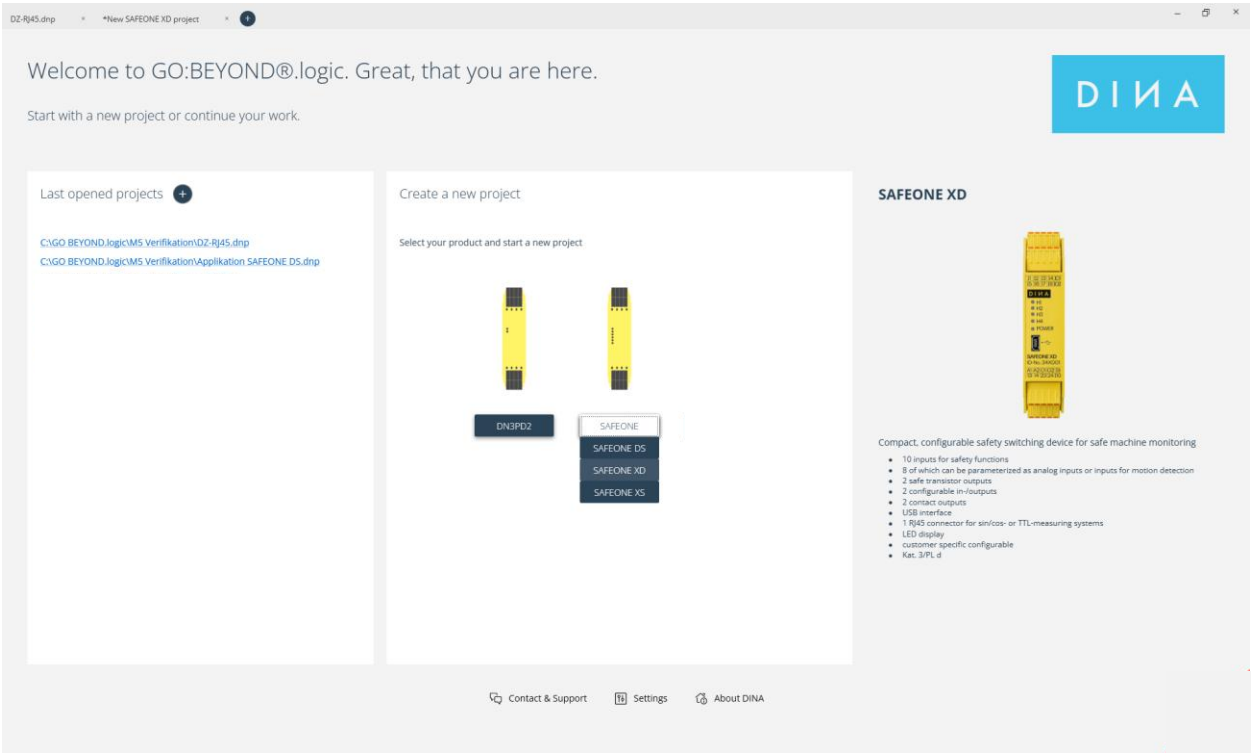
These panes are used to:

- Enter parameters and create logic diagrams
- View help texts and error messages

5 Creating a project

► Open the configuration software

► Select the module you want or open an existing project



5.1 Device management

The “Device management” screen provides device information and can be used to configure model-specific settings (*Fig.* 5-1).

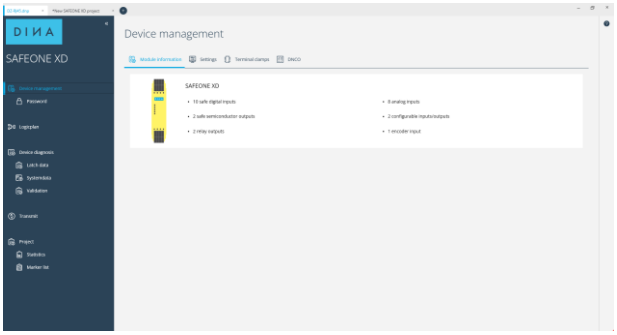


Fig. 5-1

5.2 Settings

You can configure module settings under the “Settings” tab.

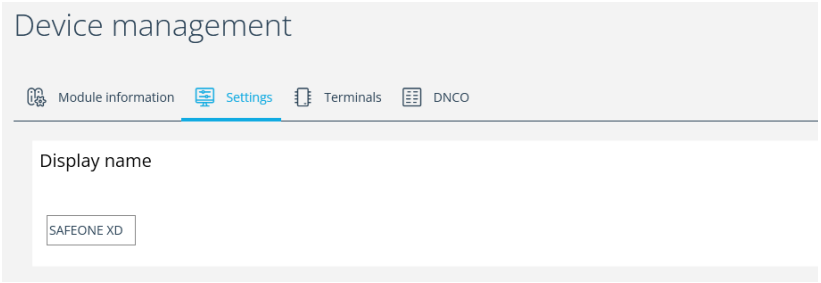


Fig. 5-2

Display name

You can change the module name here (max. 12 characters).

5.3 Terminal clamps

You can enter names for module’s input and output terminal clamps under the “Terminals clamps” tab. These names will be shown on the corresponding block.

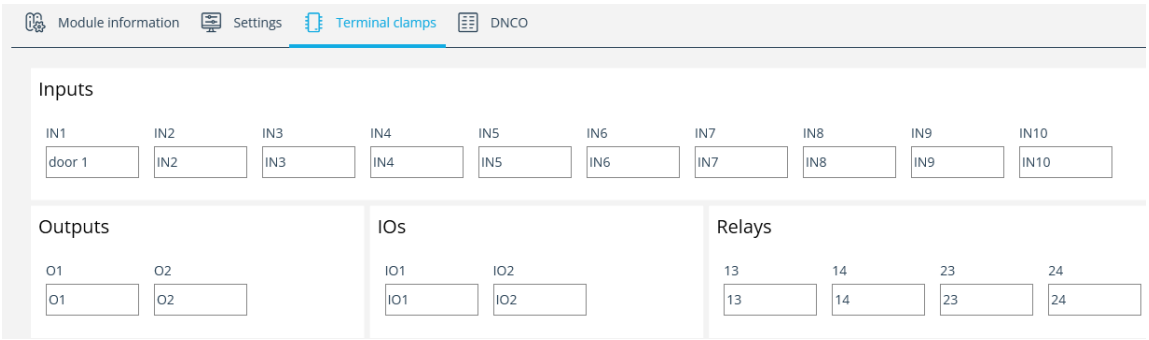


Fig. 5-3

5.4 DNCO (SAFEONE XD only)

You can enter 16 frequencies for each operating mode in this frequency table (*Fig. 5-4)*. This table is used in the speed monitor block with the “Multiplexer” function block.

The table can be filled out manually or automatically. In addition, you can reset individual columns to the corresponding default values.

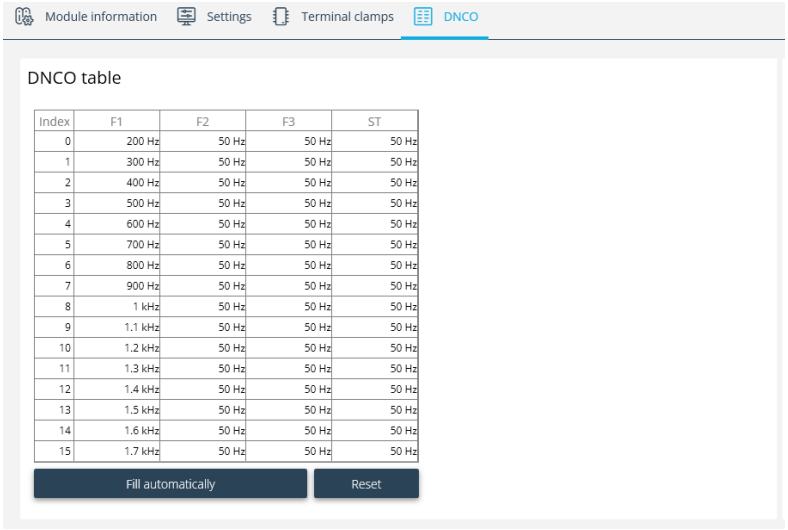


Fig. 5-4

5.4.1 Automatically filling out the DNCO table

► Enable the checkbox for the operating mode you want. Enter the start index, the end index, the start value, and either the end value or the steps (increments) you want *(Fig. 5-5)*.

◄ The DNCO table will be filled out automatically after you click on the “OK” button.

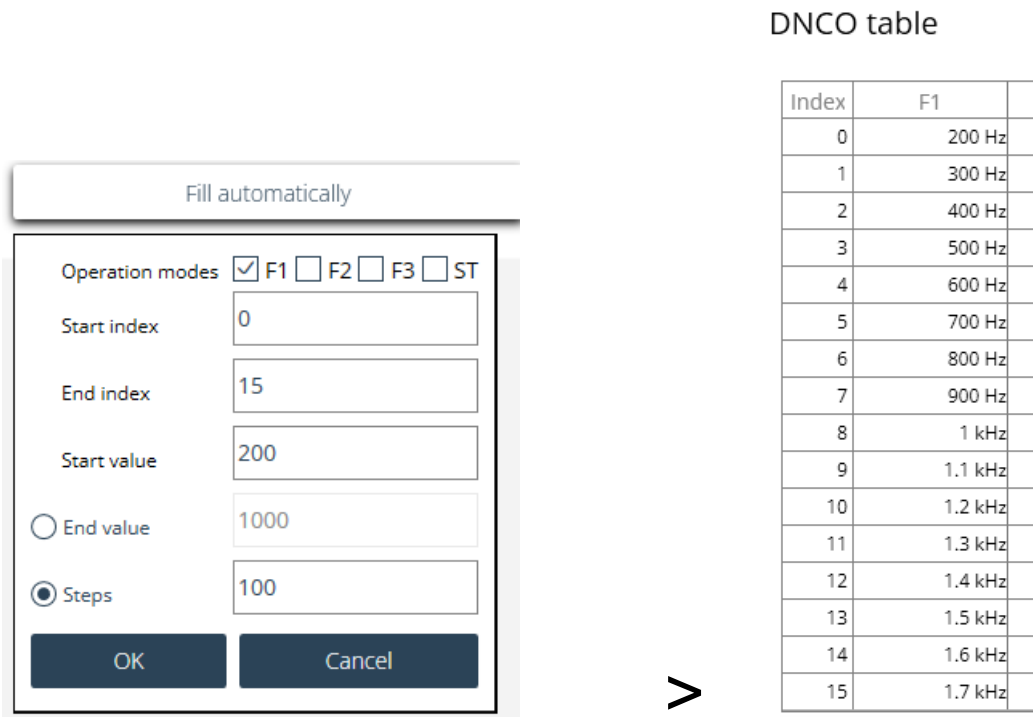


Fig. 5-5

5.4.2 Resetting the DNCO table

► Enable the checkbox for the operating mode you want to reset and click on the “OK” button *(Fig. 5-6)*.

◄ The table will be reset to its default values.

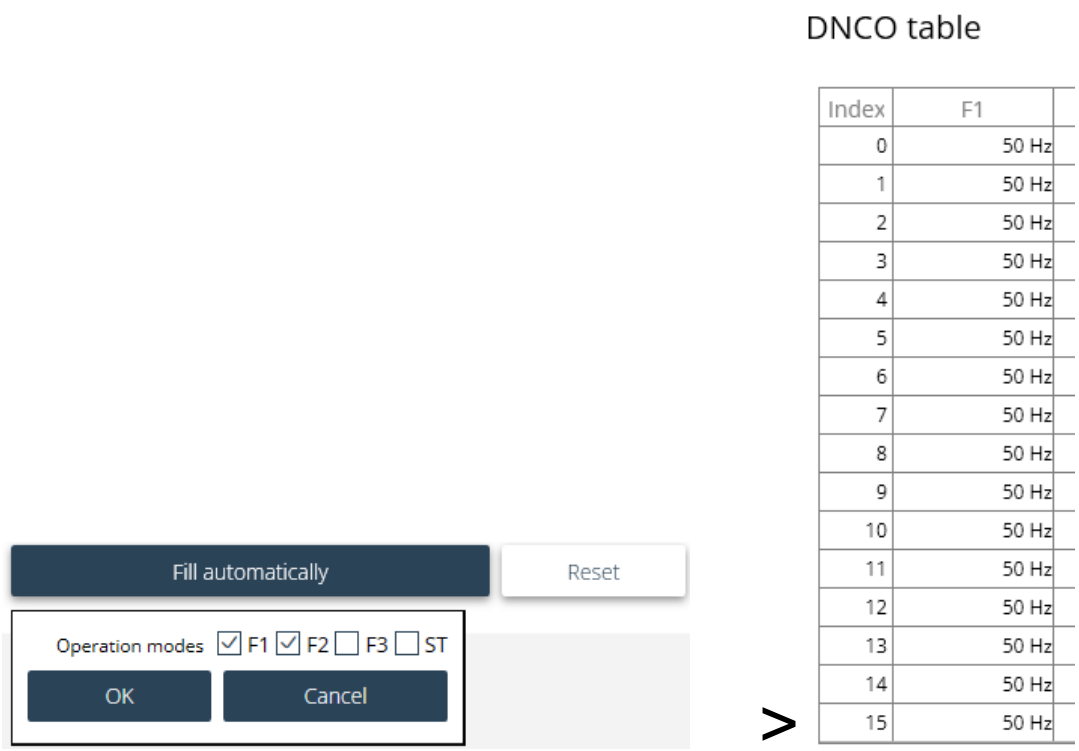


Fig. 5-6

5.5 Password

You can set up a device password that will be required when attempting to transfer an application to a module.

- Maximum eight (8) characters
- No spaces; no umlauts

Compare passwords will check whether the password you entered matches the password on the module.

► Select the “Compare passwords” option.

► Enter the current password.

► Click on the “Compare passwords” button.

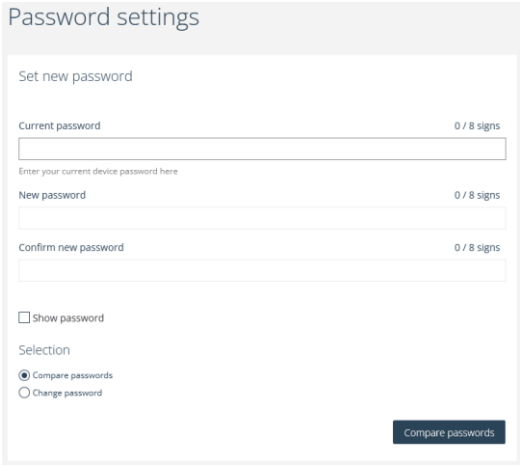


Fig. 5-7

Change password

► Enter the current password.

► Enter the new password.

► Enter the new password again.

► Click on the “Change password” button.

6 Logicplan

This pane is where you will be creating the logic diagram for your application (Fig. *6-1*).

It includes an extensive library containing both standard and safety modules. You can find an overview of all these elements in the “Blocks” section.

The logic diagram is where you can place the elements you want, connect them as indicated in your circuit diagram specifications, and configure them as needed for your machine-specific requirements.

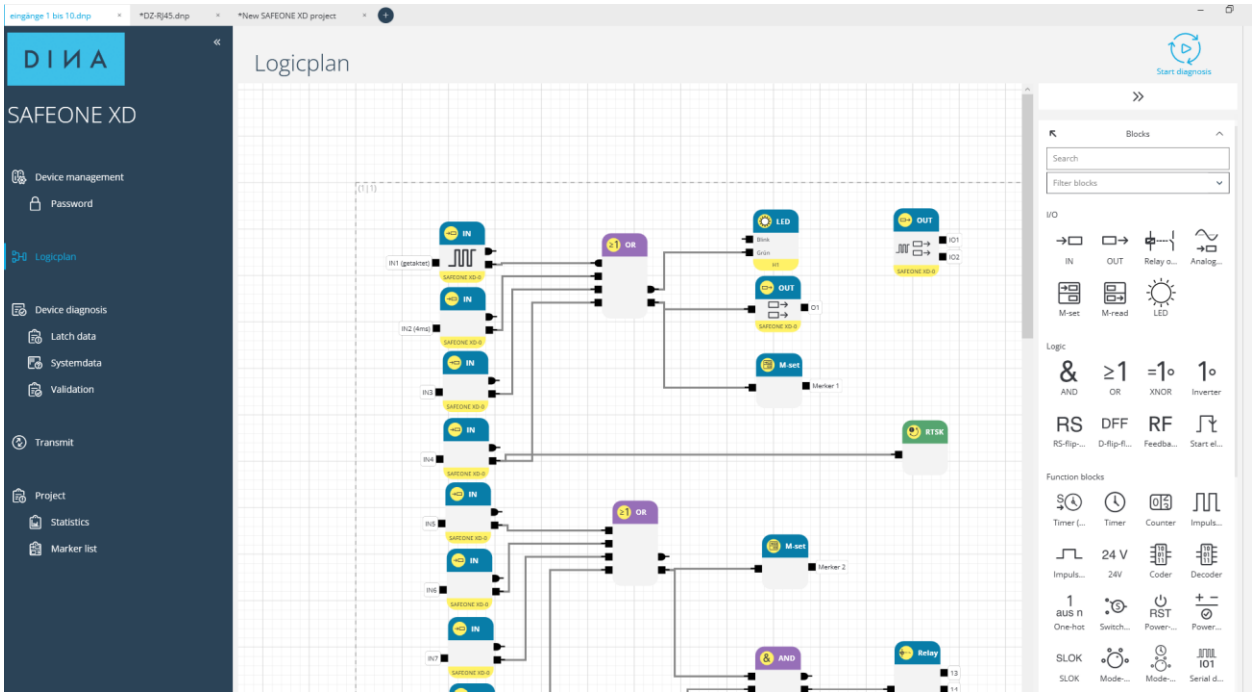


Fig. 6-1

6.1 Adding blocks

You can find the available blocks in the column to the right of the logic diagram. Simply drag and drop the blocks you want to the logic diagram pane (Fig. 6-2).

Fig. 6-2

Once you add a block, the corresponding settings will open (Fig. 6-3).

You can then configure the element-specific settings you want.

The settings that appear will depend on the element's specific function and are explained in greater detail in the corresponding sections.

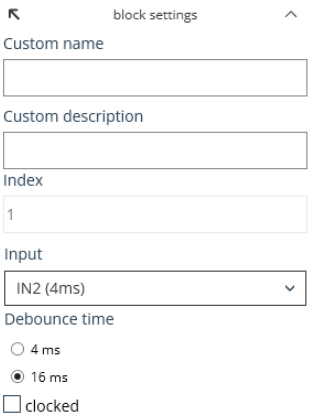


Fig. 6-3

6.2 Deleting blocks

To delete a selected element or element group, right-click on it and then click on the "Delete" icon.

6.3 Selecting multiple blocks

Click and hold down the left mouse button and draw a rectangle around the elements you want.

6.4 Copying and pasting blocks

Select the element or element group you want, right-click on it, and click on the "Copy" option.

The elements will be copied to a clipboard so that they can be pasted in the same application.

6.5 Connecting blocks

There are 500 netlists available for connecting the elements in your diagram. Each connection will decrease the number of available netlists by one. To see how many netlists are still available, go to "Project" – "Statistics".

When connecting elements, the wiring always needs to go from an element output to an element input (Fig. 6-4):

- ► Click on the element output pin you want and hold down the mouse button.
- ► Drag the cursor to the element input pin to which you want to draw a connection.
- ► Release the mouse button.

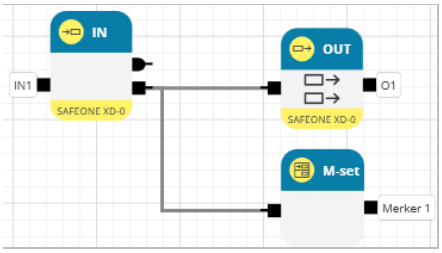


Fig. 6-4

The layout for the line between two points will be determined automatically. However, you can modify it as necessary (Fig. 6-5).

► Select the line and move it using the handles or drag the connection to a different output pin.

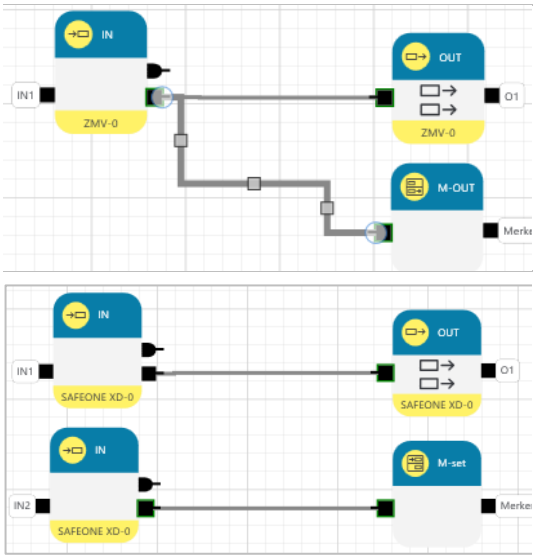


Fig. 6-5

You can also add branches:

► Press and hold down the “Alt” key and move the cursor over the line you want.

◄ The cursor will turn into a crosshair cursor.

► Click on the line and drag the cursor to the input pin you want (Fig. 6-6).

◄ To modify existing branches, press and hold down the “Alt” key and move the cursor to the spot you want.

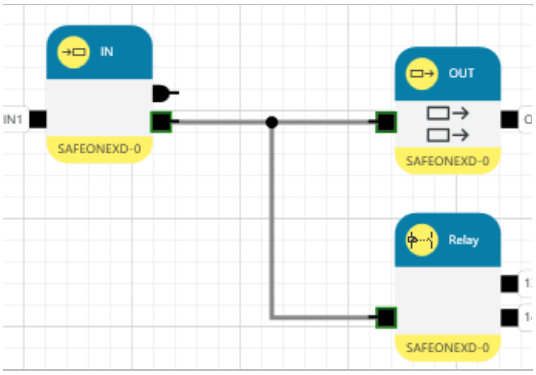


Fig. 6-6

Resetting connections

Select the connections you want to reset, right-click on them, and click on the “Reset” option.

6.6 Deleting logic diagram connections

To delete connections, either right-click on them and click on the “Delete” option or press the “Delete” key.

6.7 Tracing signal paths

You can trace signal paths.

Select the block where you want to start tracing the signal path in question, right-click on it, and click on the “Trace signal path” option.

The corresponding signal path will be shown and all other elements will be grayed out. To show them properly again, click on the “Fade in” button (Fig. 6-7).

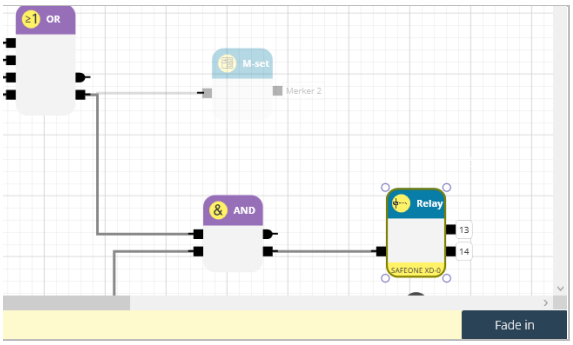


Fig. 6-7

6.8 Online diagnostics

The online diagnostics function can be used to monitor the application’s logic states, measurement data, and parameters. Both the system status and the conditions for proper operation are traceable with this function.

► Transfer the application to the device.

► Click on the “Start diagnosis” button to run the diagnostics.

◄ The diagnostics will start running and the actual states will be shown (Fig. 6-8):

- The terminals at the inputs and outputs and at safety circuits will change color depending on whether the terminal in question is ON or OFF and whether there is a fault at the terminal
- The connection lines’ color will indicate the corresponding state (HIGH or LOW)
- Both actual and target values will be shown in the block
- Specifics regarding faults can be viewed by accessing the device diagnostics

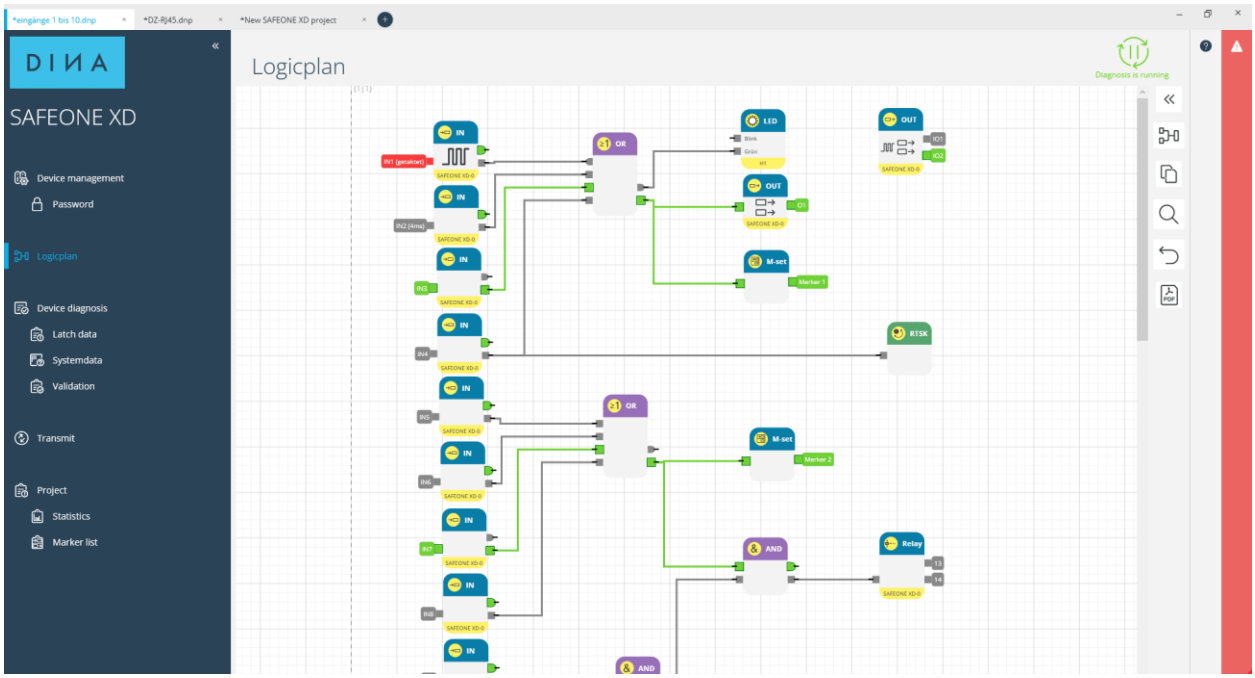
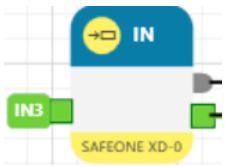
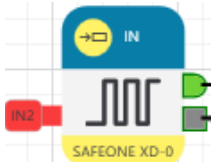
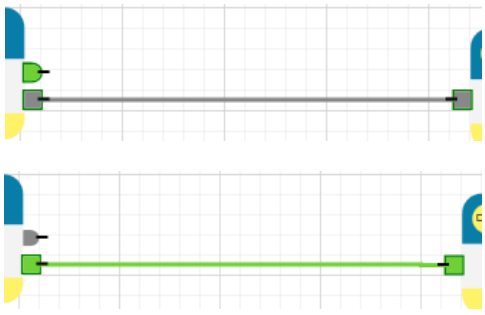
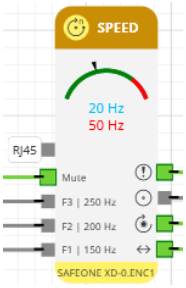
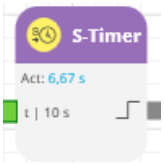
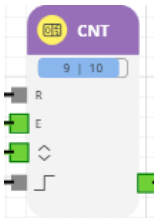
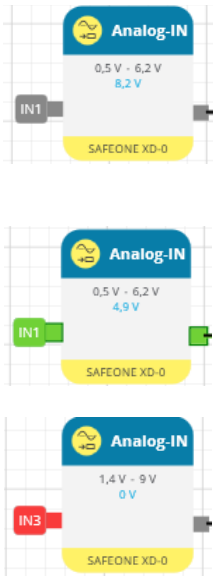


Fig. 6-8

The following table shows how the various individual symbols will be shown when running the online diagnostics:

Block	Graphic representation in online diagnostics	Description
Input (for safety-relevant functions as well)	  	Gray terminal = Input OFF Green terminal = Input ON Red terminal = Input fault (e.g., clocked input has static signal)

Block	Graphic representation in online diagnostics	Description
Output		Gray terminal = Output OFF Green terminal = Output ON
Connection		Connection in LOW state Connection in HIGH state
Speed		Blue value = Actual value Red value = Limit
Timer		Current time (blue)
Counter		Current count / configured target count Blue bar will grow / shrink

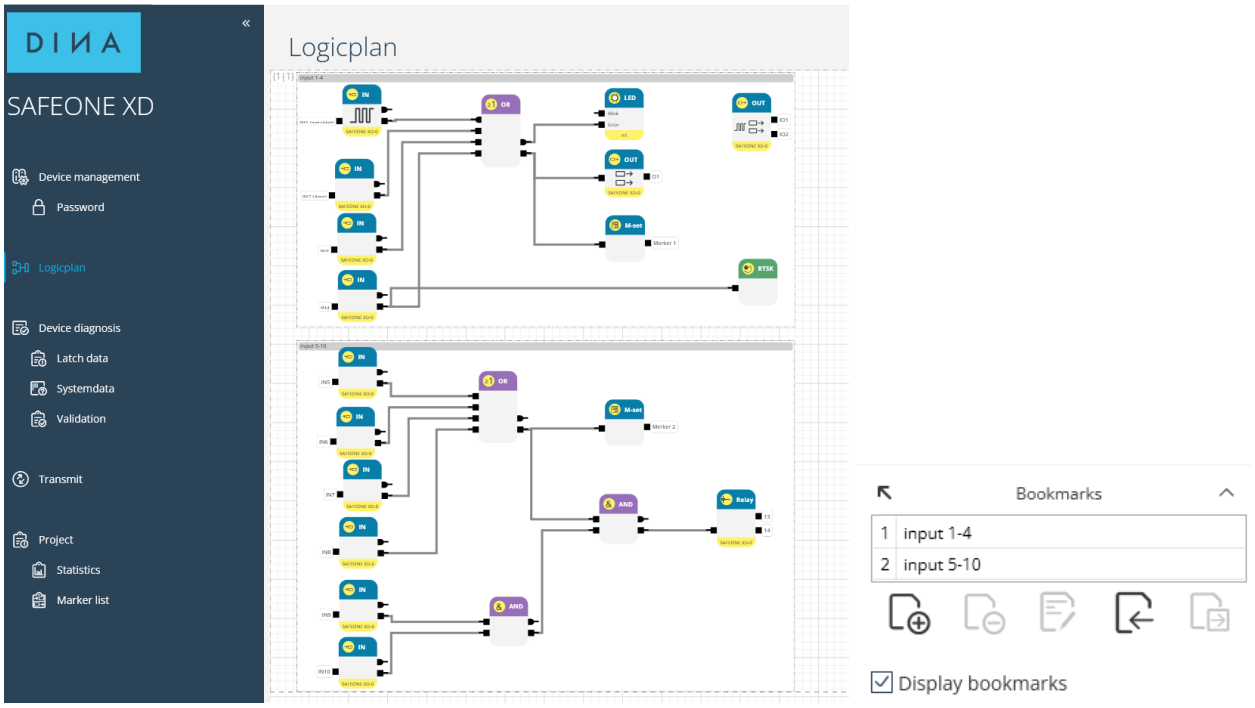
Block	Graphic representation in online diagnostics	Description
Analog input		First line of values: Configured limits Second line: Current analog value (blue) Gray terminal: Analog value outside of configured limits. Green terminal: Analog value within configured limits. Red terminal: Short circuit or open wire or voltage/current exceeding 13.5 V / 25 mA
DNCO multiplexer		Limit for F3 Limit for F2 Limit for F1 Limit for standstill As per the DNCO table and the active terminal.

6.9 General functions in the logic diagram

6.9.1 Bookmarks

The “Bookmarks” function can be found in the column to the right of the logic diagram view.

You can add bookmarks to navigate directly to specific logic diagram sections. In addition, you can both name these bookmarks and enter descriptions for them.

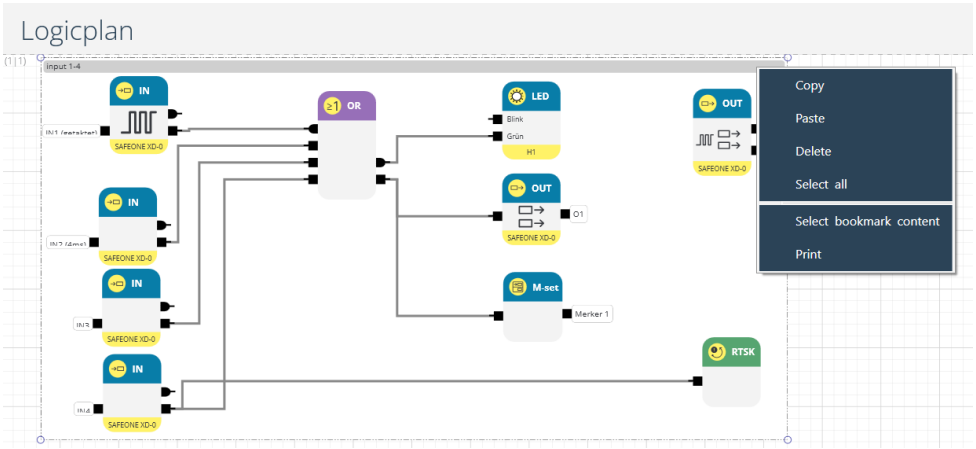


You can select bookmarks in the bookmark list in the column to the right of the logic diagram or by clicking on the upper gray border of the bookmark in question.

The following bookmark functions are available in the column to the right of the logic diagram:

	Add bookmark	Use the mouse to select the section you want to cover with the bookmark and name it. The bookmark will appear in the bookmark list.
	Delete bookmark	Deleting a bookmark will only the delete the corresponding bookmark, not its content.
	Rename bookmark	Used to change the name and description for a bookmark.
	Import bookmark from file	Opens a selection dialog box with bookmarks that have been exported already. These bookmarks will have the .dnpl file extension.
	Export bookmark to file	Bookmarks can be exported and then imported in any application.

The following bookmark functions will be available after right-clicking:



- Copy and Paste
- Delete
- Select bookmark content
- Print

Note

If you want to copy, delete, or move a bookmark with all its contents, you will first need to click on the “Select bookmark content” option.

6.9.2 History

You can undo one or more actions:

Undoes one action at a time.

Redoes one action at a time.

Undoes / redoes all actions starting from the selected one.

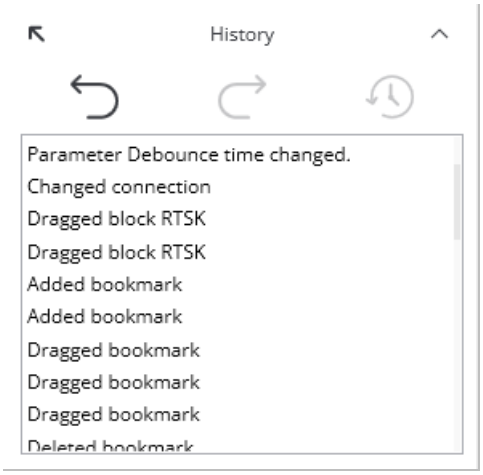


Fig. 6-9

6.9.3 Searching a diagram

You can search the logic diagram for custom names and descriptions, as well as for inputs and outputs.

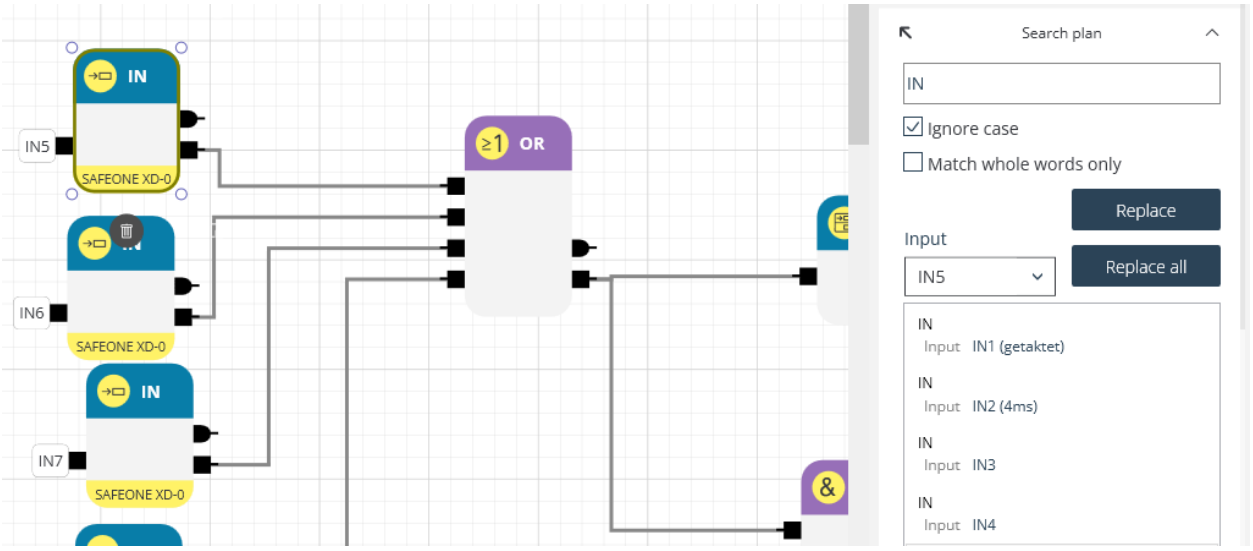
► Enter the term you want to search for into the search box.

◄ All elements matching your search term will be listed.

When you select an element in the hit list, it will be selected in the logic diagram as well.

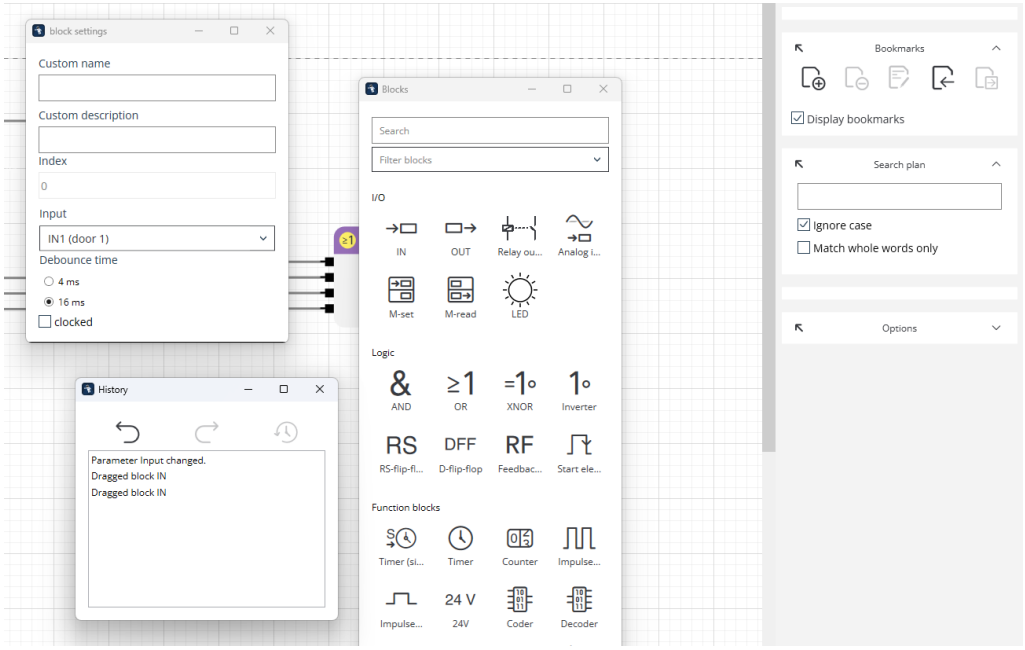
You can then replace the input/output or texts.

To do this, open the drop-down menu or enter a different text.



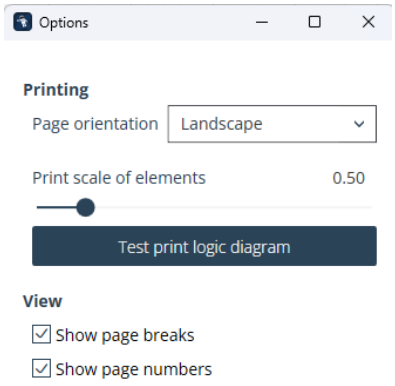
6.9.4 Undocking panels

Every single panel can be undocked (and shown on a separate monitor, for instance). To do this, simply click on the arrow in the upper left corner and then move the corresponding panel where you want. To dock a panel again, simply click on the X (“Close”) icon.



6.9.5 Options

The settings in this panel can be used to configure the page view in the logic diagram and the print layout.



Page orientation	Portrait or landscape
Print scale of elements	Used to adjust the size of the printed pages
Show page breaks	When this option is enabled, dashed lines will show where printed pages begin and end in the logic diagram.
Show page numbers	When this option is enabled, the page numbers for the pages will be shown.

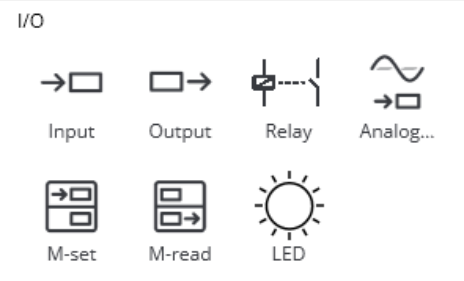
7 Blocks in the logic diagram

SAFEONE XD/XS devices feature an extensive block library. Every element in this library can be configured in detail with a specific parameter panel that will show the number and type of parameters specific to the element in question. The only parameters found on every panel are “Custom name” and “Custom description.”

- The name can have a maximum of eight characters and will be shown inside the symbol.
- The description can have a maximum of 80 characters and will only be shown when the cursor moves over the symbol.

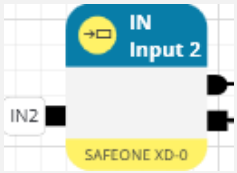
All other parameters are element-specific and are described in greater detail in the following sections.

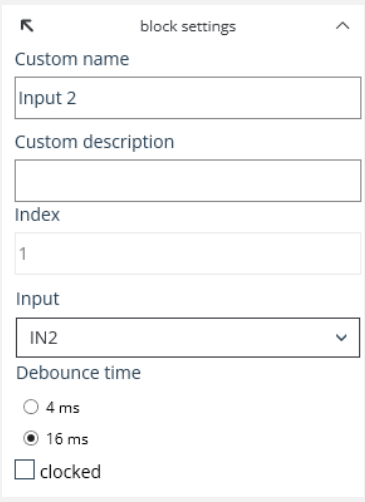
7.1 I/O

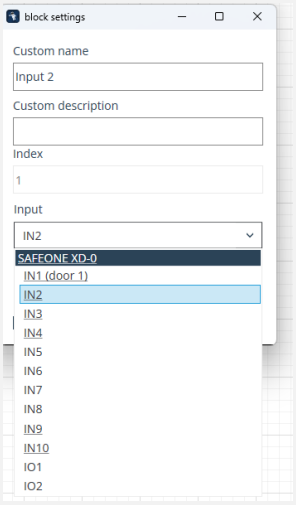
I/O	Function	Available quantity
	Input	10
	Output	2
	Input/Output	2
	Relay	2
	Analog input	8
	Marker	∞
	LED	5

7.1.1 Digital inputs

SAFEONE XD devices have ten digital inputs available. After you add one of these inputs to the logic diagram, you will be able to configure and modify it with the drop-down menu. To make it easier to keep track of available inputs, any inputs that are already in the diagram will be underlined. In addition, terminal names will be shown if you have assigned them.





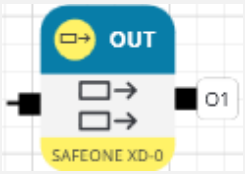


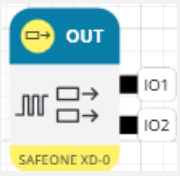
Parameters	
Debounce time	• 4ms • 16ms • 16 ms, clocked (I1 through I8 only – forced dynamization achieved by connecting the input to a clock signal output)

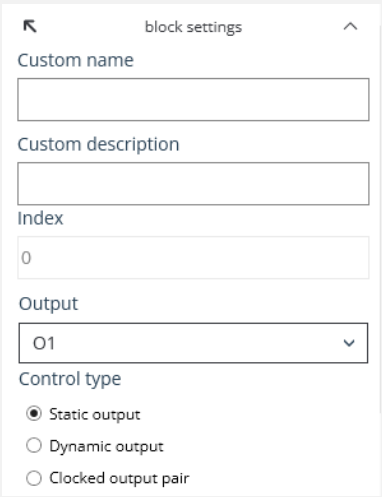
7.1.2 Outputs

There are two safe semiconductor outputs (O1 and O2) and two contact outputs (13/14, 23/24) with a safe NO contact each. Meanwhile, terminals IO1 and IO2 can be used as inputs, outputs, or clocked outputs for driving a clocked safety circuit or a clocked input for cross-circuit fault monitoring.

To make it easier to keep track of available outputs, any outputs that are already in the diagram will be underlined. In addition, terminal names will be shown if you have assigned them.



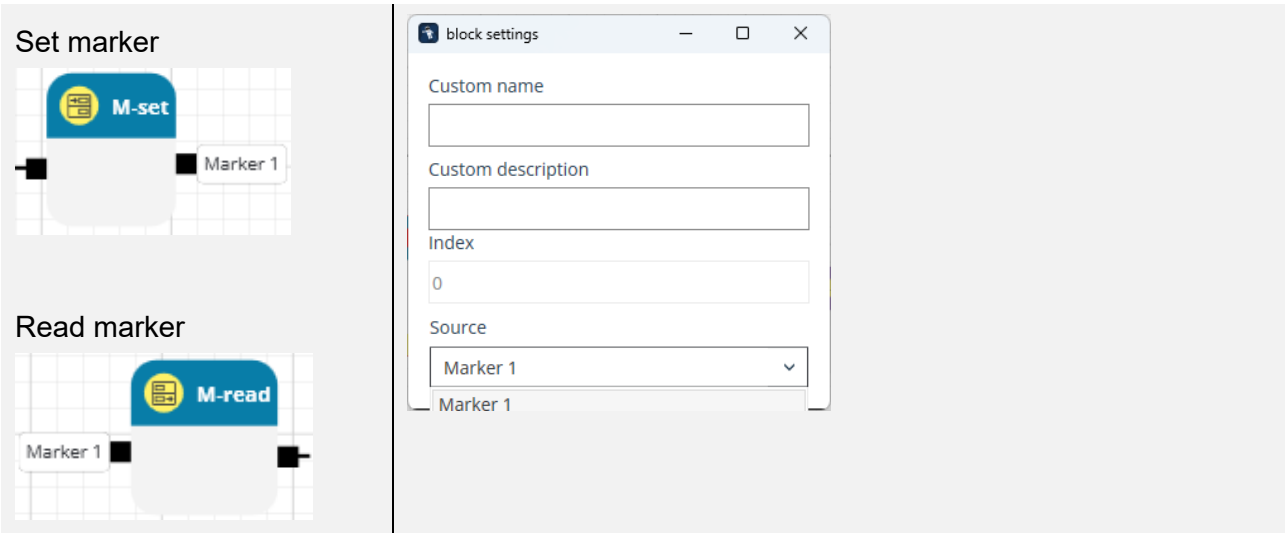




Parameters	
Static output	Positive-switching safe semiconductor output
Clocked output pair	IO1 and IO2 will generate a clock signal
Dynamic output	Positive-switching safe semiconductor output with test pulse for cross-circuit fault detection

7.1.3 Markers

Markers represent a saved state that can be used as an input for other operations as necessary.



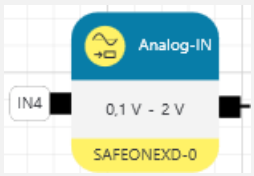
Note

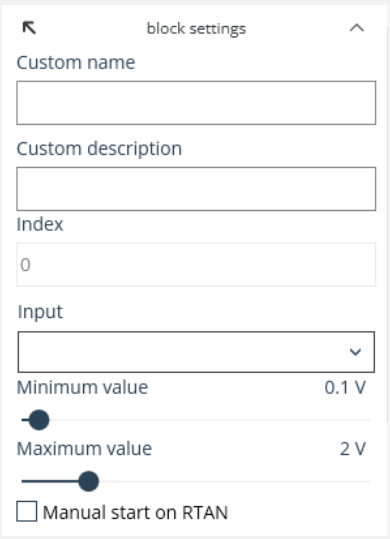
Do not leave markers unconnected in the logic diagram!

7.1.4 Analog inputs

Inputs I1 through I8 can be configured as safe analog inputs. They can be used to read analog voltage values of 0 to 10 V.

The corresponding output will output a logic 1 signal if the voltage value connected to the input falls between the entered “Minimum value” and “Maximum value.”





Parameters	
Maximum value	The output will switch to a logic 0 if this value is exceeded.
Minimum value	The output will switch to a logic 0 if this value is fallen below.
Manual start on RTAN	The output will be switched back on by the RTAN enable symbol.

7.1.5 LEDs

The “LED” block can be used to configure how LEDs H1 through H4 and Power will work in your application.

LEDs H1 through H3 can be configured to show a solid green light or to flash green with one of two frequencies.

LEDs H4 and Power can be configured to show one of two solid colors (red or green) or to flash alternating between red and green.

Legend:


LED on

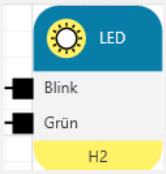

LED off


LED flashing


LED flashing (long on / short off)


LED flashing (long off / short off)

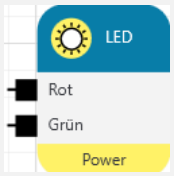
LEDs H1 through H3



The LEDs will be driven as shown in the tables below:

Flash input	Green input	LEDs H1 through H3
0	0	
0	1	
1	0	
1	1	

LEDs H4 and Power



Red input	Green input	LEDs H4 and Power
0	0	
0	1	
1	0	
1	1	

7.2 Logical operators

Logic	Function	Available quantity
	2-input AND 3-input AND 4-input AND	52 10 26
	2-input OR 4-input OR	52 26
	XNOR	16
	Inverter	16
	RS flip-flop	8
	D flip-flop	8
	Feedback element	16
	Start element	4

7.2.1 AND

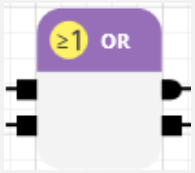
The “AND” logical operator will output a logic 1 at its output and a logic 0 at its inverted output if all inputs are in the logic 1 state.

Input 1	Input 2	Output
0	0	0
0	1	0
1	0	0
1	1	1

Parameters	
Number of inputs	2, 3, or 4
Invert	Negates the input
Input/output name	Maximum twelve characters

7.2.2 OR

The “OR” logical operator will output a logic 1 at its output and a logic 0 at its inverted output if at least one input is in the logic 1 state.



Input 1	Input 2	Output
0	0	0
0	1	1
1	0	1
1	1	1

Parameters	
Number of inputs	2 or 4
Invert	Negates the input
Input/output name	Maximum twelve characters

7.2.3 XNOR

The “XNOR” logical operator will output a logic 1 at its output and a logic 0 at its inverted output if two inputs have the same logic state.

Input 1	Input 2	Output
0	0	1
0	1	0
1	0	0
1	1	1

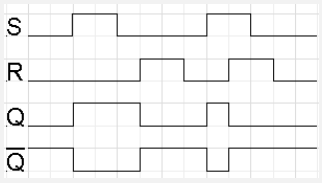
7.2.4 Inverter

The “Inverter” operator inverts the input signal at its output.

Input 1		Output
0		1
1		0

7.2.5 RS flip-flop

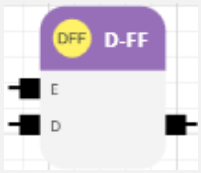
The “RS-Flip-Flop” operator has two stable states that are used to store state information and that can be output. These two states are “set” (S) and “reset” (R).

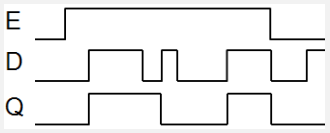


S	R	Output
0	0	Current stored state is retained
1	0	1
0	1	0
1	1	0

7.2.6 D flip-flop

The “D-Flip-Flop” operator switches the state of its Q output when there is a rising edge at input signal D, but only while the input signal at input E is in the logic 1 state.

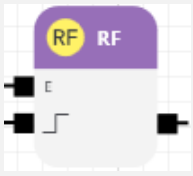


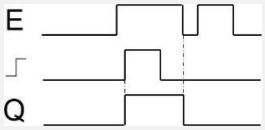


E	D	Output
0	0	0
1	0/1	1
1	1/0	1
1	0/1	0

7.2.7 Feedback element

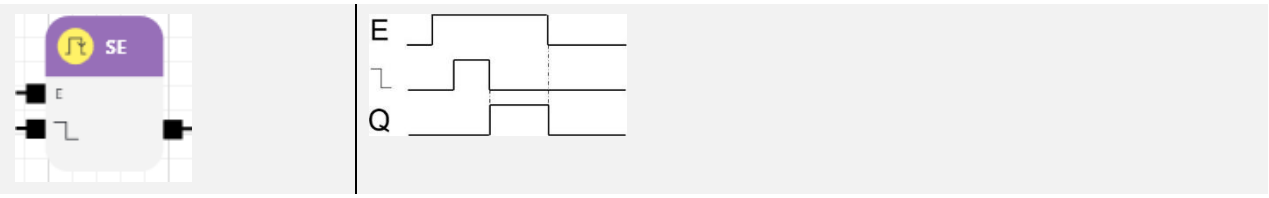
A rising edge at the input will set output Q to a logic 1, but only while the input signal at input E is in the logic 1 state.



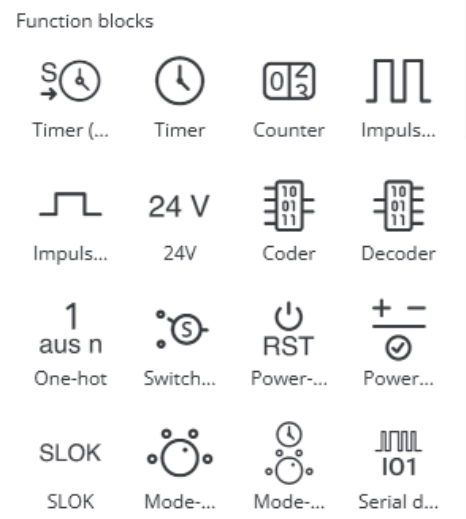


7.2.8 Start element

A falling edge at the input will set output Q to a logic 1, but only while the input signal at input E is in the logic 1 state.

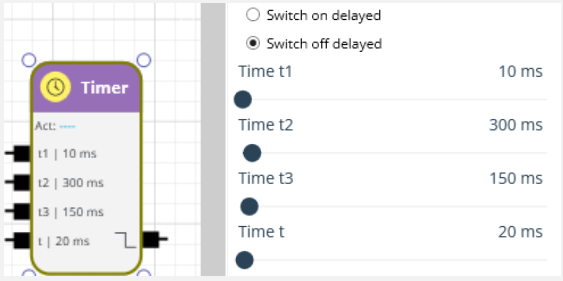


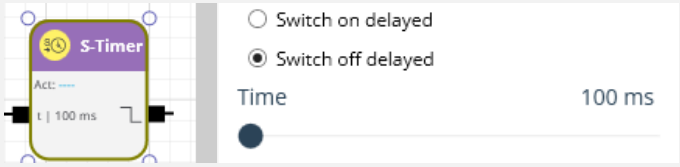
7.3 Function blocks

Function blocks	Function	Available quantity
	Timer	15
	Timer (single)	30
	Counter	4
	Pulse generator	1
	Pulse former	8
	24V	1
	Encoder	2
	Decoder	2
	One hot encoder	4
	2-in, 1-out switch	8
	Power-On-Reset	1
	Power control	1
	SLOK	1
	Mode-Select	2
	Mode-Select-Time	1
	SDIAG	4

7.3.1 Timer and timer (single)

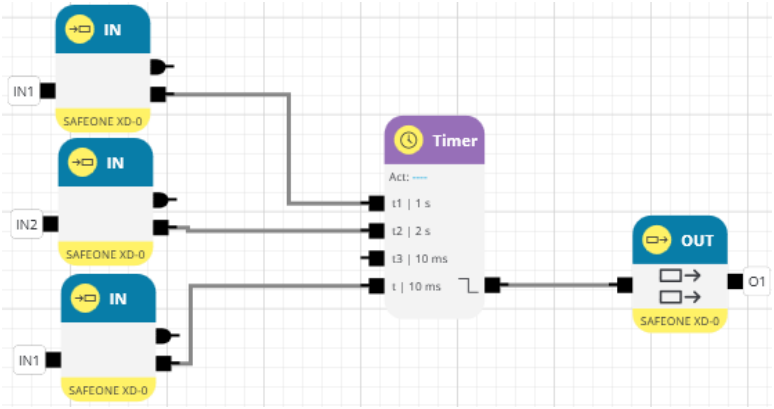
The two function blocks of type “timer” will generate a signal (logic 1 or logic 0) at their output after a custom time.





Parameters	
Time t	1 to 300 s
Switch on delayed	Time t will start after a rising edge at input t. Once this time elapses, the signal at the output will switch from a logic 0 to a logic 1.
Switch off delayed	Time t will start after a falling edge at input t. Once this time elapses, the signal at the output will switch from a logic 1 to a logic 0.
Times t1 through t4	If multiple inputs are ON, the following prioritization order will be used: t3 > t2 > t1 > t.

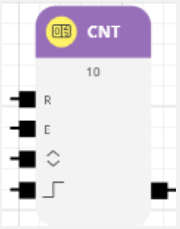
Example showing a timer with an on-delay:



If input t2 is ON and a falling edge is detected at input t, output O1 will be switched off after 2.0 s.

7.3.2 Counter

The counter function block is a pulse counter that sets its output to a logic 0 as soon as the target count you want is reached.

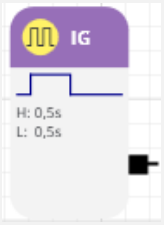


- The output's initial state is HIGH.
- Before each counting operation, the count must be reset with reset input R.
- The counting direction can be selected by switching the ⇕ input.
- The counting operation needs to be enabled with enable input E.
- Up counting: The output will be switched off when the configured target count is reached.
- Down counting: The output will be switched off when a count of zero is reached.
- With up counting, the counter will continue counting up after the output is switched off.
- The counting direction can be changed during a counting operation.

Parameters	
Count value	1 to 30000

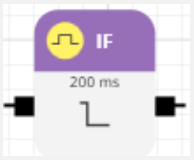
7.3.3 Pulse generator

The pulse generator function block generates logic 0 and logic 1 signals at its output for the durations you set up.

	
Parameters	
Time (H) and Time (L)	100 ms to 25.5 s in increments of 100 ms

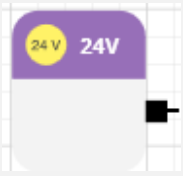
7.3.4 Pulse former

The pulse former function block generates a logic 1 signal at its output for the duration you set up. The duration time will start when there is a rising or falling edge at the input.

	
Parameters	
Pulse length	30 ms to 1 s in increments of 10 ms
Start with	Rising or falling edge at the function block's input

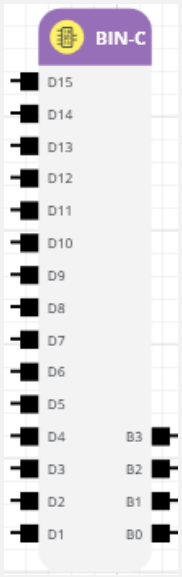
7.3.5 Virtual 24 V

The 24 V function block generates a login 1 signal at its output even if the device experiences a fault. This function block can be used multiple times within an application.

7.3.6 Encoder

The binary encoder function block converts the state of inputs D1 to D15 to a binary value and provides the corresponding information through outputs B0 to B3.

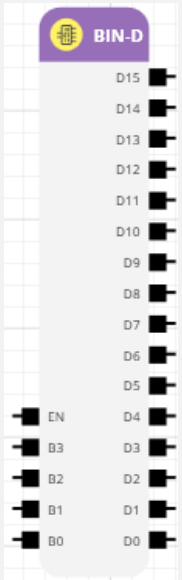


Inputs D1 to D15 correspond to decimal numbers 1 to 15 (none of the inputs correspond to 0). Meanwhile, outputs B0 to B3 correspond to the four bits of the corresponding binary number, with B0 corresponding to the least significant bit.

By default, none of the outputs will be switched if more than one input is active. However, this behavior can be disabled, in which case the active input with the highest value will be converted and output.

7.3.7 Decoder

The decoder function block converts the state of inputs B0 to B3 to a decimal value and provides the corresponding information through outputs D0 to D15.



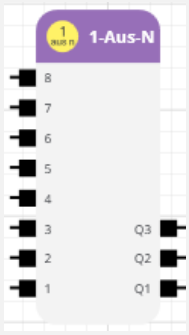
Inputs B0 to B3 correspond to the four bits of a binary number, with B0 corresponding to the least significant bit.

Outputs D0 to D15 correspond to decimal numbers 0–15.

The decoder function block will not decode the binary number at its inputs unless there is a logic 1 signal at its EN input (enable).

7.3.8 One hot encoder

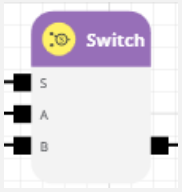
The one-hot encoder function block takes an eight-digit input signal pattern and outputs a three-digit signal pattern based on it.



- Output Q1 will output a logic 1 if only one of the inputs is in the logic 1 state.
- Output Q2 will output a logic 1 if only one of the inputs is in the logic 0 state.
- Output Q3 will output a logic 1 if all inputs are in the logic 1 state.

7.3.9 2-in, 1-out switch

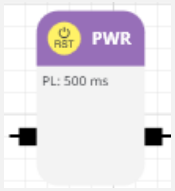
The “2-in, 1-out switch” function block will reflect the states of inputs A and B at its output as a function of the state of input S as shown in the table below.



Input S	Input A	Input B	Output
0	0	-	0
0	1	-	1
1	-	0	0
1	-	1	1

7.3.10 Power-On-Reset

The Power-On-Reset function block generates a logic 1 signal at its output, for the configured duration, after a power on or when the input is activated.



The input can be left unconnected.

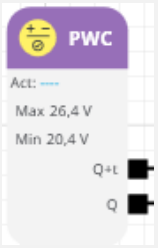
This function can be used to set enable signals after the device is powered on, for example.

Parameters	
Pulse length	300 ms to 25.5 s in increments of 100 ms

7.3.11 Power control

The power control function block generates a logic 1 signal at its Q1 and Q1+t outputs as long as the supply voltage at the central module remains between the configured upper and lower limits.

Otherwise, it switches off output Q1 immediately and output Q1+t after 500 ms.



Note

Please note that the RTSK element is needed in order to switch the outputs back on.

Parameters	
Upper limit	27 V, 26.4 V, 25.8 V, 25.2 V
Lower limit	21 V, 20.4 V, 19.8 V, 19.2 V

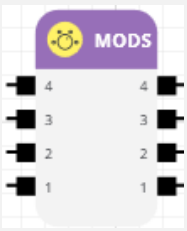
7.3.12 SLOK

The SLOK function block generates a login 1 signal at its output if the device is ready for operation.

This function block can only be added once to an application.

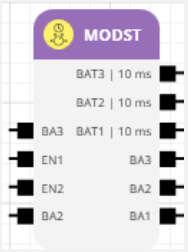
7.3.13 Mode-Select (operating mode selector switch)

The Mode-Select function block checks the state of the inputs of an operating mode selector switch with four inputs and four outputs. If only one of the inputs is in a logic 1 state, the corresponding output will output a logic 1. For any other combination of input states, all outputs will output a logic 0.



7.3.14 Mode-Select-Time (operating mode selector switch)

The Mode-Select-Time function block checks the state of the inputs of an operating mode selector switch with three inputs, three outputs, and three delayed outputs.

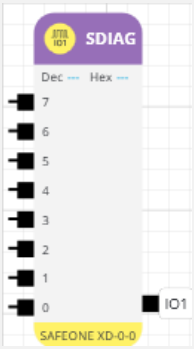


- If all inputs are in a logic 0 state, outputs BA1 and BAT1 will output a logic 1.
- If all inputs are in a logic 1 state, all outputs will output a logic 0.
- Operating modes 2 and 3 expect enable signals EN1 and EN2.
- If an enable signal drops out or a different operating mode is selected, the deselected BA output will be switched off immediately and the corresponding BAT output will be switched off after a delay.

Parameters	
Delay for BA1 to BA3	0 to 25.5 s in increments of 10 ms

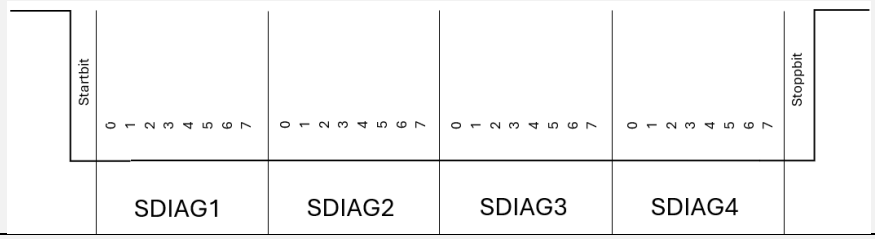
7.3.15 Serial diagnostic

The serial diagnosis function block provides its input signals serially at output IO1.



The frame length will depend on the number of SDIAG function blocks that have been added.

Frame length = Start bit + number of SDIAG function blocks x 8 x time per bit length + stop bit



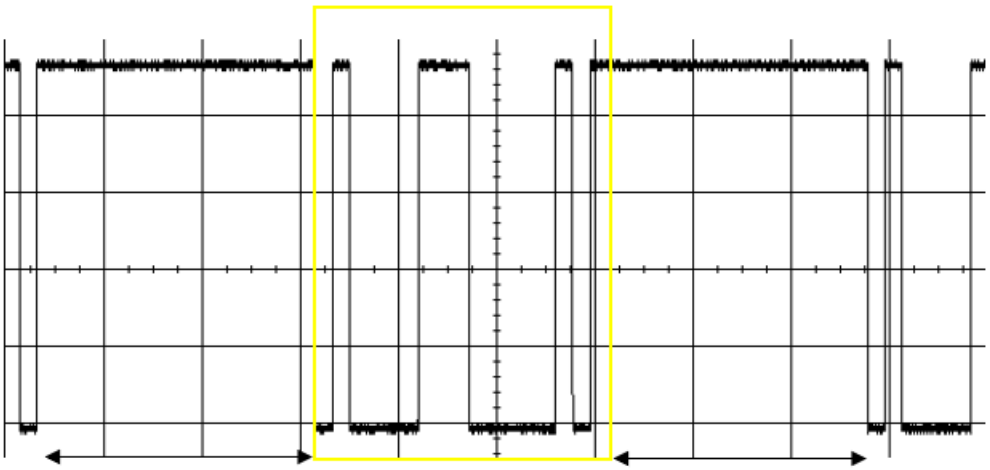
Parameters	
Repeat rate	Maximum 2.5 s
Time per bit length	5 ms to 50 ms

Example:

Configuration and connections

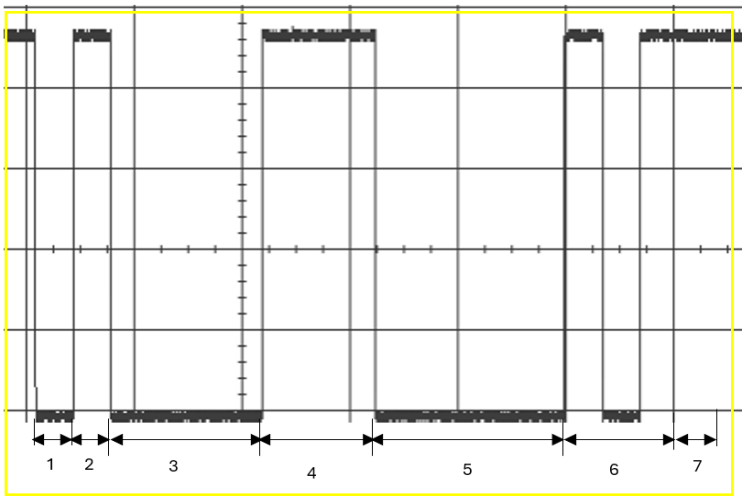
In the example above, input terminals 0 and 5–7 of SDIAG1 and input terminals 5 and 7 of SDIAG2 in the corresponding application are ON.

This results in the following signal:



Repeat rate of 500 ms Repeat rate of 500 ms

After the start bit, the state of input terminals 0 through 7 of SDIAG1 and then input terminals 0 through 7 of SDIAG2 is read and passed serially to output IO1. This sequence will repeat every 500 ms.



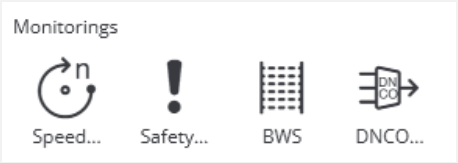
This means that a single sequence will look as follows:

1	Start bit	40ms
2	SDIAG1: 0	1x40ms = 40ms
3	SDIAG 1: 1–4	3x40 ms = 120ms
4	SDIAG 1: 5–7	3x40 ms = 120ms
5	SDIAG 2: 0-4	5x40ms = 200ms
6	SDIAG 2: 5–7	3x40 ms = 120ms
7	Stop bit	40 ms

7.4 Monitors

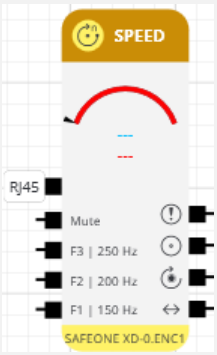
The inputs on SAFEONE XD/XS devices are intended for connecting various safety devices, including, but not limited to, emergency stop devices, guard doors, and light curtains.

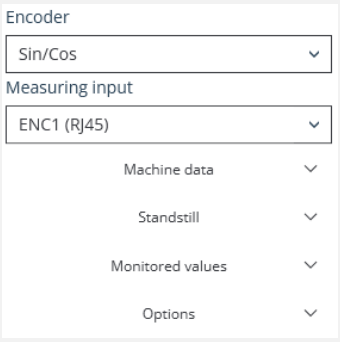
The SAFEONE XD safety relay detects movements, evaluates them, and ensures a safe shutdown in the event of overspeeds or movement from a standstill. Speeds are detected at the RJ45 port with Sin/Cos or TTL encoders or at inputs I1 through I8 with proximity switches or HTL encoders.

Monitors	Function	Available quantity
	Speed monitor (SAFEONE XD only)	1 (RJ45 port) 1–4 (via inputs)
	Safety circuit	4
	ESPE	1
	DNCO multiplexer (SAFEONE XD only)	2

7.4.1 Speed monitoring

Speed monitoring can be configured with the “speed monitoring” block.





Parameters	
Encoder	TTL or Sin/Cos, Proximity switch, HTL
Machine data	Frequency values will be calculated automatically based on machine-specific data. After you select the axis type, you will need to enter the relevant mechanical parameters into the table. Then, once you enter the speeds that should be monitored and a tolerance value (if any), the corresponding frequency value will be calculated and transmitted to the module. Please note that the actual machine data will **not** be stored on the module!
Standstill	Used to select whether the drive will be monitored with speed monitoring or position monitoring when stopped.
Monitored values	Limits for three operating modes and standstill
Options	• Muting without sensor monitoring • Safe stop • Fan monitoring • Advance limit • Switch off delay For additional information, please refer to the *Options* section

7.4.1.1 Speed monitoring block inputs

You can use the inputs on the speed monitoring block to select one of the four following operating modes:

MUTE	Drive monitoring disabled
F3	Enables operating mode 3
F2	Enables operating mode 2
F1	Enables operating mode 1

If none of the inputs are active, the drive will be monitored with standstill monitoring.

If multiple inputs are active at the same time, the following prioritization order will be used:

MTx > Fx3 > Fx2 > Fx1 > Standstill

7.4.1.2 Speed monitoring block outputs

The outputs on the speed monitoring block can be used to read various drive monitoring states.

	**Advance limit** signals that a specific percentage of **V**max has been exceeded.
	**Standstill:** This output will output a logic 1 if **V**actual < **V**standstill
 	**Speed:** This output will output a logic 1 if **V**actual < **V**max for the enabled operating mode This output will output a logic 1 if **V**actual < **V**standstill and no operating mode is selected.
	Direction: This output will output a logic 1 if the sine signal is leading and a logic 0 if the cosine signal is leading.

7.4.1.3 Position monitoring in standstill

If you select this option, the axis position will be monitored when stopped. If the configured increments are exceeded, the Speed output will be switched off. Moreover, the Standstill output will be switched off after the configured standstill frequency is exceeded.

7.4.1.4 Options

Muting without sensor monitoring	This option suppresses sensor monitoring in MUTE mode: The Speed and Standstill outputs will be set to a logic 1.
Safe stop	This option causes the Standstill output to be safely switched off if there is no connected sensor.
Fan monitoring	This option can be used to monitor a minimum speed. The Speed output will be set to a logic 0 if the minimum speed is exceeded. The Standstill output will be set to a logic 0 if **V**actual > **V**standstill.
Advance limit  Note Not available for fan monitoring. The output will always output a logic 0 in this case.	Used to enter a percentage of the limit (advance limit). The output: • Will output a logic 1 if the actual value is less than this advance limit. • Will output a logic 0 if the actual value is greater than this advance limit. The output does not need an enable signal (RTDS). The symbol on the speed monitoring block will indicate whether an advance limit has been configured:

	Advance limit = 100% Advance limit < 100%
Switch off delay	Can be used to enter a time of 0 ms to 750 ms within which the monitor will shut down after an overspeed is detected. This delay will not be applied to position monitoring while stopped.

7.4.1.5 DNCO

The DNCO option can be used to implement speed monitoring for:

- Up to 16 different speeds per operating mode.

These speeds are entered in a frequency table (DNCO). The “multiplexer” block is used to select the frequencies in all operating modes.

Note

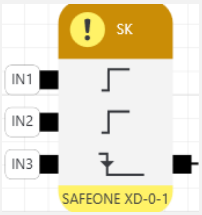
The “DNCO” option can only be used with Sin/Cos and HTL encoders at I1 through I4.

7.4.2 Safety circuits

The inputs on SAFEONE XD/XS devices are intended for connecting various safety devices and offer various safety functions.

Use examples:

- Emergency stop buttons
- Guards
- Light curtains
- Enabling switches

	There are a variety of parameters available when configuring these safety circuits.
Parameters	
Activation	• **Static** The driving signals will be applied statically. • **Antivalent** The driving signals will be switched in an antivalent pattern. • **Clocked, cross-fault-proof** The driving signals will be clocked. The clock pulse must be generated with a clocked output pair.
Initial position **Required** **Not required**	 The safety circuit will need to be switched off and then back on as a safety check after the system is switched back on. The safety circuit will not need to be switched off and then back on after the system is switched back on.
Debounce time	Debounce time for the inputs (4 or 16 ms). When using clocked safety circuits, only the 16 ms debounce time will be available.
Acknowledge **None**	 No acknowledge input
Internal	The next free input after the activation inputs will be used as an acknowledge input. This means one safety circuit will not be used.
External	The acknowledge input can be selected freely.

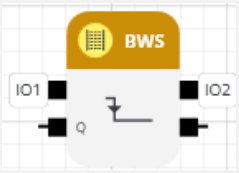
Manual	A falling edge at the acknowledge input will be used for acknowledging.
automatic	A logic 1 signal at the acknowledge input will be used for acknowledging.
Store acknowledge signal	The acknowledge signal will be stored for 500 ms. If the block is activated less than 500 ms after the acknowledge signal, the safety output will be switched on. If it is activated after this time, the output will not be switched.

Note

The “emergency stop” function requires an acknowledge input and “do not store”.

7.4.3 ESPE (electro-sensitive protective equipment)

The “ESPE” block can be used to safely evaluate and operate electro-sensitive protective equipment (ESPE) belonging to type 2 (periodic testing required in order to cover dangerous failures).

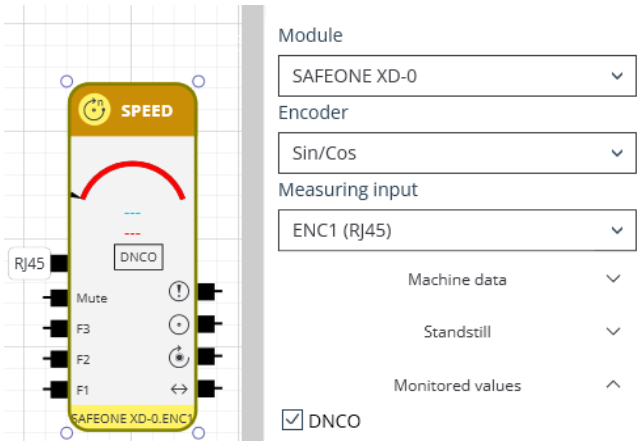


The ESPE is powered through the hardware output (IO2, on the right), and the feedback signal is provided through the input (IO1, on the left). The testing is configurable. You can set up a restart interlock with a static signal or with a falling edge.

Parameters	
Time	ON time OFF time Value range: up to 255 x 2.5 ms
Acknowledge mode	None or with falling edge or with high level

7.4.4 DNCO multiplexer

The DNCO multiplexer block can be used to select frequencies from the DNCO table with any inputs. In order to be able to do this, you will need to enable the DNCO option in the parameter panel for the speed monitoring block.



DNCO table

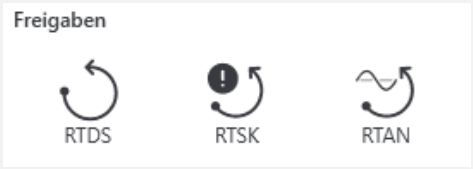
Index	F1
0	200 Hz
1	300 Hz
2	400 Hz
3	500 Hz
4	600 Hz
5	700 Hz
6	800 Hz
7	900 Hz
8	1 kHz
9	1.1 kHz
10	1.2 kHz
11	1.3 kHz
12	1.4 kHz
13	1.5 kHz
14	1.6 kHz
15	1.7 kHz

Inputs 1–15 on the multiplexer correspond to the DNCO table indexes.

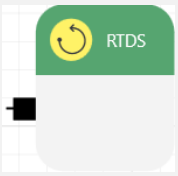
- If an input has a HIGH level, monitoring for the corresponding index value will be active.
- If none of the inputs on the multiplexer are ON, monitoring for the speed in index 0 will be active.
- If multiple inputs are ON, the highest one will apply.

7.5 Reset blocks

The reset blocks can be used to switch monitors back on after shutdowns, as well as to clear present error messages.

Reset blocks	Function	Available quantity
	RTDS (SAFEONE XD only)	1
	RTSK	1
	RTAN	1

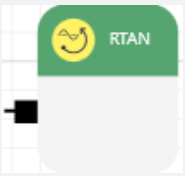
7.5.1 RTDS

	If there is a logic 1 signal at the input on the RTDS reset block, an enable signal for switching triggered speed monitoring blocks back on will be generated. The signal at the input must be present for more than 100 ms.

7.5.2 RTSK

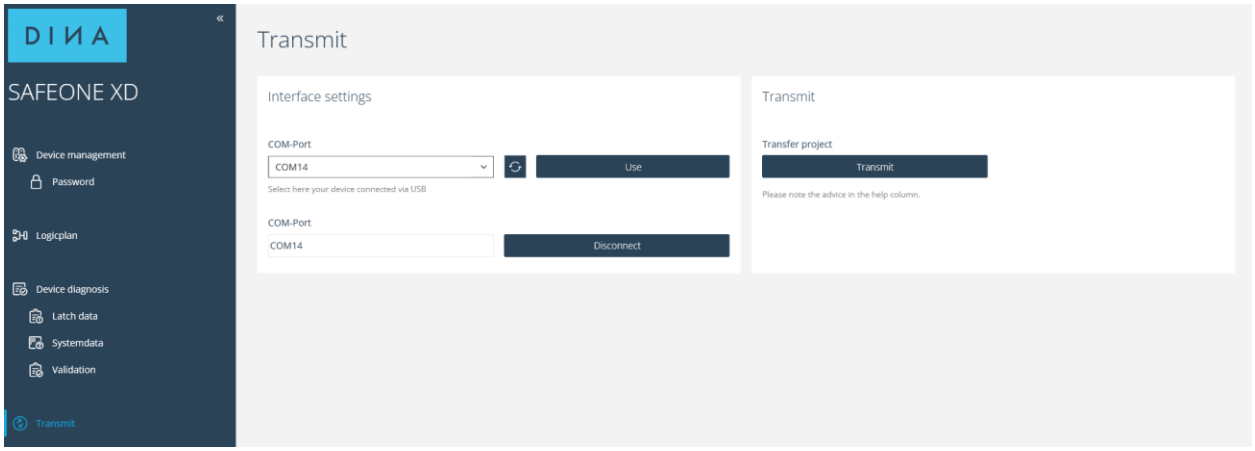
	A signal change from a logic 1 to a logic 0 at the RTSK reset block will clear error messages that have been generated as a result of a safety function or speed monitoring block being triggered. This will also clear the latch memory.

7.5.3 RTAN

	A signal change from a logic 1 to a logic 0 at the RTAN reset block will reset analog input signals after a shutdown caused by ranges being exceeded.

8 Transferring a project

To transfer your project, open the “Transmit” screen.



► Select the COM port you want and click on “Use”.

► Click on “Transmit”.

You can terminate the connection by clicking on the “Disconnect” button or closing the project.

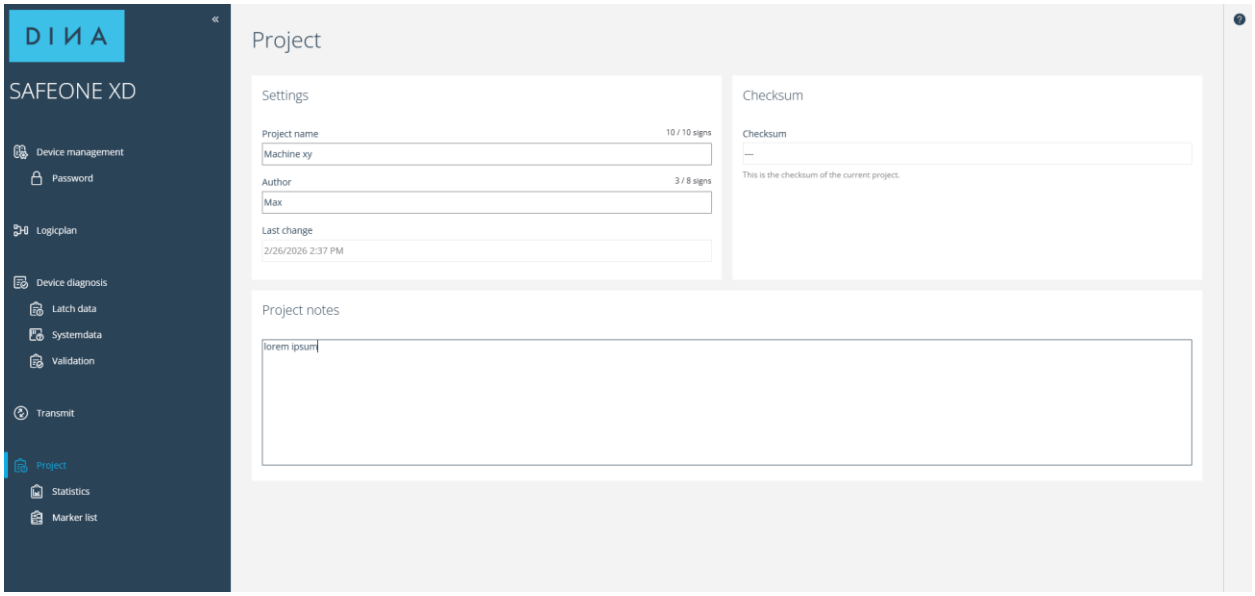
Note:

The POWER LED will show a solid red light and the safety relay will be in its safe state during the transfer.

Once a self-test is completed successfully, the device will be ready for operation. The POWER LED will flash green (default).

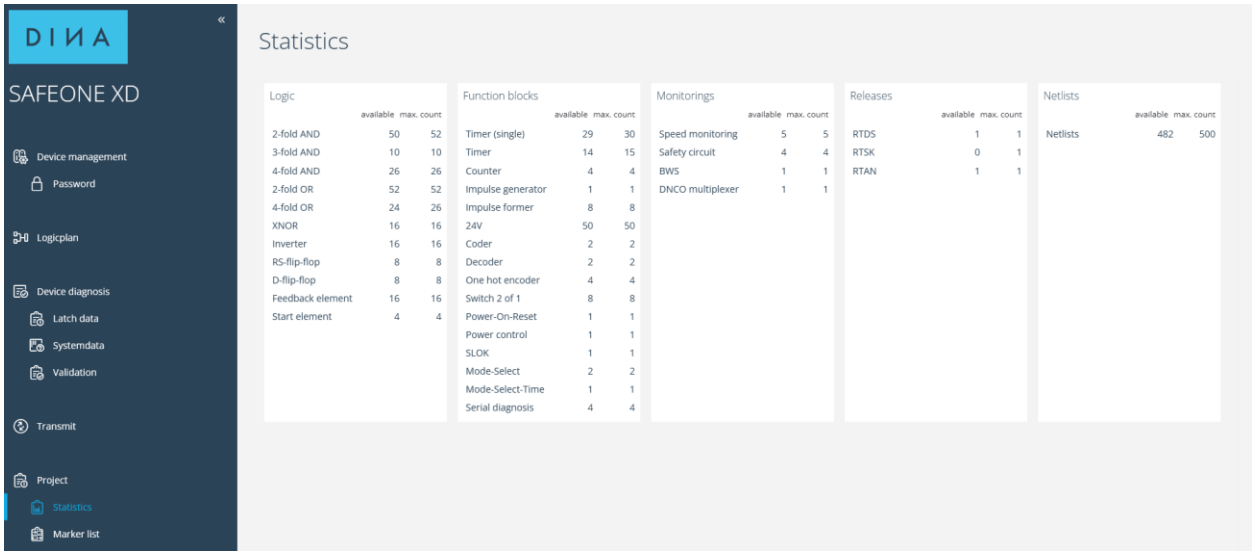
9 Project

You can enter project information on this screen.



9.1 Statistics

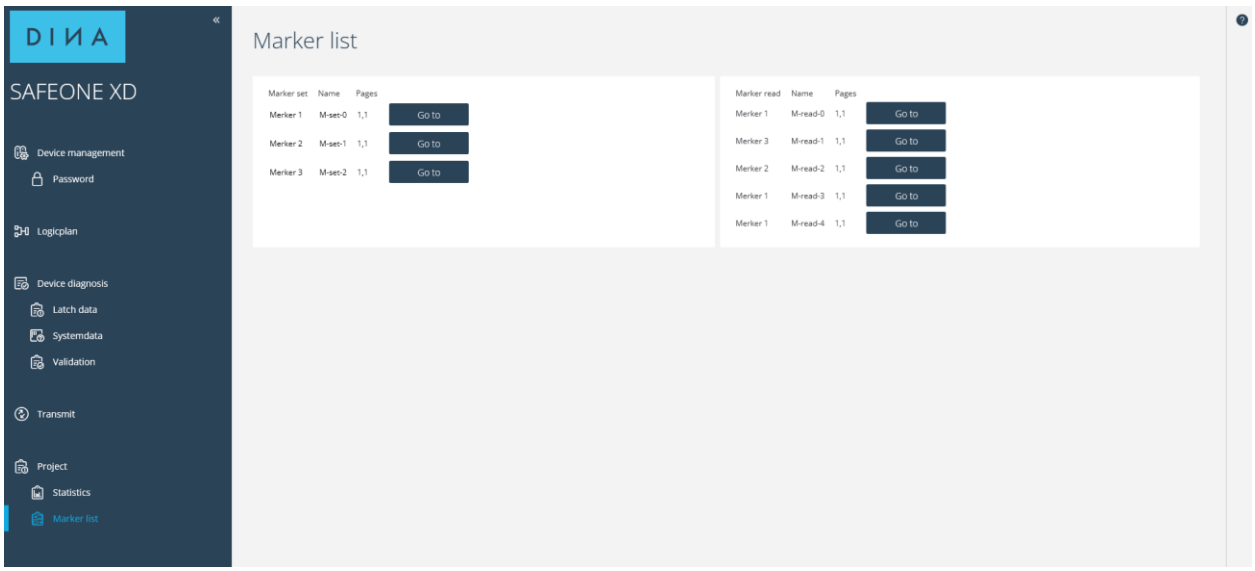
The statistics screen provides a list indicating which and how many blocks and netlists are still available.



9.2 Marker list

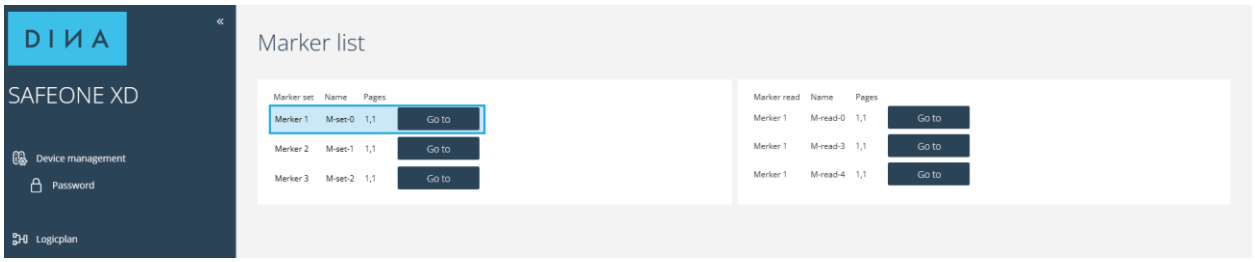
The marker list will show all added markers, as well as a reference pointing out where these markers are being used.

Clicking on the “Go to” button will take you directly to the corresponding element in the logic diagram.



► Select a marker from the “Set marker” list.

◄ The tile on the right will show a list with the locations where this marker is read (“Read marker”).



10 Device diagnostics

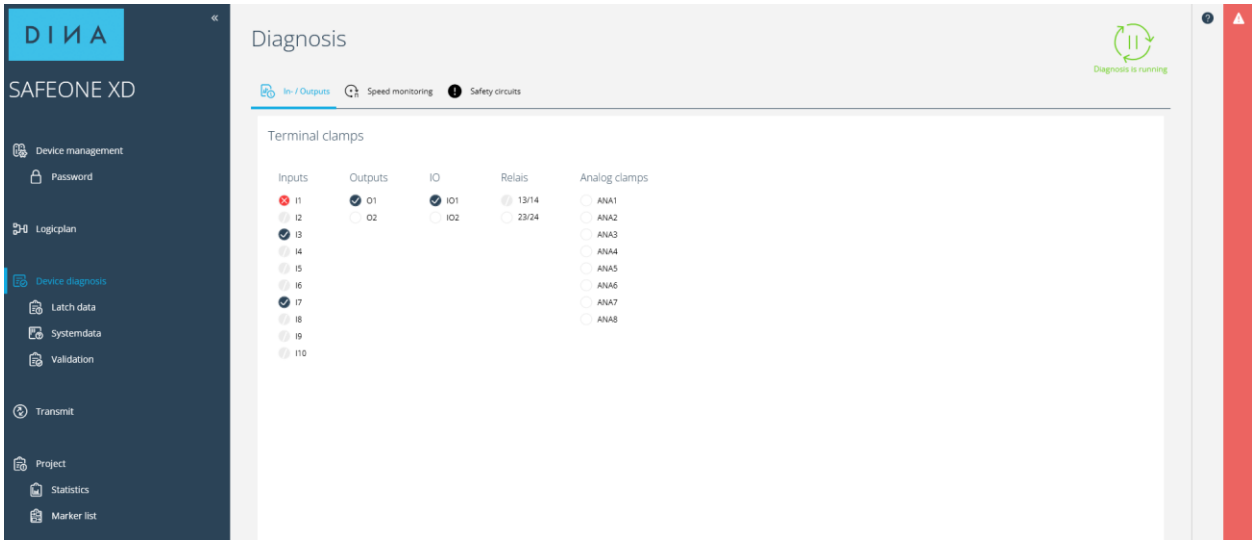
In addition to online diagnostics, GO:BEYOND®.logic features a device diagnostics function. This makes it possible to read the device's operating states, including I/O terminal states, speeds, operating modes, and safety circuit states.

10.1 I/O

► Click on the "Start diagnosis" button to run the diagnostics.

The input and output states will be shown as follows:

= aus	Not ON
= an	ON
= Fehler	Fault (e.g., connected incorrectly)
= offline	Not in use



10.2 Speed monitoring

► Click on the "Start diagnosis" button to run the diagnostics.

► Select the monitor you want.

The following states will be read and shown:

(1) Frequency vs. time diagram used to show movement visually:

Blue line: Actual value

Red line: Maximum frequency

(2) The current values and the active operating mode

(3) The states of the outputs on the speed function block and the RTDS enable signal.

10.2.1 Latch data

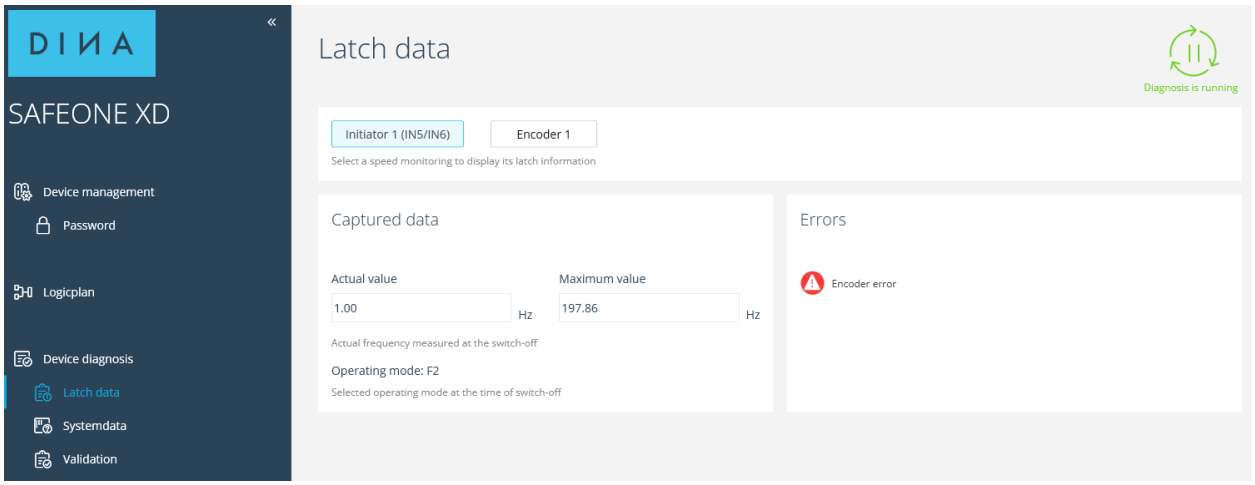
This screen will show shutdown-relevant data.

Shutdowns caused by speed monitoring can be due to various causes.

In the event of a shutdown, the speed monitor's state will be latched (i.e., temporarily stored) and shown as long as the supply voltage is not turned off and the latch function is not reset.

The following will be read and shown:

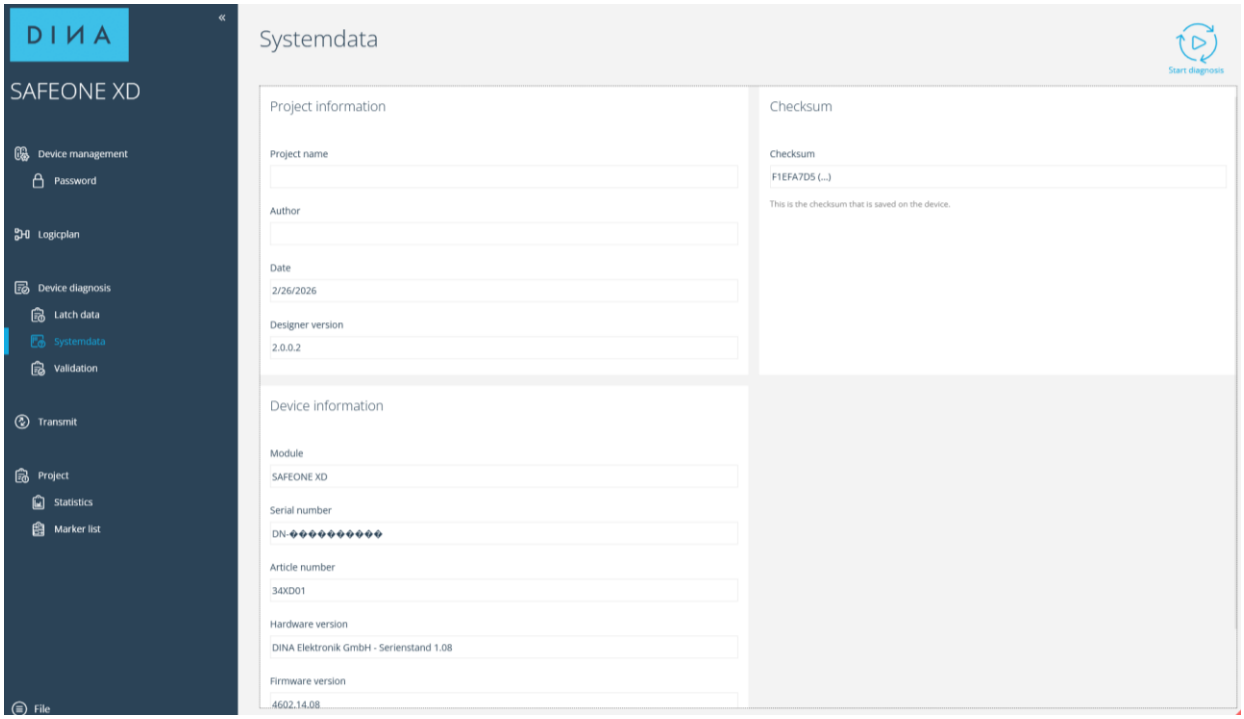
- Measured actual value
- Configured limit
- Current operating mode
- Fault causes



10.3 System data

Device data is read and shown on this screen:

- Project information
- The checksum for the application stored on the device
- Device information



10.4 Validation

The configuration software features a validation tool that can be used to validate the safety function.

This function reduces the configured maximum speed by 10%, 20%, or 30% to force the speed output to be switched off.

In order to use the validation routine, you will need to enter the device password.

You can then generate a validation report.

► Run the diagnostics.

► Select a monitor for validation.

► Select the validation level you want.

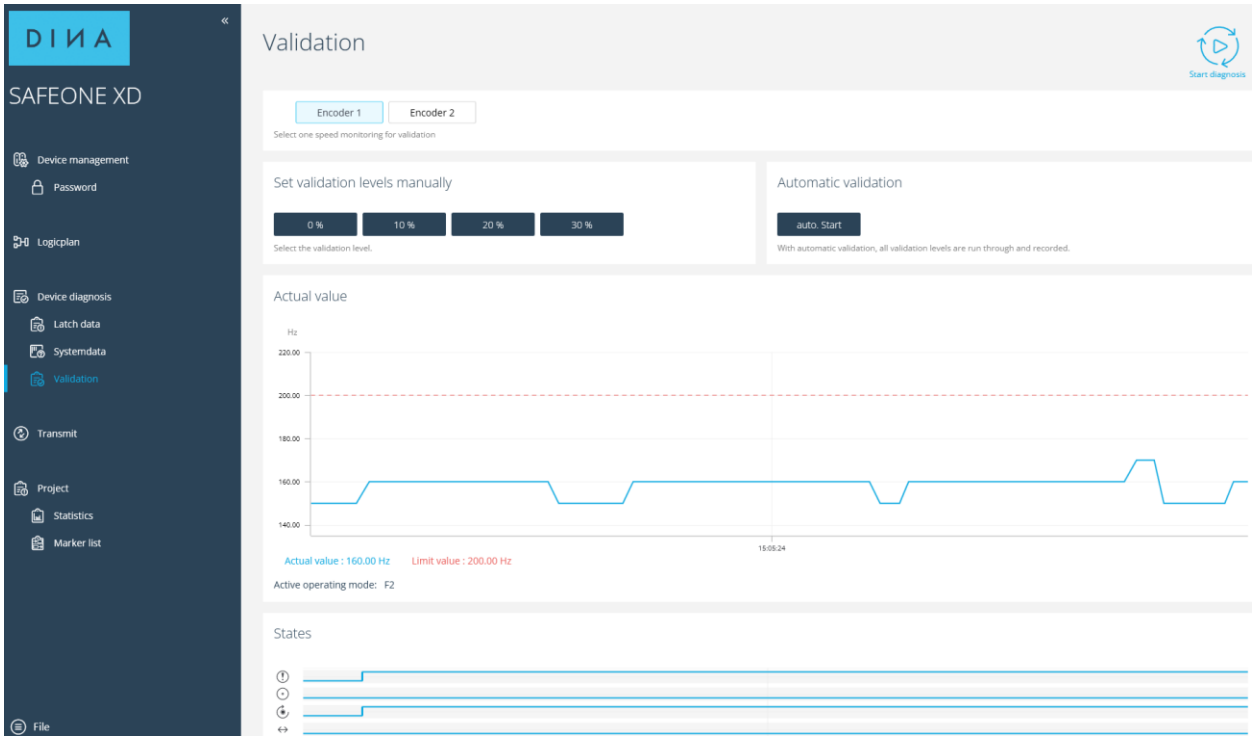
► If the device is password-protected, you will be asked to enter the password once.

The corresponding states will be recorded and can be printed out in a report once the validation process is done. Please note that the validation level will be automatically reset after 20 s.

► Stop the diagnostics in order to stop recording and generate a report.

Note

In order to be able to generate a report, the project must have been saved first!



Alternatively, you can run an automatic validation routine by clicking on the “auto. Start” button. The routine will go through and reset the validation levels one by one. This automatic validation routine will stop automatically. Please note that you can also generate a report with this routine.