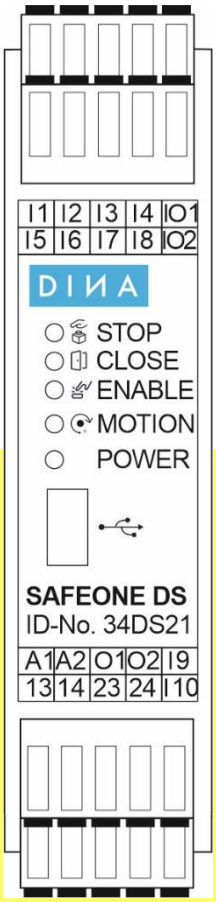
SAFEONE DS

Manual



Configurable safety system

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This manual is valid for:

Description	**ID-No.**
SAFEONE DS	34DS21

Legal information

Handbook:	Manual
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Table of Contents

1 Structure of the document

1.1 Conventions

Information of particular important is emphasized in this documentation through the use of symbols, typography or formulations.

1.1.1 Emphasizing information

The following symbols indicate important information:

	Degree of hazard (e.g. WARNING): Triangular symbols indicate the degree of hazard in warnings.
	Type of hazard (e.g. electrical shock – dangerous voltage): Triangular symbols indicate the type of hazard in warnings.
	Information: Additional clarification.
	Tip: Additional information to help optimize the workflow.

1.1.2 Emphasizing paragraphs using typography

The following typography is used to emphasize paragraphs with special functions:

►	Indicates an instruction.
◄	Indicates an expected reaction.
▼	Indicates an unexpected reaction.
■	Indicates an item in a list.

1.1.3 Emphasizing words using typography

The following typography is used to emphasize words with special functions:

(1)	Represents a numbered item in a figure.
→	Indicates a cross-reference to another page, figure or document.

1.2 Your opinion is important to us!

We do all we can to provide complete, accurate documentation for the product. If you have any suggestions for improvement or advice for us, please share your thoughts with us. Send us your comments by e-mail to the following address.

E-mail: info@dina.de

2 Safety

2.1 Warnings

2.1.1 Function of warnings

Warnings warn users about hazards when handling the product. The hazards are classified, specified, described and supplemented with information about how to avoid them.

- If there is a warning before a list of instructions, the hazard is present throughout the entire activity.
- If there is a warning immediately before an instruction, the hazard is present during the next step.

2.1.2 Design of warnings

All warnings are indicated by a signal word and a warning symbol. The different combinations of the signal word and warning symbol indicate the degree of danger.

	**DANGER** For an immediate hazard that will result in severe injuries or death.
	**WARNING** For an immediate hazard that could result in severe injuries or death.
	**CAUTION** For a potentially hazardous situation that could result in injuries.
	**CAUTION** For a potentially harmful situation in which the product or an item near it could be damaged.
	**CAUTION** For a hazard that could cause environmental damage.

2.1.3 Hazard symbols

Note

The warning symbol may be present alongside another hazard symbol that represents the type of hazard, in order to attract the reader's attention.

Hazard symbols are indicated by a triangular symbol in the context of warnings. The following hazard symbols are used in this documentation:

Electric shock – dangerous voltage!

2.2 Qualification of personnel

DINA Elektronik GmbH distinguishes between specialist staff with different qualifications when it comes to carrying out work on the product. The minimum required qualifications are specified for each task and are defined as follows:

2.2.1 Electrician

Specialist, who installs, maintains and repairs the electrical system in the product. A specialist is a person whose specialist training means that they have the knowledge and experience, including knowledge of relevant regulations, necessary to assess the work assigned to them and the potential hazards.

Note

When evaluating a person's specialist training, multiple years of work in the relevant field may also be taken into account.

→ **DIN VDE 1000-10** Requirements for persons working in a field of electrical engineering.

2.2.2 Electrical designers

Specialists, who design the electrical system and the product. A specialist is a person whose specialist training means that they have the knowledge and experience, including knowledge of relevant regulations, necessary to assess the work assigned to them and the potential hazards.

Note

When evaluating a person's specialist training, multiple years of work in the relevant field may also be taken into account.

→ **DIN VDE 1000-10** Requirements for persons working in a field of electrical engineering.

2.3 Intended use and improper use

The product has exclusively been developed for use for the purpose described here. The specifications set out in these operating instructions must be strictly complied with.

- **SAFEONE DS** is a safety switchgear
- The safety module is intended for use on machines and plants to prevent hazards from arising.

Any other form of use is regarded as improper use.

If the product is

- not used as intended,
- improperly maintained or
- incorrectly operated,

the manufacturer will not assume any liability for any damage that results. In this case, the risk shall be borne exclusively by the user.

2.3.1 Certification data

The product is certified as safety equipment in accordance with:

▪ DIN EN ISO 13849-1:2016-06, Category 3, PLd	
▪ DGUV Test: GS-ET-20:2016-10 ▪ EC type examination certificate	Notified body: **DGUV Test** Prüf- und Zertifizierungsstelle, Elektrotechnik, Fachbereich: ETEM Gustav-Heinemann-Ufer 130 D-50968 Köln (Reg.-Nr.: 0340)
▪ EMC Directive	Certified by: ELMAC GmbH Bondorf
▪ CNL, USL	File E227037
▪ QA system certified as per DIN EN ISO 9001:2015	Certified by: DQS GmbH, 60433 Frankfurt am Main, Germany

Note

You can download the certificates from our website:

→ **https://www.dina.de/downloads**

2.4 Documentation

Operating instructions contain instructions on how to use a product safely, correctly and cost-effectively. Follow the instructions in these operating instructions in order to prevent hazards, avoid repair costs and standstill, and improve the reliability and service life of the product. You must read the operating instructions and ensure that you understand them.

- ► Before working with the product, read the documentation
- ► Always ensure that the operating instructions are available where the product is in use.

2.5 Safety regulations

The safety regulations listed below must always be complied with. In the event that these safety regulations are not complied with or the device is used improperly, **DINA Elektronik GmbH** accepts no liability for any resulting injury or damage.

- The product must only be installed and commissioned by a skilled electrician or a trained, instructed person, who is familiar with these operating instructions and the applicable specifications regarding occupational health and safety and accident prevention.

WARNING

Danger to persons and materials! In the event that specifications are not complied with, this can result in death, severe injuries or significant material damage.

- ► Observe VDE, EN and local regulations, in particular with regard to protective measures.

- If the emergency stop is used, either the integrated restart prevention function must be used or the machine must be prevented from restarting automatically using a superordinate control system.
- When installing the device, the required distances as per DIN EN 50274, VDE 0660514 must be taken into account.

► During transport, storage and operation, comply with the conditions set out in EN 60068-2-1, 2-2.

► Assemble the device in a control cabinet with at least IP54 degree of protection. Otherwise, dust and moisture can impair the functions. The device must be installed in a control cabinet.

► Ensure that the output contacts have sufficient protective circuitry for capacitive and inductive loads.

► Follow the specifications in the general technical data.

Note

More detailed information can be found in the → **Technical data** section.

WARNING

Electric shock – dangerous voltage! During operation, switching devices conduct dangerous voltages.

► Never remove protective covers from electrical switching devices during operation.

► Replace the device the first time a fault occurs.

► Dispose of the device in accordance with nationally applicable environmental regulations.

2.5.1 Retrofitting and conversion

- Unauthorized conversion voids any warranty. This can cause hazards that can lead to severe or even fatal injury.

2.5.2 Basic safety regulations

The safety regulations listed below must always be complied with. In the event that these safety regulations are not complied with or the device is used improperly, **DINA Elektronik GmbH** accepts no liability for any resulting injury or damage.

- The product described here has been developed to perform safety-related functions as part of an entire system.
- The entire system is made up of sensors, analysis units, reporting units and safe switch-off concepts.
- It is the responsibility of the manufacturer of a system or machine to validate the correct overall function.
- The manufacturer of the system is obligated to check and document the efficacy of the implemented safety concept within the entire system. This documentation must be produced again every time the safety concept or safety parameters are modified.
- The manufacturer's specifications for the system or machine with regard to maintenance intervals must be complied with.
- **DINA Elektronik GmbH** is not able to make any guarantees regarding the properties of an overall system not designed by the company.
- **DINA Elektronik GmbH** accepts no liability for any recommendations given or implied in the following description.

- No new guarantee, warranty or liability claims that go beyond **DINA Elektronik GmbH**'s general delivery conditions can be derived from the following description.
- To prevent EMC disturbances, the physical environmental and operating conditions where the product is installed must correspond to the EMC section of DIN EN 602041.
- If contact outputs are used, the safety function must be requested at least once per month for Performance Level (e) and once per year for Performance Level (d).

2.6 Working on live parts

WARNING

Electric shock – dangerous voltage! Touching live components can cause severe or even fatal injury, depending on circumstances, as a result of an electric shock.

► Never assume that a circuit is dead.

► Always check circuits as a safety precaution! Components being worked on may only be live if this is absolutely necessary and stipulated.

► Accident prevention regulations (e.g. VBG4 and VDE 105) must be observed during all work.

► Only use suitable, intact tools and measuring equipment.

3 EC declaration of conformity

DINA

Original EG-Konformitätserklärung

(gemäß der Richtlinie 2006/42/EG, Anhang II, 1A)

Original EC-Declaration of Conformity

(according to Directive 2006/42 / EC, Annex II, 1A)

DINA Elektronik GmbH
Esslinger Str. 84
72649 Wolfschlugen
Deutschland

Wir erklären, dass das folgende Produkt allen einschlägigen Bestimmungen der Richlinie 2006/42/EG entspricht.
We declare, that the following product fulfils all the relevant provisions of Directive 2006/42 / EC.

Produkt/Product	Funktion/Function
SAFEONE DS Sicherheitsschaltgerät Safety device ID-No.: 34DS21	Kompaktes, konfigurierbares Sicherheitsschaltgerät zur sicheren Maschinenüberwachung Compact, configurable safety module for safe machine monitoring .

Weitere EU-Richtlinien/ Further EC- directives	
2014/30/EU	EMV-Richtlinie/EMC-Directive
2011/65/EU	RoHS Richtlinie/RoHS-Directive

Benannte Stelle/Notified Body	EG Baumusterprüfbescheinigung/EC Type-Examination certificate
DGUV Test Prüf- und Zertifizierungsstelle, Elektrotechnik Fachbereich Energie Textil Elektro Medienerzeugnisse Gustav-Heinemann-Ufer 130 D-50968 Köln (Kenn-Nr. 0340)	Reg.-Nr./No.: ET 22049

Bevollmächtigter für die Zusammenstellung der technischen Unterlagen/Authorized representative for the compilation of the technical documents.
DINA Elektronik GmbH Esslinger Str. 84 72649 Wolfschlugen Deutschland

Wolfschlugen, 26.07.2022

Markus Henzler
Entwicklung

4 Product description

The **SAFEONE DS** safety switchgear is a compact, configurable module for safe machine monitoring. It includes the safety functions

- Speed and standstill monitoring using sin/cos or TTL encoders
- Emergency stop
- Protective door
- Acknowledge button

Therefore a range of safe digital and analog inputs, semiconductor outputs and contact outputs are available.

The status of the safety functions and the speed monitoring are indicated by LEDs.

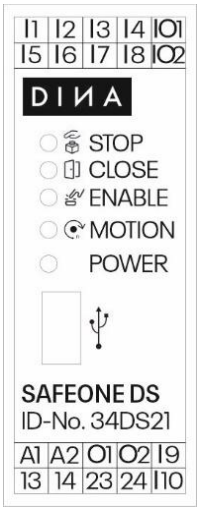
Parameterization and online monitoring as well as a validation function is possible with the **GO:BEYOND** configuration software.

4.1 Application examples

A list of potential application examples for the **SAFEONE DS** module is provided below:

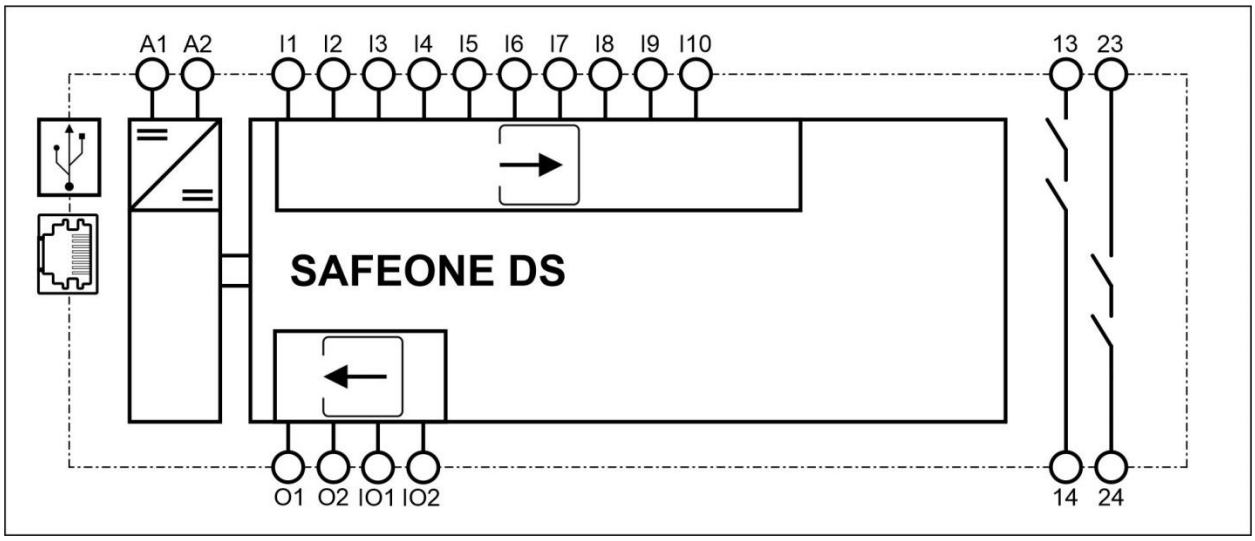
- Metalworking machines
- Woodworking machines
- Filling systems
- Packaging machines
- Escalators
- Elevators
- Driverless transport systems

4.2 Connections



I1 and I2	Inputs for emergency stop
I3 und I4	Inputs for protection door
I5 und I6	Inputs for acknowledgement button
I7	Input for selecting the operating mode 2
I8	acknowledgment input for emergency stop, speed monitoring, error messages
IO1	contact duplication protection door
IO2	contact duplication acknowledgement
A1	Power supply +24 V DC
A2	Power supply 0V
O1	Output delayed emergency stop
O2	Output „SAFEONE operational“
I9	Input “return protective door”
I10	Input “return Acknowledge button”
13/14	Contact output speed monitoring and emergency stop
23/24	Contact output standstill
USB-Port	Mini-USB
LED 1	Status of emergency stop
LED 2	Status of protective door
LED 3	Status of Acknowledge button
LED 4	Status of speed monitoring
LED 5	PWR on/off, operational readiness

4.3 Block diagram




Inputs


Outputs


RJ45


USB

5 Safety functions

5.1 Description and usage

The inputs are intended for the connection of various safety devices and offer the following safety functions.

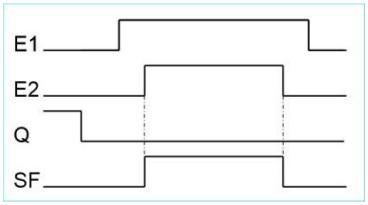
- Emergency stop
- Protective door
- Acknowledge button

The safety functions are configured using the GO:BEYOND configuration software. Various parameters are available for this.

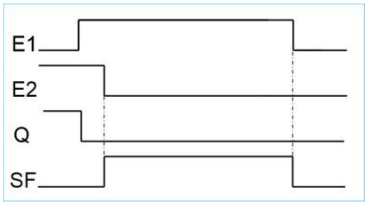
- The safety functions are controlled statically or antivalently.
- Initial setting of the inputs required or not required after power on
- The safety functions can be acknowledged automatically (with 24V at the acknowledgment input) or manually (falling edge at the acknowledgment input).

5.1.1 Control (E1, E2) of a safety function (SF) and acknowledgement (Q) with a falling signal edge

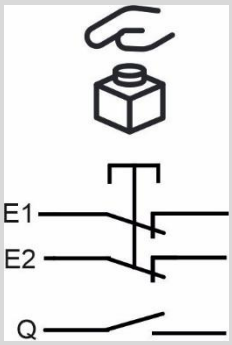
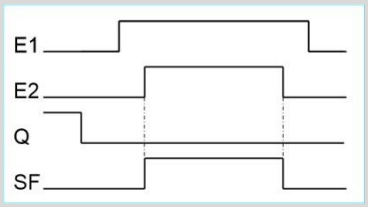
static



antivalent

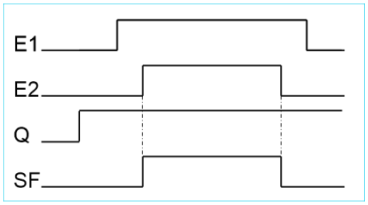


Example: Emergency stop with static control E1, E2 and acknowledgment Q with a falling signal edge.

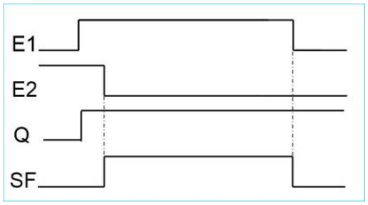
Diagram	**Signal**
	

5.1.2 Control (E1, E2) of a safety function (SF) and automatically acknowledgement (Q)

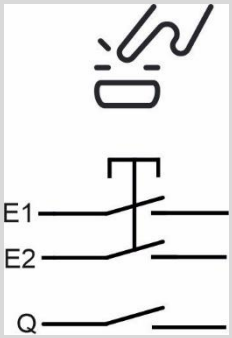
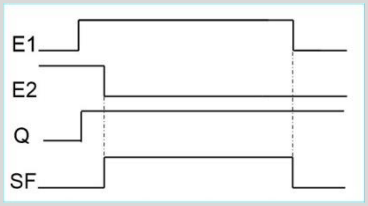
static



antivalent

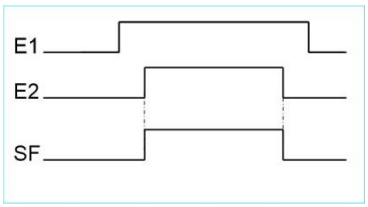


Example:: Acknowledge button with antivalent control E1, E2 and automatically acknowledgment Q

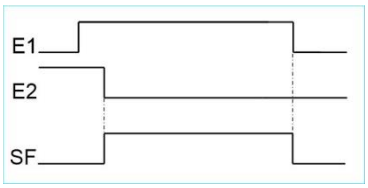
Diagram	Signal
	

5.1.3 Control (E1, E2) of a safety function (SF) without acknowledgement (Q)

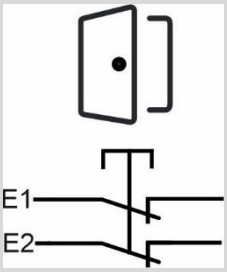
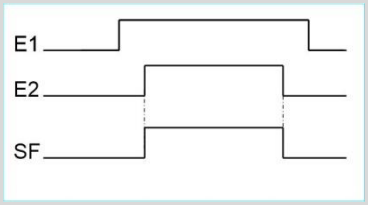
static



antivalent



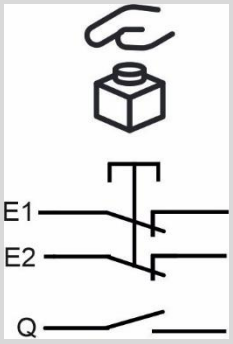
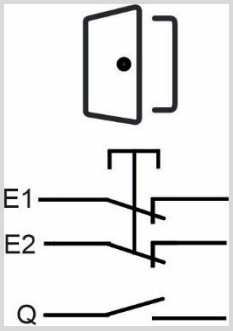
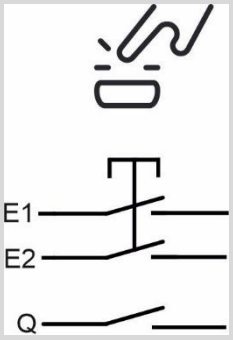
Example: Protection door with static control (E1, E2) without acknowledgement (Q).

Diagram	Signal
	

5.1.4 Basic position of inputs E1 and E2 after Power on

If this option is selected, the inputs E1 und E2 must first been brought to the basic position after Power off/on, bevor the safety function can be switched on again.

5.2 Terminals of the safety functions at SAFEONE DS

	Input E1	Input E2	Acknowl-edgement Q	Output	Contact du-plication
Emergency stop					
	I1	I2	I8	Relay 13-14 and O1 off delayed	–
Protection door					
	I3	I4	I9	Operating mode 1 Automatic mode	IO1
Acknowledge button					
	I5	I6	I10	Operating mode 3 Agree mode	IO2

6 Standstill- and speed monitoring

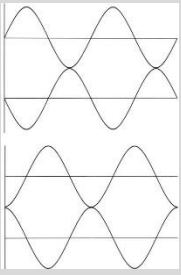
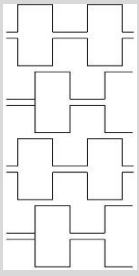
The SAFEONE DS safety switching device detects movements, evaluates them and ensures safe shutdown in the event of overspeed and movement from a standstill. A speed is recorded at the RJ45 socket via sin/cos or TTL measuring systems.

6.1 Features of rotation monitoring

- Safe monitoring of one axle
- Connection option
  - 1 Incremental encoder
- Frequency range from 50Hz to 300kHz
- Measured values
  - Standstill
  - Speed
- 3 operating modes
- A range of cable adapters with different plug connectors are available for connecting the speed monitoring to the measurement system.
  For more information, please contact **DINA support** at www.dina.de.

6.1.1 Requirements for the increment encoder

It is possible to assess the following incremental encoders:

Measurement system		**Measurement system**	
▪ Sin/Cos 1Vss		▪ TTL 1 V– 5 V	

6.1.2 Operating modes

There are three operating modes available with the SAFEONE DS. A speed to be monitored and a release delay (time until the operating mode is switched off when changing the operating mode) can be parameterized for each operating mode.

- When the protective cover is closed, the “Automatic” operating mode is active.
- Connecting input I7 activates operating mode 2.
- In “enabling mode”, the inputs for the enabling acknowledge must be connected.

If none of the above operating modes are active, the standstill speed is monitored.

	Input	**Operating mode**	**Acknowledgement Q**	**Output**
Speed monitoring				
	Protective door acknowledgement	Automatic	I8	Relay 13/14
	I7	Operating mode 2	I8	Relay 13/14
	Acknowledge button	Enabling mode	I8	Relay 13/14
Standstill monitoring				
	−	Standstill	−	Relay 23/24

Operating modes

Note

If several operating modes are selected at the same time, the following priority applies: Automatic > operating mode 2 > enabling mode > standstill

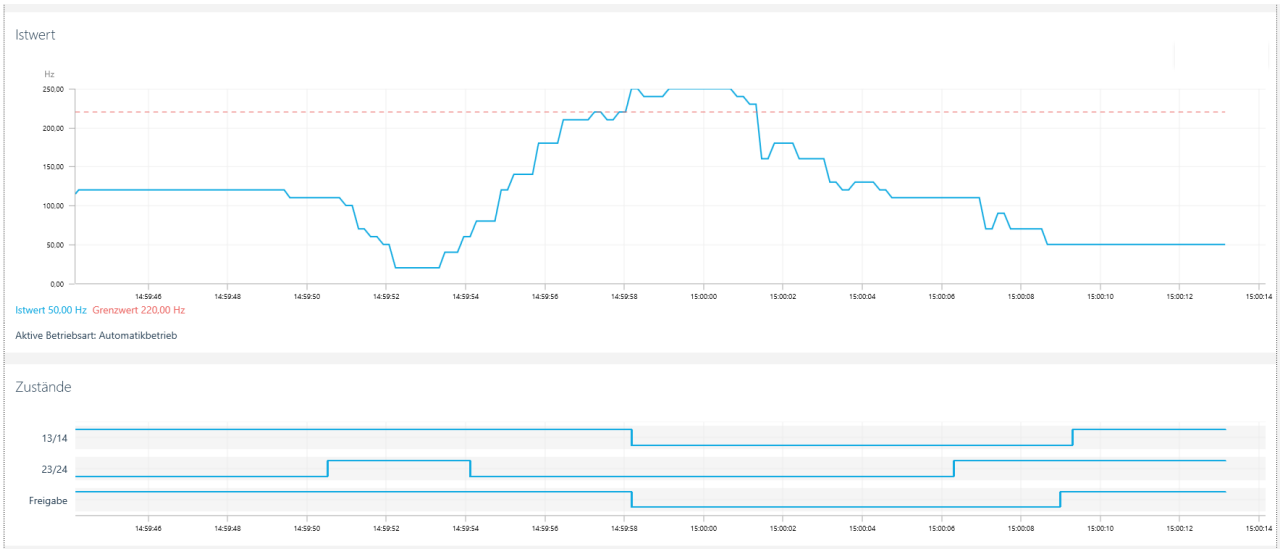
6.1.3 Drive monitoring outputs

If the parameterized speeds are exceeded, an internal or external error opens the enabling current path 13/14, 23/24 immediately. The device is in a safe switching state.

The speed output 13/14 is switched back on by a high signal at the release input Q when the current speed (minus 12% hysteresis) is smaller than the parameterized maximum speed.

The standstill output 23/24 does not require an enable. It switches on when the standstill speed is undershot.

If no operating mode is selected, outputs 13/14 and 23/24 switch off when the standstill speed is exceeded.



Switching behavior of the outputs

6.1.4 Optional functions

Fan monitoring

This function ensures safe shutdown in the event of underspeed. A minimum speed can be monitored. The speed output closes when the minimum speed is exceeded. The stop output opens when v > v standstill.

Safe Stop

This function leads to the safe switching off of the stop output if the sensor is not connected.

7 Diagnostics and switching status displays

The module has an LED indicator for

- Ready to use
- Status of the safety function
- Speed monitoring status

In addition, the parameterization software offers an online diagnosis. The description of this can be found in the "Configuration and commissioning" chapter.

7.1 LED indicators

Legend


LED on


LED off


LED flashing

LED	State	Status
 Stop		Emergency stop actuated
		Emergency stop not actuated
		Error
 Close		Protection door open
		Protection door closed
		Error
 Enable		Acknowledge button not actuated
		Acknowledge button actuated
		Error

 Motion		Actual speed is lower than the parameterized standstill speed. The enabling current path 13/14 and 23/24 is closed.
		Actual speed is lower than the configured maximum speed, but higher than the standstill speed. The enabling current path 23/24 is open.
		Actual speed is greater than the configured maximum speed. The enabling current path 13/14 is open.
 Motion Bei Lüfter-betrieb		Actual speed is greater than the parameterized set speed. The enabling current path 13/14 is closed.
		Actual speed is lower than the parameterized set speed. The enabling current path 13/14 is open.
Power		PWR off
		PWR on, operational
		PWR on, not operational, data transfer

7.2 Signal output O2 for operational readiness

The safe semiconductor output O2 indicates operational readiness. It switches off when the device malfunctions.

8 Validation function

To validate the safety function, a validation tool is available in the configuration software.

With this function, the configured maximum speed will be reduced or increased by 10%, 20% or 30%, thereby forcing a switch-off of the speed output.

The validation requires the entry of the device password.

A validation protocol can then be created.

9 Configuration and commissioning

The configuration of the safety switchgear SAFEONE DS is made via the configuration software GO:BEYOND.
The parameterization is described in the following chapters.

WARNING

Danger through incorrectly set parameters
Incorrectly set parameters for motion monitoring can lead to dangerous machine or system states.

- ► Make sure that the parameters entered or selected in the software correspond to the connected hardware.
- ► Carry out a function test after parameterization and after every change in the parameterization as part of the validation.

Note

Assistance during validation and commissioning can be a separate measuring device or the diagnostic function (display of actual and limit values) in conjunction with the validation function in the configuration software.
The diagnostic function is **not** safety-related.

9.1 System requirements

The configuration software is compatible with the following operating systems

- MS Windows 8
- MS Windows 10
- Hard disk space min. 1 GB
- Main memory min. 2 GB
- Resolution 1920 x 1080 px
- Scaling 100%
- Interface USB

9.2 Installation of the Configurations-Software

The configuration software can be found in the download area at **www.dina.de.**

► Always work with the latest version of the software.

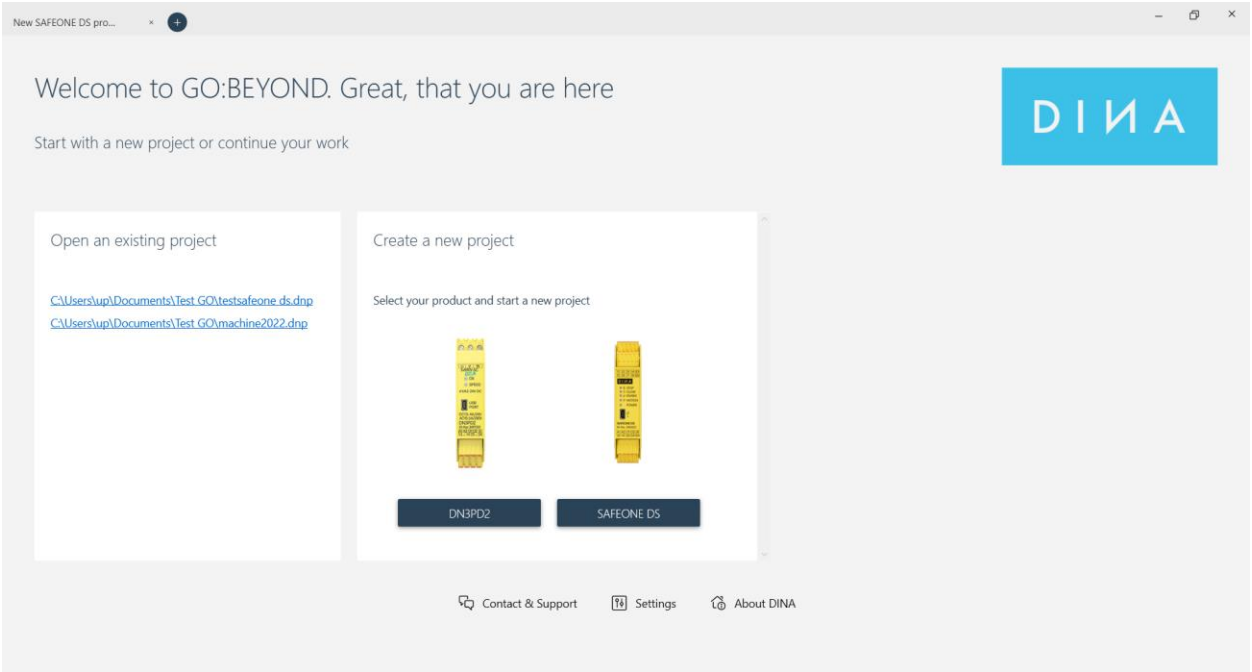
Installation of the software:

► Download the software.

► Start the installation.

► Follow the instructions of the installation wizard.

► Choose the language about “Settings” in the start screen.



9.3 Connection to the PC

Communication between the safety switchgear and the configuration software takes place via the USB interface.

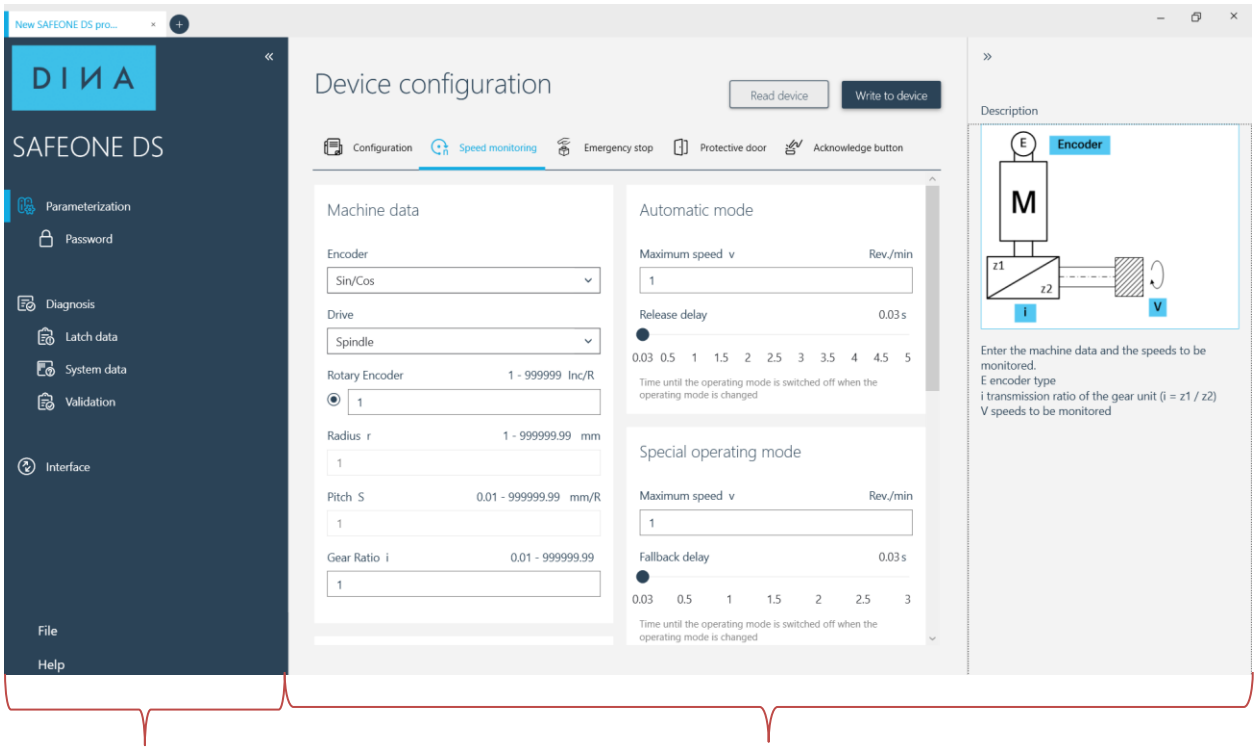
► Connect the safety relay to the PC using a suitable connection cable.

The interface is suitable for standard USB cables.

The transmission speed can be increased if the waiting time is reduced to 1ms in the interface settings (extended connection settings - BM setting).

9.4 User interface

The configuration software has the following user interface.



Navigation area

Edit- and Action area

Navigation area
In the navigation area you can select the following areas:

- Parameterization — edit parameters, password management
- Diagnostics — display of online values, error messages, switch-off-relevant data, device ID, validation
- Interface — selection of the interface
- File — new creation / saving / opening / printing / closing a project
- Settings — display of the working directory
- Help — help-menu

Edit- and Action area

This area offers the following functions:

- Edit parameters
- Read out the parameter from the switch gear to the configuration-software
- Transmit the parameter from the configuration-software to the switch gear
- Help menu, error messages

9.5 Read out the project

You can read out the parameterization saved on the safety relay.

► Start the configuration software

► Open the "Interface" menu item and select the COM port and click the button “use”

► Open the "Parameterization" menu item.

► Click the "Read out device" button.

► If the device is protected with a password, enter the valid password.

9.6 Create a project

► Start the configuration software

► Open the "Interface" menu item and select the COM port and click the button “use”

► Open the "Parameterization" menu item.

► Edit the parameter.

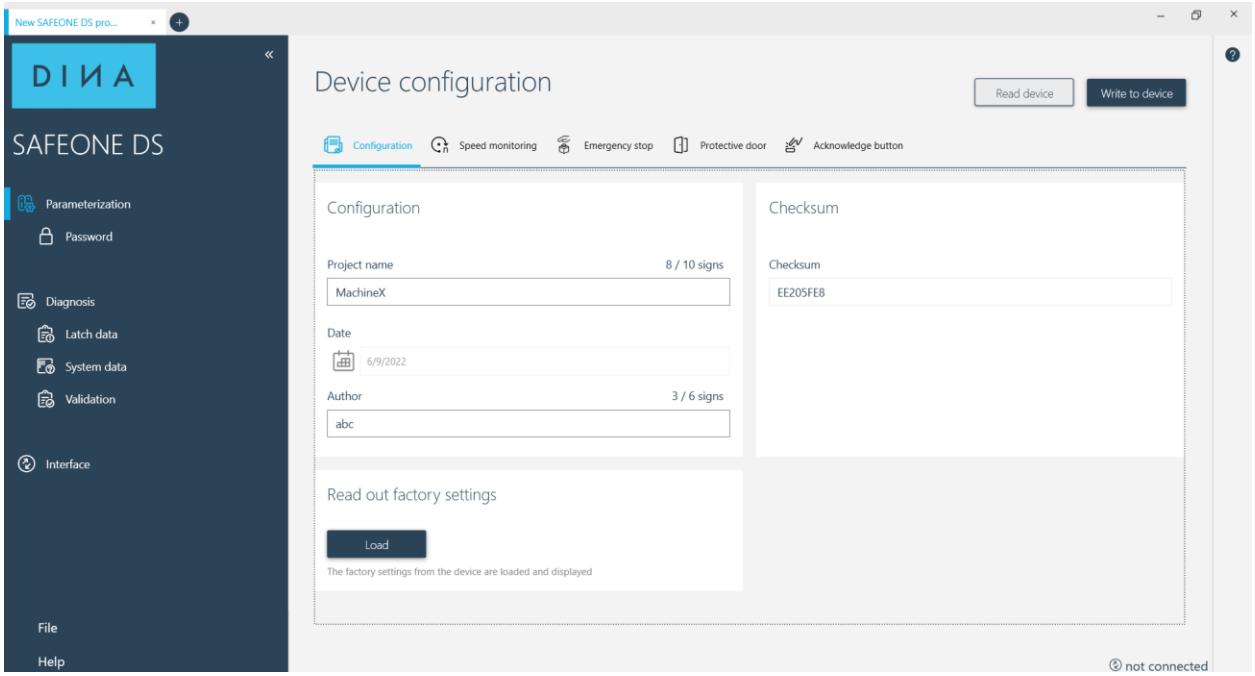
► Transmit the project to the device with the button „save on device“.

► If the device is protected with a password, enter the valid password.

► Save the project.

9.7 Device parameterization

The device is parameterized via the Parameterization menu.



9.7.1 Configuration

► Edit project name and author.

9.7.1.1 Checksum

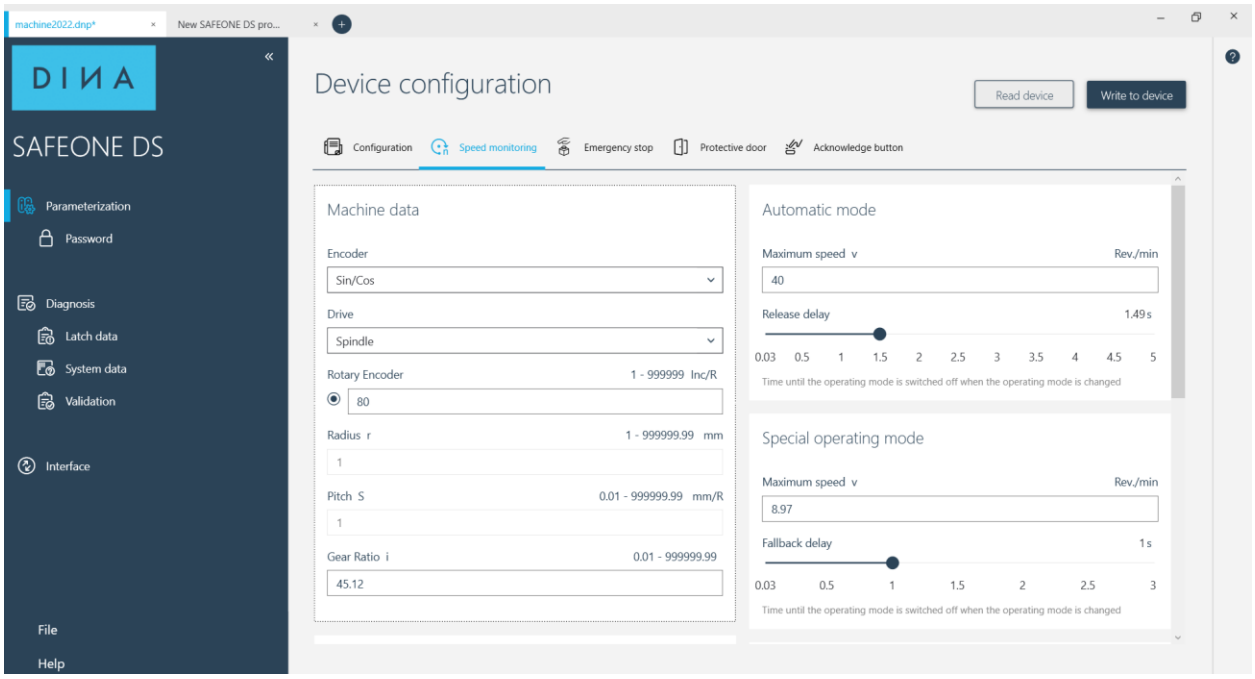
The checksum of the project is displayed here.

9.7.1.2 Read out factory settings

With the "Load" button, the factory settings are read from the device and entered in the appropriate fields.

9.7.2 Speed monitoring

Enter the machine-specific data and the maximum speeds.

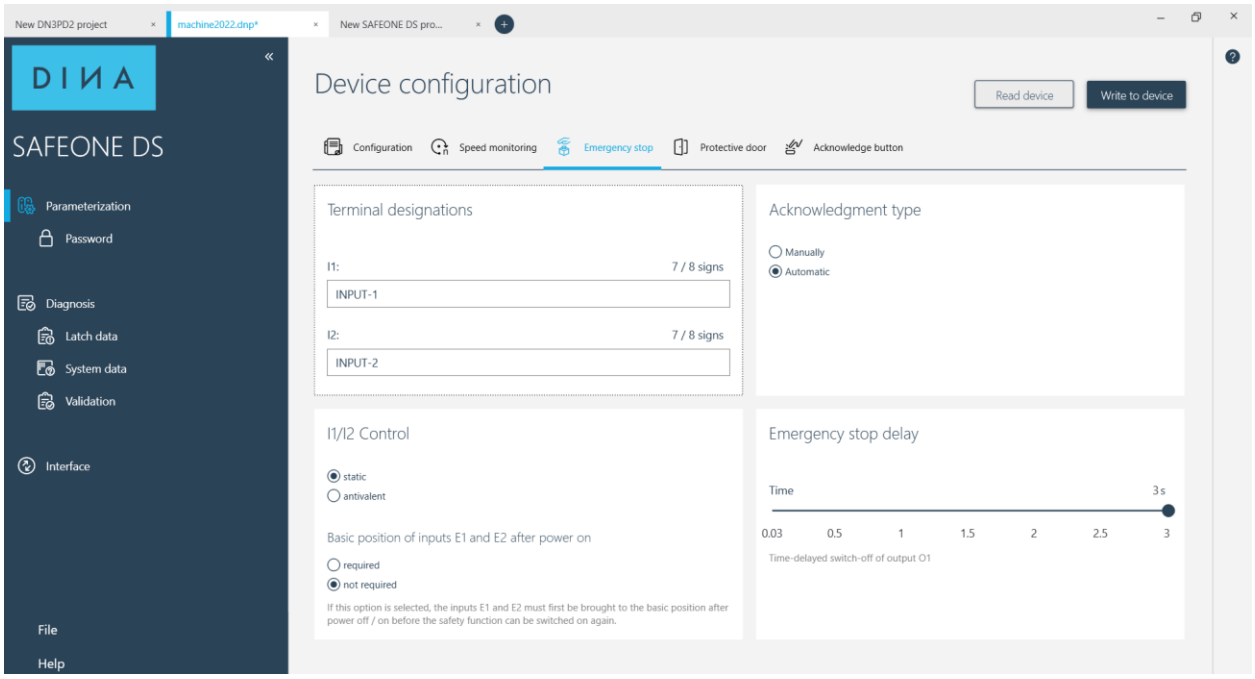


Speed monitoring	Range	Description/note
Drive	Axis, spindle, round axis	
Encoder	Sin/Cos, TTL	
Pitch	0,01 – 999999,99 mm/U	
Gear Ratio	0,01 – 999999,99	
Radius	1 – 999999,99 mm	
Maximum speed	50 Hz – 300 kHz	
Off-delay time Automatic mode	30 ms – 5 s	Time until the operating mode is switched off, when the operating mode is changed.
Off-delay time Special operating mode	30 ms – 3 s	Time until the operating mode is switched off, when the operating mode is changed.
Off-delay time Agree mode	30 ms – 1 s	Time until the operating mode is switched off, when the operating mode is changed.

Speed at standstill	50 Hz – 300 kHz	
Tolerance	0 – 20 %	Tolerated deviation of the maximum speed.
Switch-off delay	0 – 750 ms	Delayed shutdown of the speed output.
Safe stop	selected	If there are no sensors, not only the speed output but also the standstill output is switched off.
Fan	selected	The entered speeds are regarded as minimum speeds. The speed output switches off when the speeds are undershot.
Calculated frequencies	50 Hz-300 kHz	Are automatically calculated and displayed based on the machine data and entered speeds.

9.7.3 Emergency stop

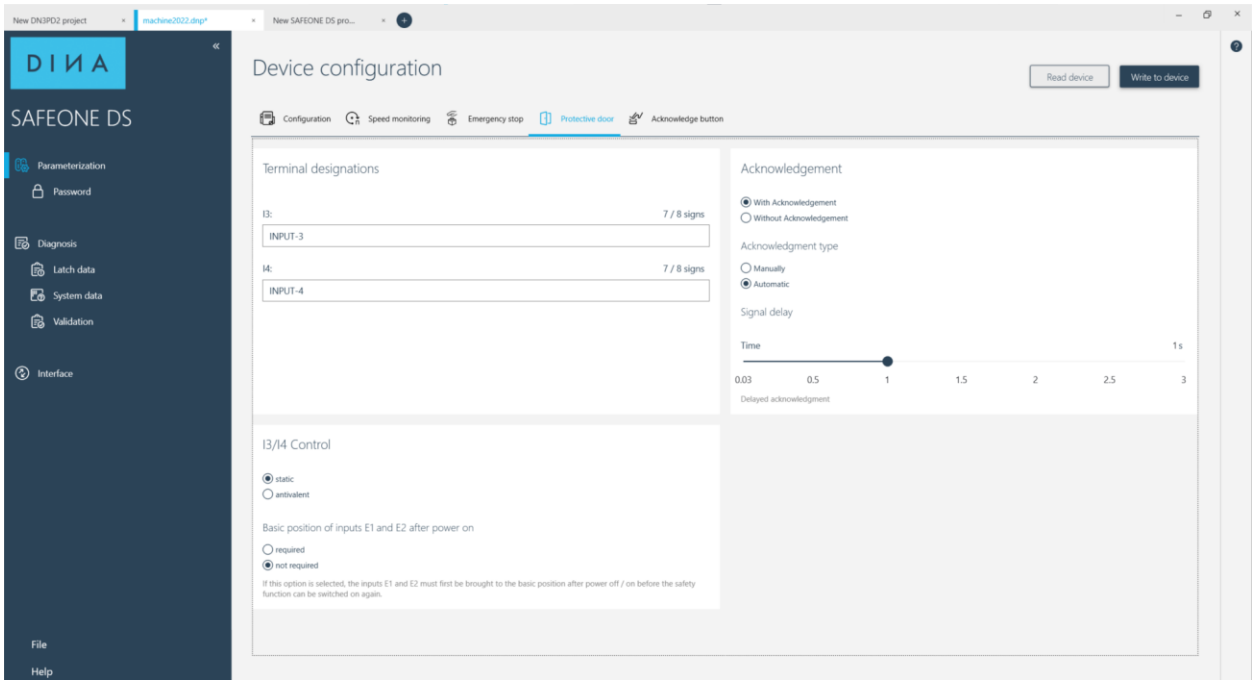
► Configure the emergency stop function



Emergency stop	**Range**	**Description/note**
Terminal designations	Maximum 8 signs	
Control	Static or antivalent	
Basic position after power on	required	The inputs E1 and E2 must first be brought to the basic position after power off/on before the safety function can be switched on again.
Acknowledgment type	▪ Manual ▪ Automatic	
Emergency stop delay	30 ms – 3 s	Time-delayed switch-off of output O1

9.7.4 Protective door

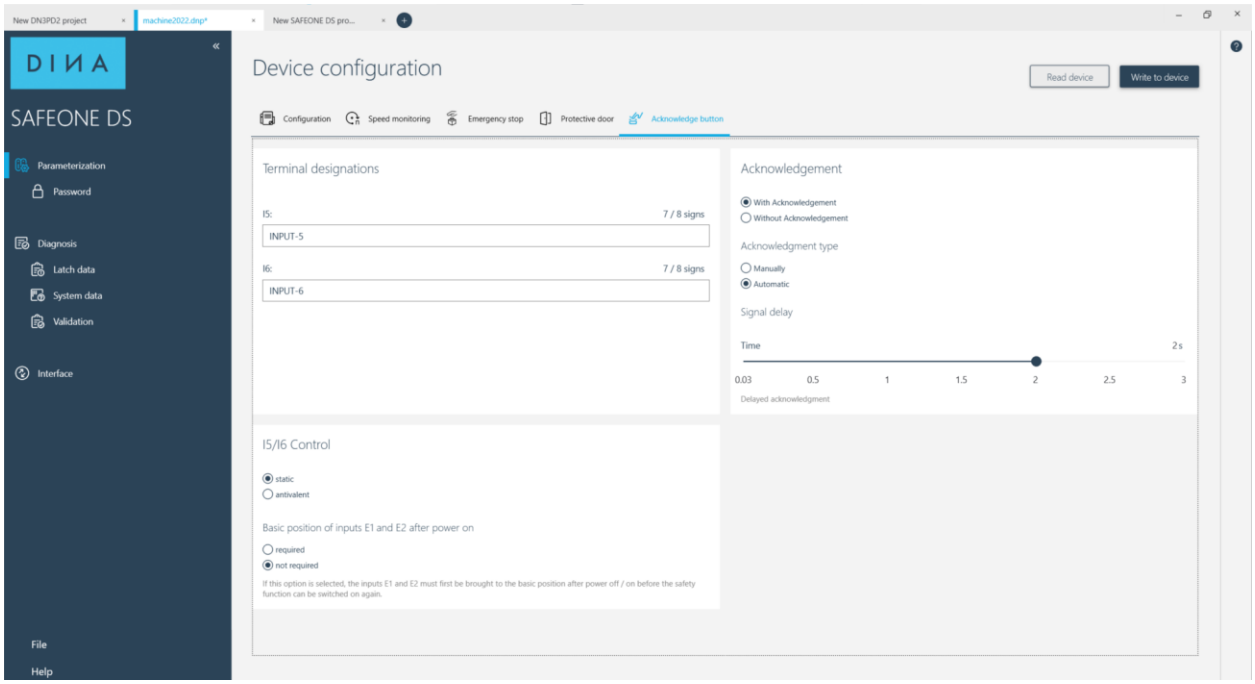
► Configure the protective door monitoring



Protective door	**Range**	**Description/note**
Terminal designations	Maximum 8 signs	
Control	Static or antivalent	
Basic position after power on	required	The inputs E1 and E2 must first be brought to the basic position after power off/on before the safety function can be switched on again.
Acknowledgment type	▪ Without Acknowledg-ment ▪ Manual ▪ Automatic	
Signal delay	30ms – 3s	Delayed acknowledgment

9.7.5 Acknowledgment button

► Configure the Acknowledgment button



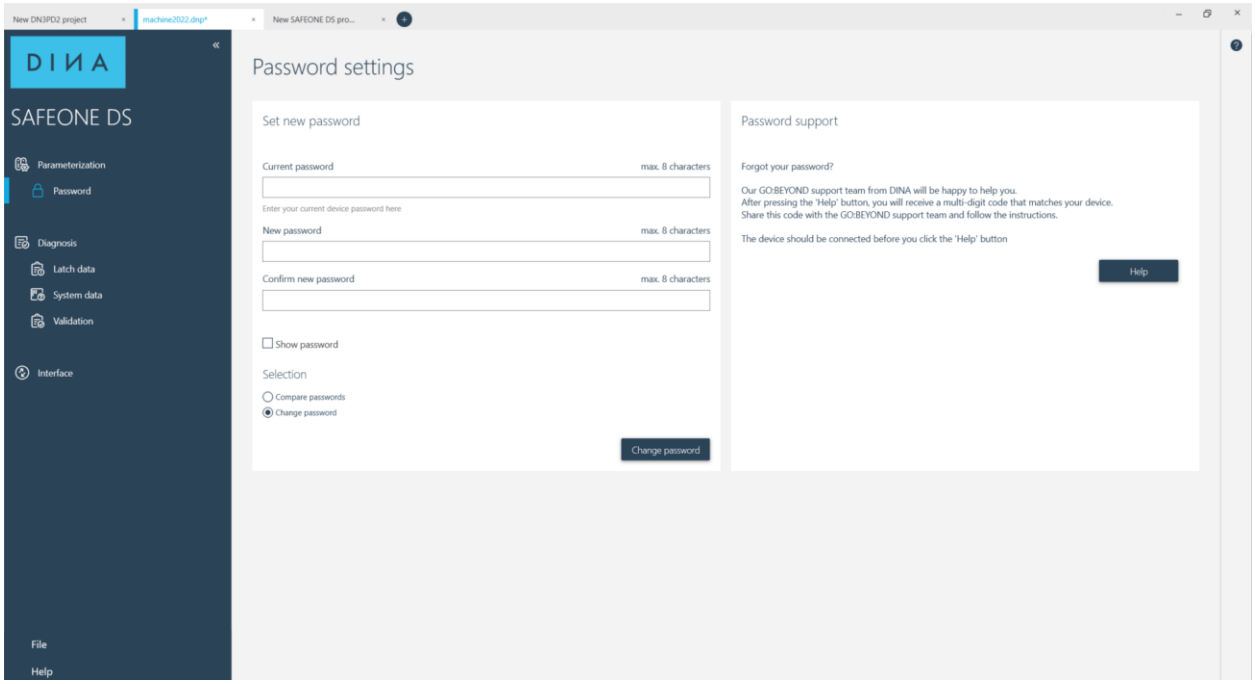
Protective door	**Range**	**description/note**
Terminal designations	Maximum 8 signs	
Control	Static or antivalent	
Basic position after power on	required	The inputs E1 and E2 must first be brought to the basic position after power off/on before the safety function can be switched on again.
Acknowledgment type Signal delay	▪ Without Acknowledg-ment ▪ Manual ▪ Automatic 30ms – 3s	 Delayed acknowledgment

9.8 Edit and Change password

Protect your safety device against unauthorized access with a device password.

- ► Open the menu item "Parameterization password"
- ► Enter the current password. If no password is assigned, the field can remain empty.
- ► Edit a new password (maximum 8 signs) and confirm it.
- ► Select “Change password”.
- ► Click the button “Change password”.

The password is now stored in the device and must be specified when transferring a new project or when validation.



9.9 Compare passwords

You can check whether the entered password is identical to the device password.

- ► Enter a password.
- ► Select "Compare passwords".
- ► Click the button "Compare passwords".

You will be informed whether the passwords are identical.

9.10 Forgot password?

- ► Follow the instructions in the menu.

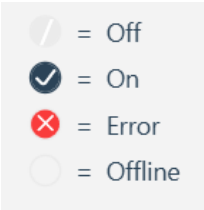
9.11 Diagnose

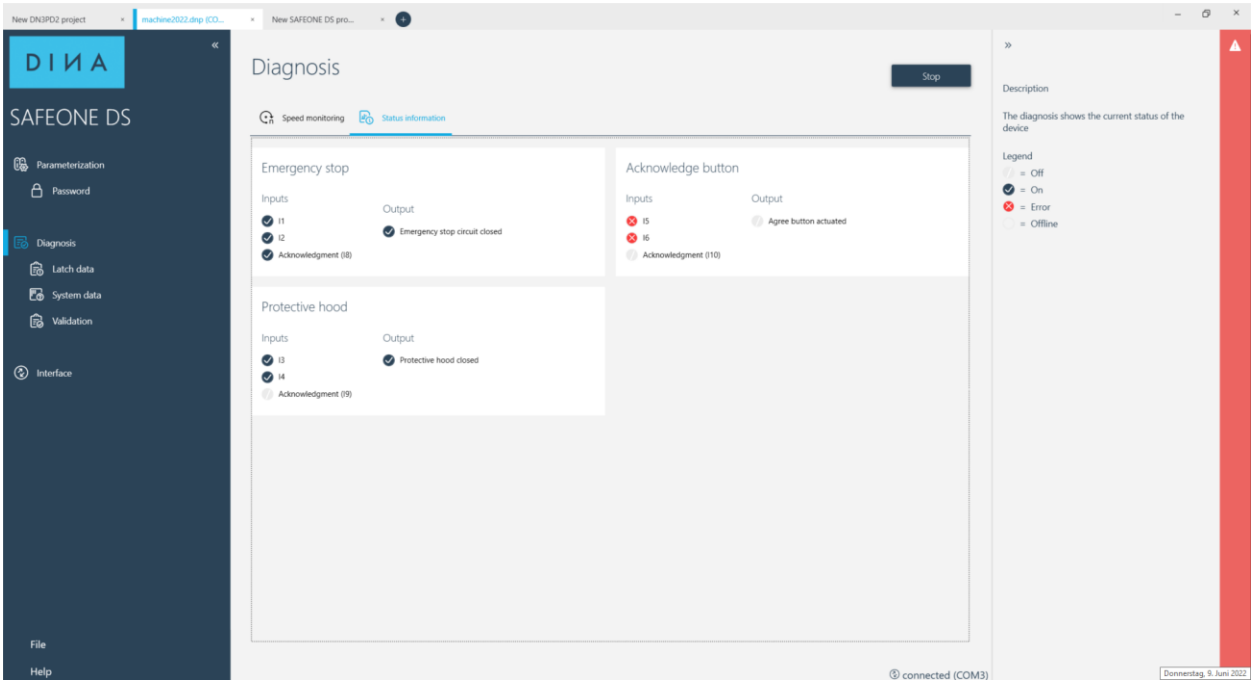
The diagnostic function enables online monitoring of the inputs and outputs of the safety functions and speed monitoring.

9.11.1 Status information

The states of the inputs and outputs of the safety functions are displayed in the Status information menu.

The states are shown as follows:





9.11.2 Speed monitoring

- ► Start the diagnosis with the button “Start”.
- ► Select the desired unit for displaying the values.

The following statuses are read out.

(1) Movement/time diagram for the visual representation of the movement:

Blue line: actual value

Red line: maximum frequency/maximum speed

(2) Display of the current values and the active operating mode

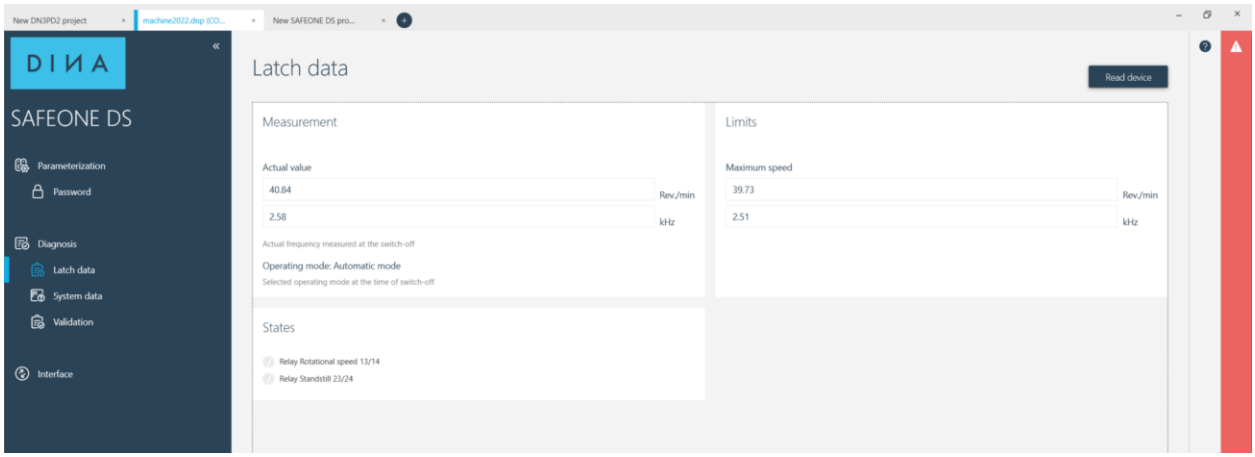
(3) States of the enable current paths for speed and standstill monitoring and the enable signal.

9.11.3 Latch data

After a shutdown, the switch-off-relevant data are saved in the device and can be read out.

- Measured actual value when switching off
- Limit values
- Actual operating mode
- States of the relay outputs

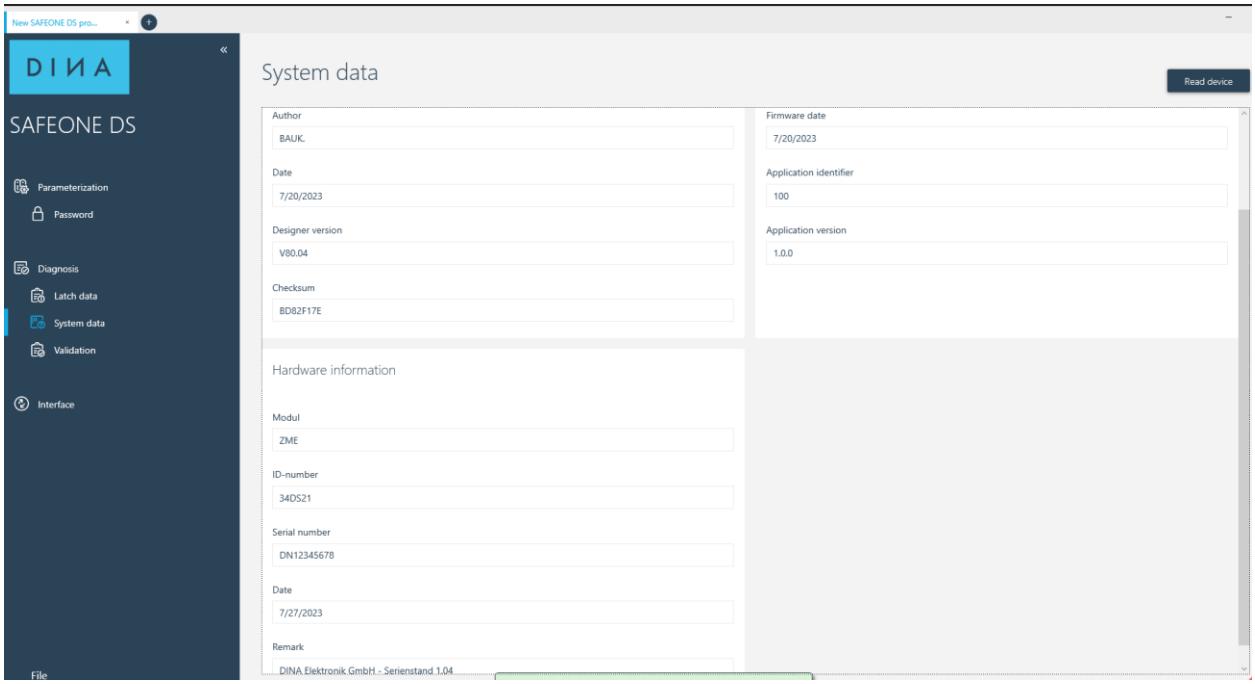
The data remains saved until it switched off again.



9.11.4 System data

The device data is read out here.

- Information about the basic application supplied with the device.
- Checksum of the application stored in the device
- Hardware, firmware and application information



9.12 Validation

- ► Select the validation step
- ► If the device is password-protected, you will be asked to enter a valid password.

The states are recorded and can be printed out as a protocol.

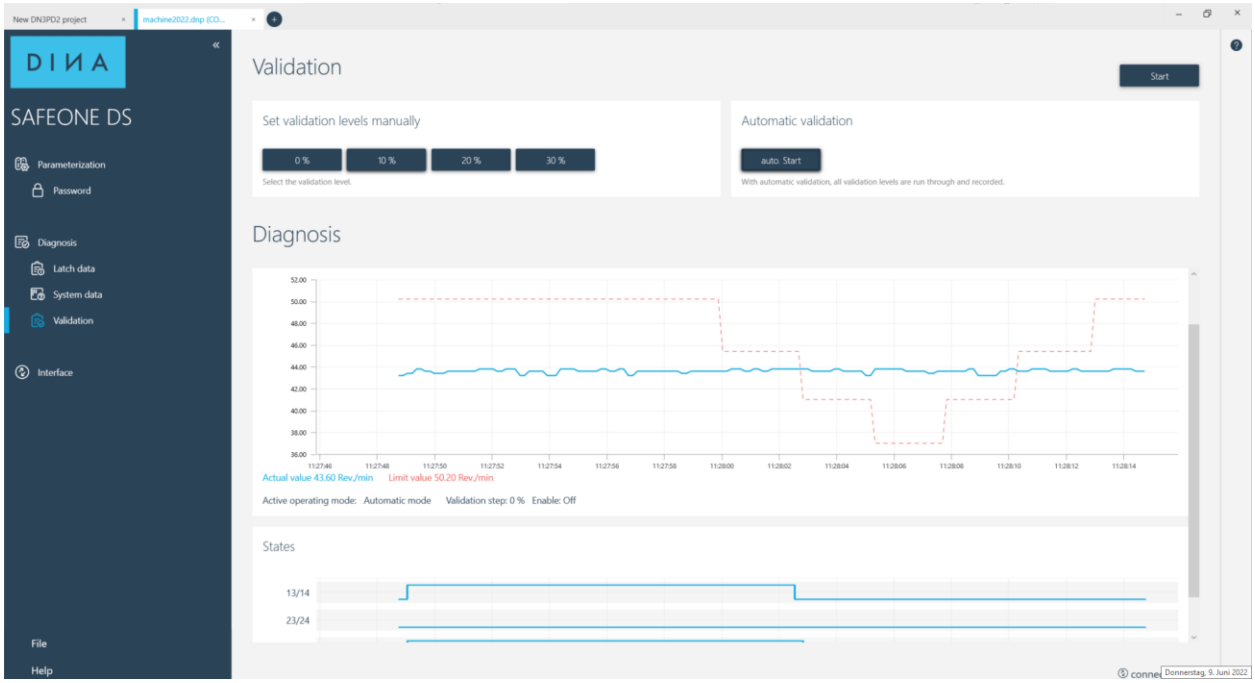
The validation level is automatically reset after 20s.

- ► Press the “Stop” button to stop recording.

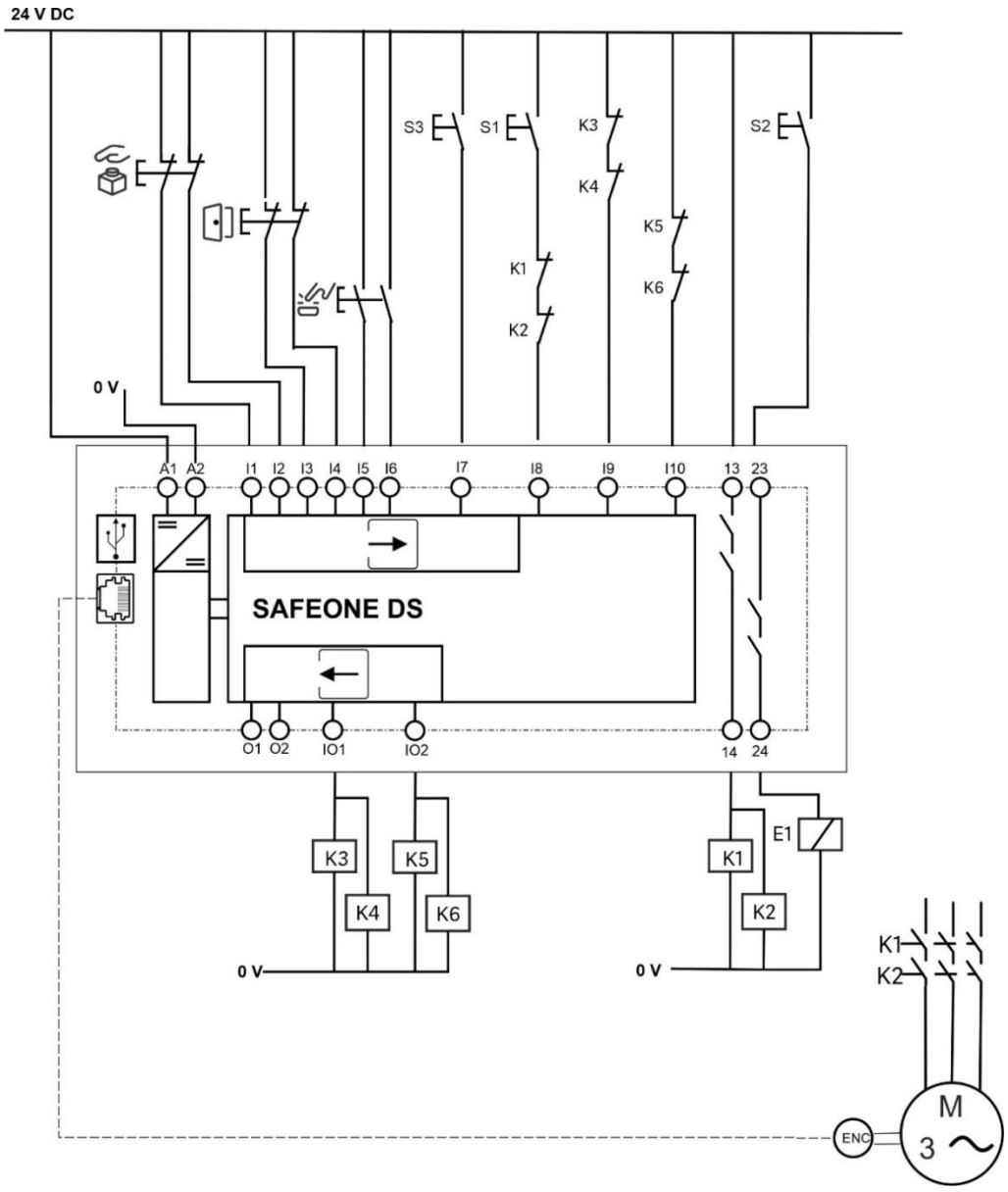
Note

To generate a log, the project must first be saved!

Alternatively, you can use the “auto. Start “. The validation levels are run through step by step and reset again. The automatic validation stops automatically.


DINA
SAFEONE DS
Parameterization
Password
Diagnosis
Latch data
System data
Validation
Interface
File
Help
Validation
Start
Set validation levels manually
0 %
10 %
20 %
30 %
Select the validation level.
Automatic validation
auto. Start
With automatic validation, all validation levels are run through and recorded.
Diagnosis
Actual value 43.60 Rev./min
Limit value 50.20 Rev./min
Active operating mode: Automatic mode
Validation step: 0 %
Enable: Off
States
13/14
23/24

10 Example of application



Legend:

Emergency stop switch

Protective door

Acknowledgment button

S1 Acknowledgment button speed monitoring and emergency stop

S2 Safety door release

S3 Selection special operating mode

E1 Safety door guard locking

11 Order information

Description	Product	ID-No.
Compact, configurable safety switching device for safe machine monitoring	SAFEONE DS	34DS21

12 Technical data

12.1 Supply

Operating voltage U_B	24 V DC (-15/+10%)
Current consumption at 24V	50 mA
Power consumption at A1/A2	1,2 W

12.2 Digital inputs

Inputs	10 safety inputs I1 – I10
Input voltage range	24 V DC (-15/+10%)
Current consumption	Typ. 4mA (at U_B)
Input voltage range „0“-signal	0…5 V DC
Input voltage range „1“-signal	15 V DC…30 V DC

12.3 Measuring inputs: Encoder

Encoder input	1 safety encoder input RJ45
Signal type	Sin/Cos, TTL
Minimum frequency	50 Hz
Maximum frequency	300 kHz

12.4 Transistor outputs

Outputs	O1, O2	IO1, IO2

Output type		
Voltage	24 V	24 V
Max. switching current	1 A	0,5 A
Max. total switching current	2 A	1 A
Min. switching current	1 mA	1 mA

12.5 Contact outputs

Outputs	13/14, 23/24
Contact material	Ag alloy
Output guidance, performance level	 , PLd
Minimum switching current	10 mA
Switching capacity in accordance with IEC 60947-5-1	DC13: 1A/30V DC
Mechanical service life	5 x 10^7 switching cycles
Contact fuse	3 A gL/gG
Typical response time	10 ms / 10 ms

12.6 General data

Type of protection (housing and terminals)	IP 20
Type of protection (place of installation)	min. IP 54
Clearance and creepage distances between circuits	In accordance with DIN EN 50178
Rated insulation voltage	50V AC
Rated surge voltage/insulation	0,8 kV
Degree of contamination	2
Overvoltage category	III

Housing material	Polyamide (PA), not reinforced

12.7 Connection data

Terminals	Push-in, pluggable
Conductor cross section	0,25 - 1,5mm²
AWG conductor cross section	24…16
Conductor type	Flexible with end sleeves
Stripping length	10 mm

12.8 Environmental conditions

Operating temperature	-10 °C to +55 °C
Storage temperature	-40 °C to +85 °C
Attitude of place of use	< 2000 m above sea level
Shock resistance	11g
Vibration	2g

12.9 Dimensions

B x H x T	22,5 x 114 x 111 mm (0.886 x 4.488 x 4.370 in)
Size of DIN rail	35,0 mm (1.378 in)

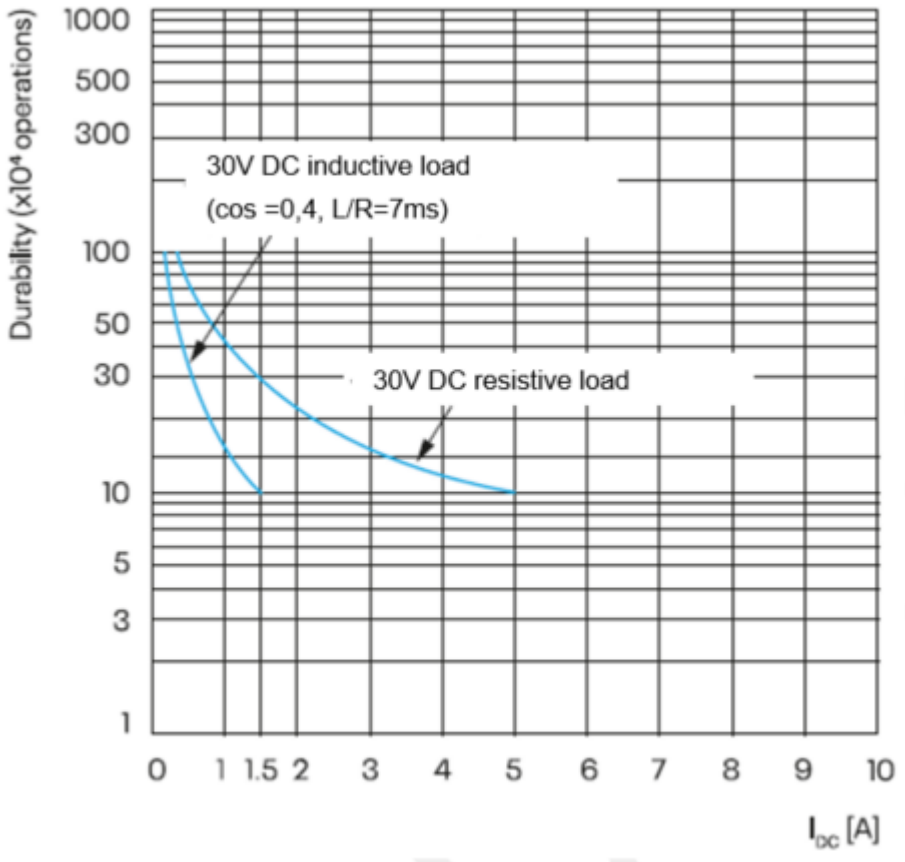
12.10 Safety-related parameters in accordance with DIN EN ISO 13849-1:2016-06

MTTFd [a]	100
Category	3
Performance Level	d
PFHd	4,29E-08 (1A DC13; 5 cycles/h)

Proof-Test-Interval	20 years

12.11 Contact life

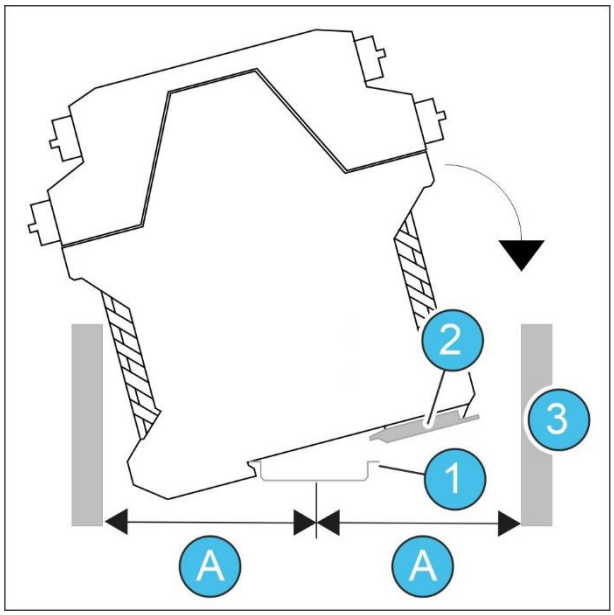
Electrical service life of the output contacts in accordance with DIN EN 60947-5-1/ Annex C.3



13 Installation and removal

13.1 Installing a module

13.1.1 Overview



(A) 70-75 mm (2,756-2,953 in)

(1) Top hat rail

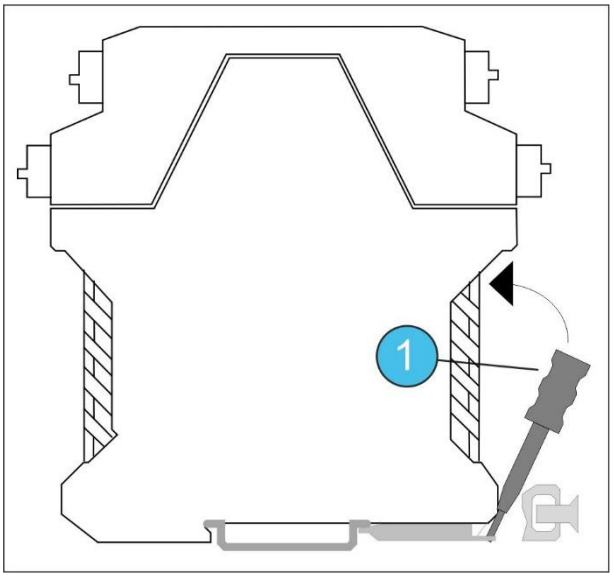
(2) Locking slider

(3) Cable duct

Procedure

- ► Hook the module onto the top hat rail **(1)** and press it downward.
- ► The locking slider **(2)** engages under the top hat rail.

13.2 Removing a module



Procedure

- ► Use a screwdriver **(1)** to move the locking slider away from the module.
- ► Move the module upward and remove it from the rail.