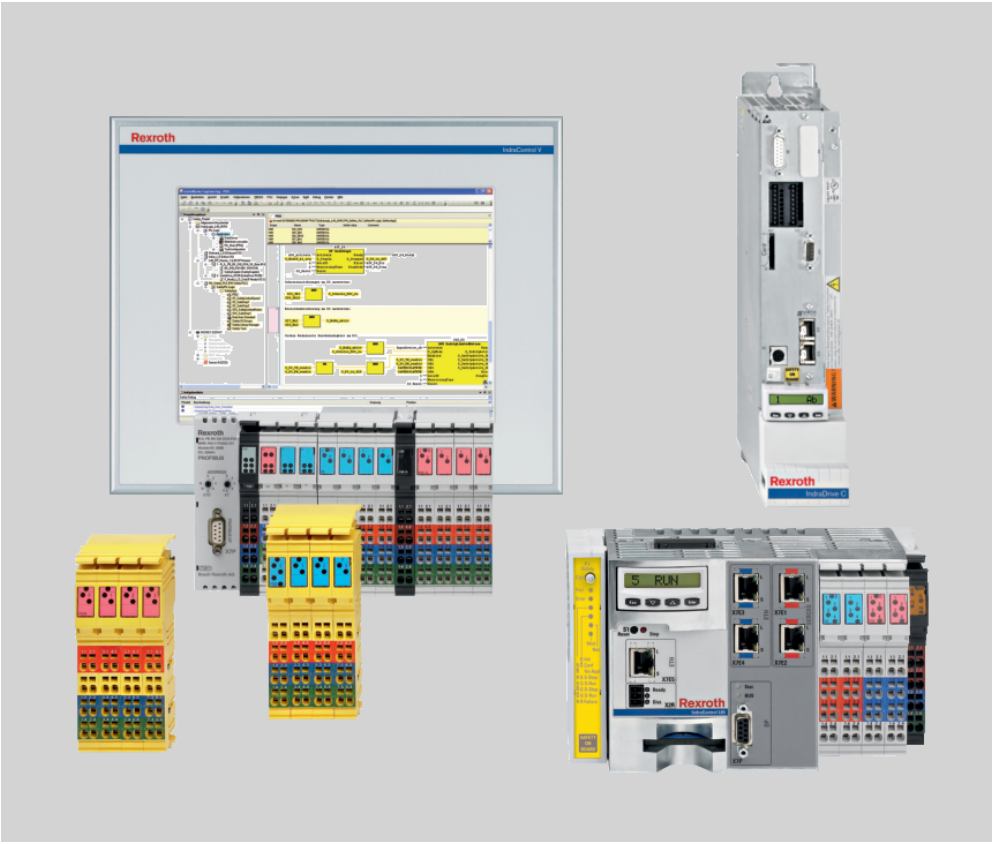
rexroth
A Bosch Company

# IndraControl CFL01.1-F1

## Safety Function Module

**Operating Instructions**
**R911336576**

Edition 06



## Change record

Edition 06

2022-06

Refer to tab. 1-1 "Change record" on page 1

## Copyright



## Liability



## Editorial Department

Engineering Automation Systems Solution Integration PLC, Safety and Control HW HaBu, AnSt (MaKo/MePe)

# Table of Contents

Page

Page

# 1 About this documentation

## 1.1 Editions of this documentation

### Editions of this documentation

| Edition | Release date | Note |
|---|---|---|
| 01 | 2013-01 | First edition |
| 02 | 2013-08 | Corrections in the table "Further documents". Section "Customer feedback" inserted |
| 03 | 2016-04 | Revision |
| 04 | 2017-06 | Revision of the chapter "Safety standards" |
| 05 | 2021-09 | Standards updated |
| 06 | 2022-06 | SD card supplemented, Supplements in the table "Further documents" |

**Tab. 1-1:** Change record

## 1.2 Overview on target groups and product phases

In the following illustration, the framed activities, product phases and target groups refer to the present documentation.

Example: In the product phase "Mounting (assembly/installation)", the "mechanic/electrician" can execute the activity "unpack, mount and install" using this documentation.

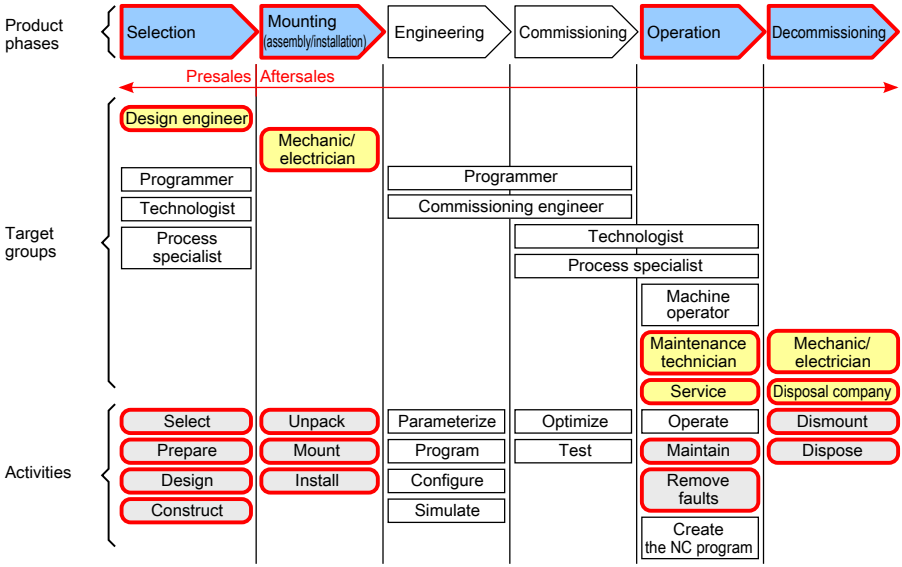



**Fig. 1-1:** Assigning the present documentation to the target groups, product phases and activities of the target group

## 1.3 Purpose

This operating instructions provides information on the safe mounting and the electric installation of the Safety function module to the technical employees of the machine manufacturer. This documentation does not provide instructions on the operation of the machine into which the Safety function module IndraControl CFL01.1-F1 is integrated. For more information, refer to the operating instructions of the machine.

## 1.4 Qualifications

Required qualification: Individual who is able to assess the tasks assigned and to identify possible safety risks owing to qualification in the subject, knowledge and experience. The individual should also be familiar with the standards and regulations.

## 1.5 Original operating instructions

The German operating instructions is the original operating instructions. Other language versions are translations of the original operating instructions.

## 1.6 Scope

This operating instructions applies to the Safety function module with the type code "CFL01.1-F1".

The type code specifications are located on the type plate of the function module. Also refer to chapter 2.1 "Product identification" on page 5.

## 1.7 Related documents

| Title | Description |
|---|---|
| IndraWorks 14VRS | R911341694 |
| SafeLogic | Application Description |
| Project Configuration | This documentation is intended as guideline when creating a safety-related application |
| IndraWorks 15VRS | R911398635 |
| SafeLogic | Application Description |
| Project Configuration | This documentation is intended as guideline when creating a safety-related application |
| IndraWorks | R911341520 |
| SafeLogic 14VRS | Commissioning Manual |
| First Steps | This documentation contains descriptions about the following topics:<br>• Creation and use of a safety application<br>• Basics of the data exchange between the safety application and the standard application of the IndraLogic XLC/ IndraMotion MLC/IndraMotion MTX 14VRS<br>• Information on diagnostics and troubleshooting<br>• Programming under SafeLogic |
| IndraWorks | R911400170 |
| SafeLogic 15VRS | Commissioning Manual |
| First Steps | This documentation contains descriptions about the following topics:<br>• Creation and use of a safety application<br>• Basics of the data exchange between the safety application and the standard application of the IndraLogic XLC/ IndraMotion MLC/IndraMotion MTX 15VRS<br>• Information on diagnostics and troubleshooting<br>• Programming under SafeLogic |

| Title | Description |
|---|---|
| IndraLogic XLC | R911341696 |
| IndraMotion MLC 14VRS | Project Planning Manual |
| SafeLogic System Overview | This documentation describes the project planning of safety-related devices in the systems IndraLogic XLC and IndraMotion MLC |
| ILC | R911400164 |
| MLC 15VRS | Project Planning Manual |
| SafeLogic System Overview | This documentation provides an overview on the safety-specific Bosch Rexroth system solutions. This documentation describes the safety control SafeLogic compact and the Safety Extension module. |
| IndraMotion | R911341698 |
| MTX 14VRS | Project Planning Manual |
| SafeLogic System Overview | This documentation describes the project planning of safety-related devices in the IndraMotion MTX |
| MTX 15VRS | R911398637 |
| SafeLogic System Overview | Project Planning Manual |
| | This documentation provides an overview on the safety-specific Bosch Rexroth system solutions. This documentation describes the safety control SafeLogic compact and the Safety function module. |
| IndraControl L25[1)], L45, L65, L75 and L85 | R911336525 |
| | Operating Instructions |
| Controls | This document instructs the technical staff of the machine manufacturer on how to safely perform the mechanical and electrical installation and on how to commission the device |

1) The Safety function module IndraControl CFL01.1-F1 is not supported by the IndraControl L25

**Tab. 1-2:** Related documents

If a documentation is not available, please contact the Bosch Rexroth Service.

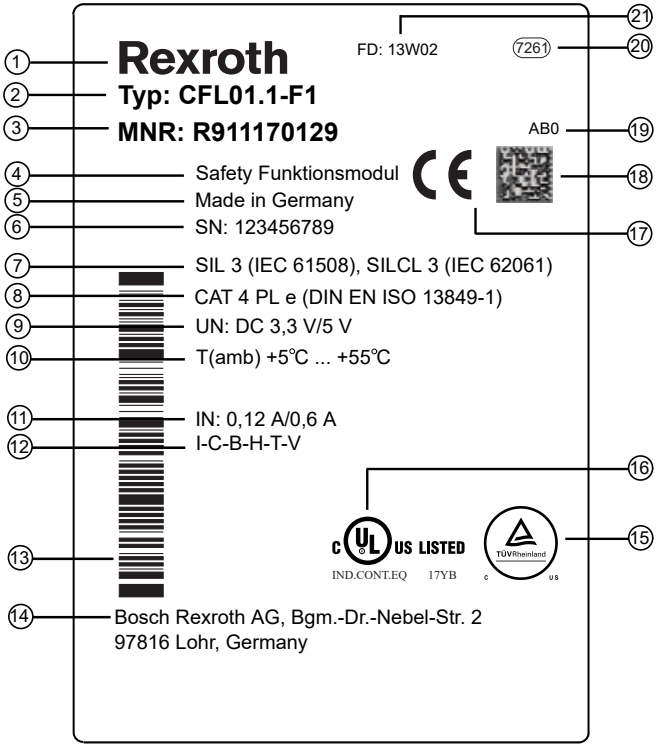
## 1.8 Customer feedback

Customer requests, comments or suggestions for improvement are of great importance to us. Please email your feedback on the documentations to Feedback.Documentation@boschrexroth.de. Directly insert comments in the electronic PDF document and send the PDF file to Bosch Rexroth.

# 2 Product identification and scope of delivery

## 2.1 Product identification

The type plate is located on the left side of the function module.




**1** Word mark
**2** Type code
**3** Part number
**4** Device name
**5** Name of origin
**6** Serial number
**7** Safety integrity level
**8** Safety integrity level
**9** Rated voltage
**10** Ambient temperature
**11** Rated current
**12** Test logging
**13** Serial number as barcode
**14** Company address
**15** TÜV seal
**16** UL conformity mark
**17** CE conformity mark
**18** QR code
**19** State of revision
**20** Sector/plant number
**21** Manufacturing date

**Fig. 2-1:** Type plate of the Safety function module

## 2.2 Scope of delivery

- IndraControl CFL01.1-F1

# 3 Using safety instructions

## 3.1 Structure of the safety instructions

The safety instructions are structured as follows:

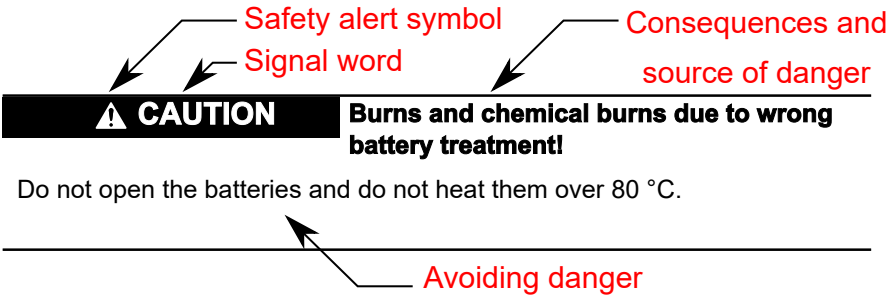



**Fig. 3-1:** Structure of the safety instructions

## 3.2 Explaining signal words and safety alert symbol

The safety instructions in this documentation contain specific signal words (danger, warning, caution, notice) and, if necessary, a safety alert symbol (according to ANSI Z535.6-2006).

The signal word draws attention to the safety instruction and indicates the risk potential.

The safety alert symbol (triangular safety reflector with exclamation marks), preceding the signal words Danger, Warning, Caution indicates hazards for persons.

**DANGER**

In case of non-compliance with this safety instruction, death or serious injury **will** occur.

**WARNING**

In case of non-compliance with this safety instruction, death or serious injury **can** occur.

**⚠ CAUTION**

In case of non-compliance with this safety instruction, minor or moderate injury can occur.

***NOTICE***

In case of non-compliance with this safety instruction, material damage can occur.

## 3.3 Symbols used

Pointers are displayed as follows:

This is a note.

Tips are displayed as follows:

This is a tip.

## 3.4 Explaining the signal alert symbol on the device

If this symbol is on your device, you have to observe the documentation on the device. The respective documentation informs on the type of hazard as well as the steps required to avoid this hazard.

# 4 Intended use

The Bosch Rexroth Safety function module IndraControl CFL01.1-F1 is a safety component. It becomes only a safety-related control system if used with a Rexroth IndraControl L control (IndraLogic XLC SafeLogic, IndraMotion MLC SafeLogic, IndraMotion MTX SafeLogic). For further documentation, refer to tab. 1-2 "Related documents" on page 3.

The Safety function module is not supported by the IndraControl L25 hardware.

The Safety function module IndraControl CFL01.1-F1 is used to securely process logic signals of periphery components (sensors) according to the sequential program and to provide logic signals for periphery components (actuators). The sequential program can be freely programmed using the Engineering system. Even though the control system was developed, manufactured and tested according

to the safety standards and certified by an accredited test institute, using this component does not automatically ensure a functionally safe machine. The machine manufacturer has to perform a risk analysis and take corresponding protective measures to reduce risks and to validate their effect even though it was accredited and developed according to the safety standards. The functional safety can only be ensured by comprehensively implementing the requirements (e.g. systematic measures, software requirements, integrating the sensors and actuators) according to the applicable standards (DIN EN ISO 13849 and DIN EN 62061).

**NOTICE**

**Risk of damaging the function module if not expressly stated accessories, mounting parts and other components, cables, lines and software and firmware are used**

The Safety function module IndraControl CFL01.1-F1 may only be used as intended and combined with the accessories and attachments specified in this documentation. Components that are not expressly mentioned must neither be attached nor connected. It is strictly prohibited to open and operate components (individual parts) as well as using firmware that is not permitted.

The Safety function module IndraControl CFL01.1-F1 may only be operated under the mounting, installation and ambient conditions (such as temperature, protection class, humidity, EMC) specified in this documentation. Also refer to chapter 6 "Ambient conditions" on page 9.

A typical area of application of the Safety function module is the implementation of safety-related controls for:

- Handling and mounting systems
- Food and packaging machines
- Printing and processing machines
- Machine tools
- Compactors
- Foundry and rolling technology
- Conveying engineering
- Building automation
- Special purpose machines
- Wood processing machines
- Hydraulic machines

The operation is not permitted for the following systems according to the following standards and guidelines:

- Lifts (directive 2006/42/EC)

- ATEX (directive 2014/34/EU)
- Burner control systems (DIN EN 298)
- Safety systems for unfired pressure vessels (DIN EN 764-7:2002/AC:2006)

# 5 Spare parts and accessories

## 5.1 SD card

| Type code | Product description | Part number |
|---|---|---|
| MICRO SD 1GB | SD card (cannot be ordered anymore) | 1070924212 |
| MICRO SD 1GB 01 | SD card | R911416004 |

**Tab. 5-1:** Ordering data of the SD card

# 6 Ambient conditions

| | In operation | Storage and transport |
|---|---|---|
| Ambient temperature of the control | +5 °C – +55 °C | -25 °C – +70 °C |
| Relative humidity | 10% – 95%, condensing not permitted | 10% – 95%, condensing not permitted |
| Contamination level | 2 acc. to DIN EN 61131-2 | 2 acc. to DIN EN 61131-2 |
| Air pressure | 86 kPa – 106 kPa (up to 2,000 m above sea level) | 70 kPa – 106 kPa (up to 3,000 m above sea level) |
| Degree of protection | IP 20 acc. to DIN EN 60529 | IP 20 acc. to DIN EN 60529 |
| Warning if internal temperature is low | ≤ 5 °C | – |
| Switch-off if internal temperature is low | ≤ 1 °C | – |
| Warning if internal temperature is high | ≥ 86 °C | – |
| Switch-off if internal temperature is high | ≥ 89 °C | – |

**Tab. 6-1:** Climatic ambient conditions and characteristics

| | In operation | Storage and transport |
|---|---|---|
| Mounting position | Horizontal on the mounting rail | – |
| Sinusoidal vibrations | 5 Hz ≤ f ≤ 9 Hz: 1.75 mm amplitude<br>9 Hz ≤ f ≤ 150 Hz: 1.0 g<br>Acc. to DIN EN 60068-2-6 | – |

| | In operation | Storage and transport |
|---|---|---|
| Shock test | 15 g peak value, period of 11 ms<br>Acc. to DIN EN 60068-2-27 | – |
| Free fall | – | With product packaging:<br>Height of fall of 300 mm<br>With despatch packaging:<br>Height of fall of 1,000 mm<br>Acc. to DIN EN 60068-2-32, method 1 |
| Noise-induced oscillation | – | 10 Hz – 200 Hz with 1 ($m/s^2$) 2/Hz<br>200 Hz – 1500 Hz with 0.3 ($m/s^2$) 2/Hz<br>Crest factor = 3 |

**Tab. 6-2:** Mechanic ambient conditions and characteristics

| | In operation |
|---|---|
| Emitted interference of the housing<br>Test acc. to DIN EN 55016 | 30 MHz – 230 MHz: 40 dB (µV/m) Q<br>230 MHz – 1000 MHz: 40 dB (µV/m) Q |
| Emitted interference of the mains connection<br>Test acc. to DIN EN 55016 | 0.15 MHz – 0.5 MHz: 79 dB (µV) Q, 66 dB (µV) M<br>0.5 MHz – 30 MHz: 73 dB (µV) Q, 60 dB (µV) M |

**Tab. 6-3:** Electromagnetic operating conditions: Testing noise emission acc. to EN 61000-6-4

| | In operation |
|---|---|
| ESD<br>Test acc. to DIN EN 610000-4-2<br>Standard | Air discharge up to ±8 kV, criterion A<br>Contact discharge up to ±4 kV, criterion A |
| ESD<br>Increased noise level | Air discharge up to ±8 kV, criterion FS<br>Contact discharge up to ±6 kV, criterion FS |
| Electromagnetic HF field<br>Test acc. to DIN EN 61000-4-3<br>Standard | 80 MHz – 1,000 MHz: 10 V/m<br>1.4 GHz – 2.0 GHz: 3 V/m<br>2.0 GHz – 2.7 GHz: 1 V/m |
| Electromagnetic HF field<br>Increased noise level | 80 MHz – 1,000 MHz: 20 V/m<br>1.4 GHz – 2.0 GHz: 10 V/m<br>2.0 GHz – 6 GHz: 3 V/m |

| | In operation |
|---|---|
| Fast transients (burst)<br>Test acc. to DIN EN 61000-4-4<br>Standard | Affected interfaces 1 kV<br>Supply voltage 2 kV |
| Fast transients (burst)<br>Increased noise level | Affected interfaces 2 kV<br>Supply voltage 4 kV |
| Surge<br>Test acc. to DIN EN 61000-4-5<br>Standard | Asymmetric coupling:<br>0.5 kV (supply lines)<br>1 kV (signal/data lines)<br>Symmetric coupling:<br>0.5 kV (supply lines) |
| Surge<br>Increased noise level | Asymmetric coupling:<br>2 kV (supply lines)<br>2 kV (signal/data lines)<br>Symmetric coupling:<br>1 kV (supply lines) |
| HF coupling to lines<br>Test acc. to DIN EN 61000-4-6 | 0.15 MHz – 80 MHz: 10 $V_{eff}$, criterion A |
| HF coupling to lines<br>Increased noise level | 0.15 MHz – 80 MHz: 20 $V_{eff}$, criterion FS |
| Conducted common mode voltage<br>Check acc. to EN 61000-4-16 | Conducted asymmetric disturbances between 0 Hz and 150 kHz |
| Voltage dips, short interruptions and voltage fluctuations at DC mains inputs<br>Test acc. to DIN EN 61000-4-29 | DC 24 V supply voltage: 20 interruptions every 10 s, interruption period of 10 ms |
| Voltage dips, short interruptions and voltage fluctuations at DC mains inputs<br>Increased requirements | DC 24 V supply voltage:<br>1. 40% UT (rated voltage) for 10 ms<br>2. 0% UT (rated voltage) for 20 ms<br>Voltage deviation of -15 % / +20 %<br>3 attempts, period of 10 s |

**Tab. 6-4:** Electromagnetic operating conditions: Testing electromagnetic compatibility acc. to EN 61000-6-2 as well as increased noise level acc. to EN 61326-3-1

**NOTICE**

**The Safety function module IndraControl CFL01.1-F1 goes into a safe state in case of overheating**

Provide sufficient ventilation and cooling to ensure that the ambient temperature does not exceed 55°C.

**NOTICE**

**Defective product due to gases jeopardizing functions**

Due to the risk of corrosion, avoid sulphurous gases (e.g. sulphur dioxide ($SO_2$) and hydrogen suphide ($H_2S$)). The product is not resistant against these gases.

**NOTICE**

**Failure of the product due to contaminated air**

- The ambient air must not contain acids, alkaline solutions, corrosive agents, salts, metal vapors and other electrically conductive contaminants in high concentrations
- The devices to be installed into the housing and installation compartments must at least comply with the degree of protection IP 54 according to DIN EN 60529.
- The device shall be provided in a suitable fire enclosure in the end-use application.

**NOTICE**

**Risk to damage the device due to external influences**

Keep the device away from oils and emulsions.

This is a product that corresponds to the limit values of the emitted interference of class A (industrial environments). This is a product that does *not* correspond to the limit values of the emitted interference of class B (residential area and small enterprises)

When using the product in residential areas or small enterprises, the operator has to take actions to prevent radio interferences (also refer to DIN EN 55022).

# 7 Technical data

## 7.1 Voltage supply

The internal voltage of the IndraControl L supplies the Safety function module IndraControl CFL01.1-F1 via the function module plug.

The input voltage of the control is DC 24 V (as per the requirements acc. to DIN EN 61131-2). The voltage is supplied from the PELV power supply units with safe separation acc. to EN 50178 and EN 60950-1.

| Voltage | Typical current consumption | Typical power consumption |
|---|---|---|
| 3.3 V | 0.12 A | 0.4 W |
| 5 V | 0.6 A | 3 W |

**Tab. 7-1:** Voltage, current and power consumption of the IndraControl CFL01.1-F1

***NOTICE***

**The Safety function module IndraControl CFL01.1-F1 goes into a safe state in case of overvoltage or undervoltage**

Ensure that the voltage remains in the specified range.

## 7.2 Safety-related characteristic values

| | |
|---|---|
| Safety integrity level SIL | SIL3 (DIN EN 61508 and DIN EN 61131-6) |
| Performance level PL | PL e (DIN EN ISO 13849-1) |
| Hardware error tolerance | HFT = 1 |
| Category | Category 4 (DIN EN ISO 13849-1) |
| PFH (average frequency of a dangerous failure per hour) | $4.5 \times 10^{-10}$ 1/h |
| $PFD_{avg}$ (average probability of a dangerous failure in case of request) | $3.9 \times 10^{-5}$ |
| Service life $T_M$ | 20 years (DIN EN ISO 13849); no proof test required |
| $MTTF_d$ (mean time to failure) | 2,500 years |
| $DC_{avg}$ (average diagnostic coverage) | 99 % ≙ high |
| Types of failure | If the internal diagnostics of the Safety function module IndraControl CFL01.1-F1 detects an error, the module goes into the safe state, that is, no more safe bus telegrams are sent |

## 7.3 Dimensions and weight

| | |
|---|---|
| Dimensions (W × H × D) | 22 × 122 × 76 mm |
| Weight (without packaging) | 120 g |

# 8 Standards

## 8.1 Standards used

The Safety function module IndraControl CFL01.1-F1 was developed according to the following standards.

### 8.1.1 General standards

| | |
|---|---|
| DIN EN IEC 61000-6-2:2019<br>IEC 61000-6-2:2016 | Electromagnetic compatibility (EMC) –<br>Part 6-2: Generic standards – Immunity for industrial environments |
| DIN IEC EN 61000-6-4:2020<br>IEC 61000-6-4:2018 | Electromagnetic compatibility (EMC) –<br>Part 6-4: Generic standards – Emission standard for industrial environments |
| DIN EN 60204-1:2019 (in excerpts)<br>EN 60204-1:2018 (in excerpts) | Safety of machinery –<br>Electrical equipment of machines –<br>Part 1: General requirements |
| DIN EN 61131-1:2004<br>IEC 61131-1:2003 | Programmable controllers –<br>Part 1: General information |
| DIN EN 61131-2:2008 + Corr. 2009<br>EN 61131-2:2007<br>IEC 61131-2:2017 | Programmable controllers –<br>Part 2: Equipment requirements and tests |
| DIN EN 61131-3:2014<br>IEC 61131-3:2013 | Programmable controllers –<br>Part 3: Programming languages |

**Tab. 8-1:** General standards

### 8.1.2 Safety standards

| | |
|---|---|
| DIN EN 61131-6:2013<br>EN 61131-6:2012 | Programmable controllers –<br>Part 6: Functional safety |
| EN 61511-1:2017 + A1:2017 | Functional safety –<br>Safety-instrumented systems for the process industry sector –<br>Part 1: Framework, definitions, system, hardware and software requirements |
| DIN EN 61508 Part 1-7:2011<br>EN 61508 Part 1-7:2010<br>IEC 61508 Part 1-7:2010 | Functional safety of electrical/electronic/programmable electronic safety-related systems |
| DIN EN 62061:2016<br>EN 62061:2005 + Corr.:2010 + A1:2013 + A2:2015 | Safety of machinery –<br>Functional safety of safety-related electrical, electronic and programmable electronic control systems |
| DIN EN ISO 13849-1:2016<br>EN ISO 13849-1:2015 | Safety of machinery –<br>Safety-related parts of control systems –<br>Part 1: General principles for design |
| DIN EN ISO 13849-2:2013<br>EN ISO 13849-2:2012 | Safety of machinery –<br>Safety-related parts of control systems –<br>Part 2: Validation |
| DIN EN 61326-3-1:2018<br>EN 61326-3-1:2017 | Electrical equipment for measurement, control and laboratory use –<br>EMC requirements –<br>Part 3-1: Immunity requirements for safety-related systems and for equipment intended to perform safety-related functions (functional safety) – General industrial applications |

**Tab. 8-2:** Safety standards

## 8.2 TÜV certificate

EC Type-Examination Certificate

Product Safety
Functional
Safety

TÜVRheinland
CERTIFIED

www.tuv.com
ID 0600000000

**Reg.-No.: 01/205/5272.02/21**

| | | | |
|---|---|---|---|
| **Product tested** | Safety-related programmable electronic system | **Certificate holder** | Bosch Rexroth AG<br>Bgm.-Dr.-Nebel-Str. 2<br>97816 Lohr am Main<br>Germany |
| **Type designation** | SafeLogic Control, Details see actual "Revision List SafeLogic Control Bosch Rexroth AG" | | |
| **Codes and standards** | EN ISO 13849-1:2015<br>EN 62061:2005 + AC:2010 + A1:2013 + A2:2015<br>IEC 61508 Parts 1-7:2010<br>EN 61508 Parts 1-7:2010 | | EN 61131-6:2012<br>EN 61131-2:2007<br>IEC 61131-2:2017<br>EN 61326-3-1:2017 |
| **Intended application** | The programmable electronic safety system complies with the requirements of the relevant standards (Cat. 4 / PL e according to EN ISO 13849-1, SIL CL 3 according to EN 62061 / EN 61508 / EN 61131-6) and can be used in applications up to PL e according to EN ISO 13849-1 and SIL 3 according to EN 62061 / EN 61508.<br><br>The product was also reviewed in reference to the requirements of EN 61511-1:2017 + A1:2017 and EN 60204-1:2018 applicable during a type examination and can be used in application as such. | | |
| **Specific requirements** | The instructions of the associated Installation, Operating and Safety Manual shall be considered. | | |

It is confirmed, that the product tested complies with the requirements for machines defined in Annex I of the EC Directive 2006/42/EC.

Valid until 2026-08-31

The issue of this certificate is based upon an evaluation in accordance with the Certification Program TM 31 V1.0:2017 in its actual version, whose results are documented in Report No.: 968/EZ 574.17/21 dated 2021-08-31. This certificate is valid only for products, which are identical with the product tested.

0035 Notified Body

Köln, 2021-08-31

Notified Body for Machinery, NB 0035

Dipl.-Ing. Jelena Stenzel

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**Fig. 8-1:** TÜV certificate for IndraControl SafeLogic

## 8.3 CE marking

### 8.3.1 Declaration of conformity

CE

The Safety function module IndraControl CFL01.1-F1 as safety component corresponds to the following directives:

- Machinery directive 2006/42/EC
- EMC directive 2014/30/EU

## 8.4 UL/CSA certified

c UL US LISTED

The Safety function module IndraControl CFL01.1-F1 is certified according to:

- **UL 61010-2-201** (Industrial Control Equipment) and
- **C22.2 no. 61010-2-201** (CSA)

Approved under UL file no. E210730.

**Loss of UL/CSA conformity due to modifications at the device**

UL and CSA marking applies only to the device upon delivery. After modifying the device, verify the UL and the CSA conformity.

For the declaration of conformity, click on the following link for the media directory https://www.boschrexroth.com/MediaDirectory and search for "DCTC-30131-001".

# 9 Interfaces

The Safety function module IndraControl CFL01.1-F1 is provided with a function module plug on the right. Via the function module plug, the function module can either be connected directly to the IndraControl L or to a preceding function module. The Safety function module IndraControl CFL01.1-F1 is always located at the outermost position. Thus, it is not provided with an address switch for the slot selection. The internal function module bus is not lead to the outside. Thus, no further function modules can be connected in series to the module. There are no further interfaces on the function module.

For a detailed description of the operating elements and displays, refer to chapter 12.3 "Operating and error displays" on page 24.

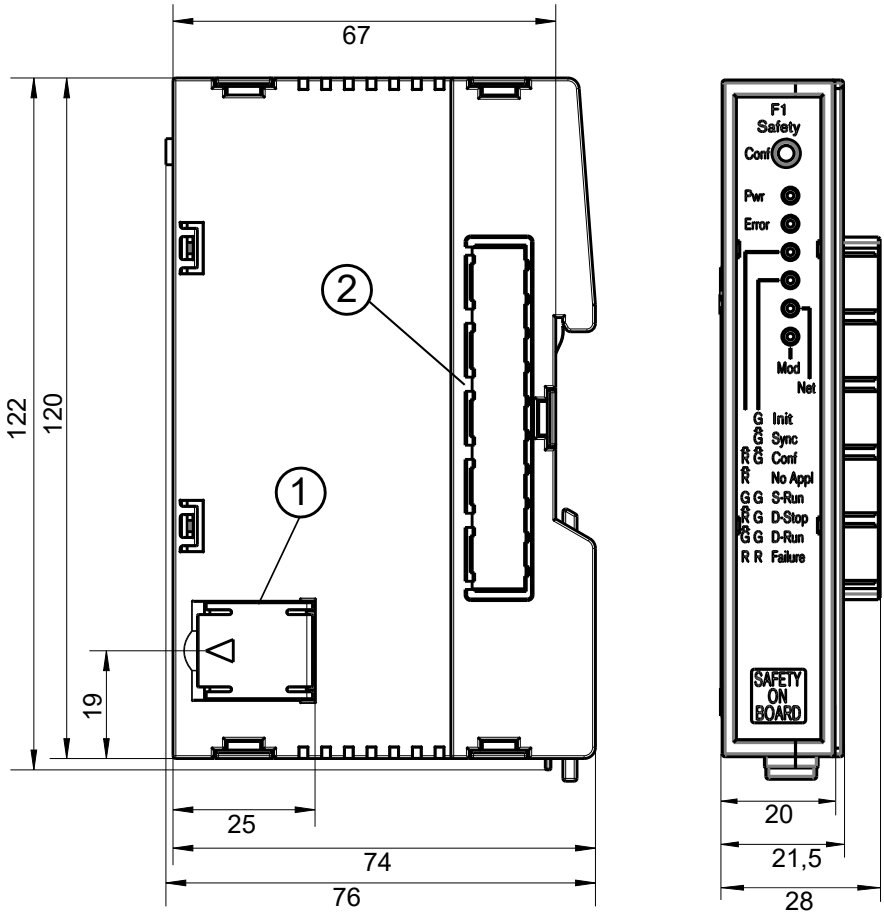
## 9.1 SD card slot

There is an SD card slot with an equipped SD card on the Safety function module IndraControl CFL01.1-F1. This memory card is used to save user-specific data [boot application, logbooks (devices and application) as well as user management data].

The position of the function module plug as well as of the SD card slot can be seen in fig. 10-1 "Dimension drawing of the Safety function module IndraControl CFL01.1-F1 (dimensions in mm)" on page 19.

# 10 Mounting, dismounting and electric installation

## 10.1 Housing dimensions




① SD card slot
② Function module plug

**Fig. 10-1:** Dimension drawing of the Safety function module IndraControl CFL01.1-F1 (dimensions in mm)

## 10.2 Mounting

**⚠ CAUTION** **Interrupted program sequence due to an incorrect protection class and installation position!**

Install the Safety function module in a control cabinet with at least the degree of protection IP 54 acc. to DIN EN 60529.

The function module IndraControl CFL01.1-F1 has to be installed on a horizontally mounted mounting rail (refer to fig. 10-2 "Mounting the Safety function module IndraControl CFL01.1-F1" on page 20).

**⚠ WARNING** **Do not mount the control, modules or plugs under voltage. The system might start accidentally!**

Disconnect the complete station and the components from voltage before mounting the components! Connect the voltage only again after the entire station has been set up.

For the mounting steps of the Safety function module IndraControl CFL01.1-F1, refer to following figure and the mounting steps.

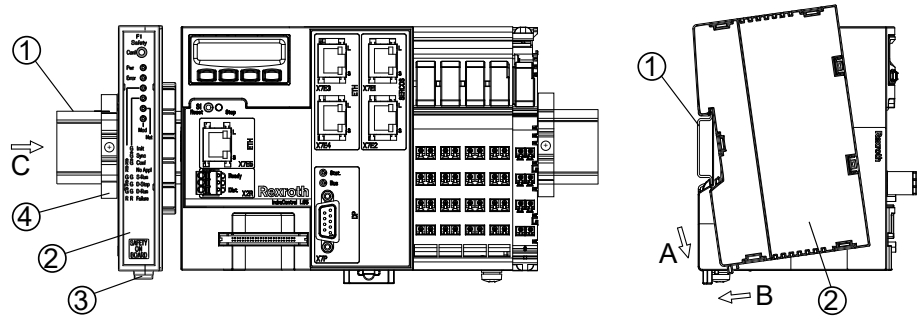



**Fig. 10-2:** Mounting the Safety function module IndraControl CFL01.1-F1

Mount the Safety function module:

1. Hang the function module ② onto the mounting rail ①, Ⓐ.
2. Tilt the function module Ⓑ down against the mounting rail until the locking ③ is engaged.

Ensure that the function module is completely engaged on the top-hat rail before plugging the plug of the function module into the adjacent neighboring socket. Otherwise, the plug connection could be damaged.

3. Insert the function module Ⓒ, ② into the left 120-pin socket of the IndraControl L control or the neighboring function module.
4. Fix the function module with the end clamp ④ on the mounting rail ①.

Ensure that are mounted on the left and right of the control components to avoid any disengagement due to vibration.

## 10.3 Dismounting

**⚠ WARNING** **Do not dismount the control, modules or plugs under voltage. The system might start accidentally!**

Disconnect the complete station and the components before dismounting the components! Connect the voltage only again after dismounting.

For the dismounting steps of the Safety function module, refer to following figure and the dismounting steps.

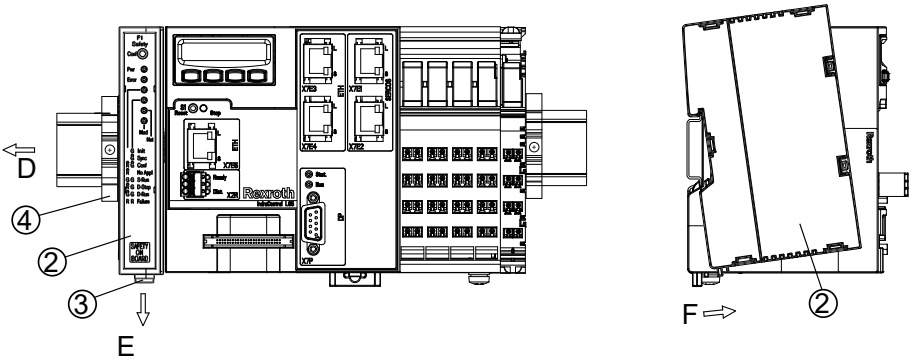



**Fig. 10-3:** Dismounting the Safety function module IndraControl CFL01.1-F1

Dismount the Safety function module:

1. Remove the end clamp ④.
2. Remove the function module ② by moving it to the left Ⓓ away from the control or the neighboring function module.
3. Pull the mounting rail locking ③, Ⓔ downwards using a flat tip screwdriver.
4. Tilt the function module ② to the front Ⓕ.

Do not open the housing of the Safety function module IndraControl CFL01.1-F1!

## 10.4 Electric installation

As the Safety function module is supplied via the IndraControl L, follow the specifications on the electric installation given in the operating instructions "IndraControl L25, L45, L65 and L85 Controls" (refer to tab. 1-2 "Related documents" on page 3).

**⚠ WARNING** **The electric installation of the control and the function module is not allowed under voltage, since the system could start accidentally!**

Disconnect the complete station and the components before mounting or dismounting the components! Connect the voltage only after the entire station has been set up.

All safety-related components of the system (wiring, connected sensors and commanders, configuration, contactor monitoring) have to meet the corresponding safety standard (e.g. DIN EN 62 061, DIN EN 60204 or DIN EN ISO 13 849-1).

☞ The voltage of the IndraControl L is supplied from the PELV power supply units with safe separation acc. to EN 50178 and EN 60950-1.

# 11 Commissioning

## 11.1 General information

The product cannot be operated upon delivery. It has to be parameterized or programmed.

The documentations providing information on the commissioning and project configuration are listed in tab. 1-2 "Related documents" on page 3.

**⚠ WARNING** **An incorrect commissioning can cause fatal immaterial and material damages!**

Ensure that a qualified person checks, documents and releases the system in which the Safety extension card IndraControl CFL01.1-F1 is used before its initial commissioning.

Before the commissioning, ensure that there is no person in the danger zone.

Ensure that the danger zone cannot be accessed.

## 11.2 IT security

The operation of installations, systems and machines requires the implementation of an integral concept for state-of-the-art IT security. Bosch Rexroth products are part of this integral concept. Bosch Rexroth product characteristics

have to be taken into consideration in an integral IT security concept. The relevant characteristics are documented in the IT security guideline (R911342562).

# 12 Device description

## 12.1 General information

The Safety function module IndraControl CFL01.1-F1 is not supported by the IndraControl L25 hardware.

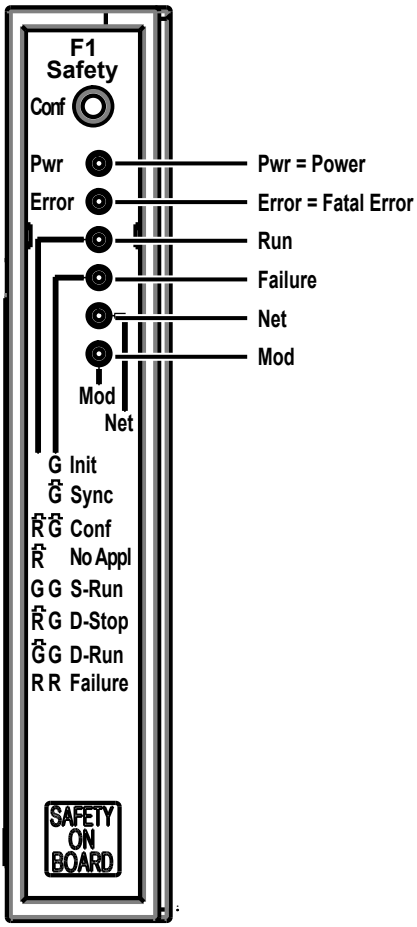



**Fig. 12-1:** Display and operating elements

## 12.2 SD card

The application program (boot application), user management data as well as two logbooks (devices and application) are stored on a D-card and also remain if the power supply fails.

## 12.3 Operating and error displays

### 12.3.1 "Conf" pushbutton

Press the "Conf" pushbutton once to confirm the established communication between the programming system and the Safety function module upon initial login. This confirmation ensures that you are only connected to your selected Safety function module.

### 12.3.2 LED display

The display LED indicates the following:

| LED | Color and status | Description |
|---|---|---|
| Pwr | Off | No power supply from the standard control present |
| | Red | Error: The voltage monitoring of the Safety function module switched off the safe logic voltage |
| | Green | All internal voltages of the Safety function module are within the permitted range |
| Error | Off | The Safety function module is ready |
| | Red | The Safety function module is not ready. This LED is on during the initialization phase.<br>If the LED is still on after the initialization (approx. 1 min) or if the LED is permanently switched on at runtime, integrated self-tests determined a "fatal error" (e.g. hardware error).<br>The Safety function module is then probably defective and has to be replaced.<br>Contact the Bosch Rexroth Service |

**Tab. 12-1:** LED for operational readiness

| LED "Run" (Color and status) | LED "Failure" (Color and status) | Operating state of the Safety function module IndraControl CFL01.1-F1 |
|---|---|---|
| Off | Off | No power supply provided or hardware reset triggered |
| Off | Green | Initialization phase; first part (ca. 30 s) is running |
| Red | Off | Initialization phase; second part (ca. 10 s) is running |

| LED "Run" (Color and status) | LED "Failure" (Color and status) | Operating state of the Safety function module IndraControl CFL01.1-F1 |
|---|---|---|
| Red, flashing | Off | Ready for download.<br>There is either no valid application in the Safety function module or a download is not yet completed |
| Red | Green, flashing | Request to press the "Conf" pushbutton |
| Red | Green | SAFETY STOP |
| Green | Green | SAFETY RUN |
| Red, flashing | Green | DEBUG STOP |
| Green, flashing | Green | DEBUG RUN or SERVICE RUN |
| Red | Red | FAILURE STOP |
| Red | Red, flashing | Exceptional state of the Safety function module due to an internal error. The different displays are used to pinpoint errors |
| Red, flashing | Red, flashing | |
| Red, flashing | Green, flashing | Firmware update is running |
| Green, flashing | Red, flashing | Special operating mode for the Bosch Rexroth service employees |

**Tab. 12-2:** Display of the operating state of the Safety function module IndraControl CFL01.1-F1

| LED | Color and status | Description |
|---|---|---|
| Mod | Off | No power supply present or no CSos configuration loaded |
| | Green, flashing | Standby state |
| | Green | Normal mode |
| | Red, flashing | Error that can be eliminated |
| | Red | Error that cannot be eliminated |
| | Red/green, flashing | Self-test or configuration |
| Net | Off | No power supply present or no CSos configuration loaded |
| | Green, flashing | No valid bus connection |
| | Green | Bus connection OK |
| | Red, flashing | Timeout |
| | Red | Critical connection error |
| | Red/green, flashing | Communication error |

**Tab. 12-3:** Special displays for CIP Safety on Sercos

# 13 Troubleshooting and debugging

For information on the display LED and the pushbutton, refer to chapter 12.3 "Operating and error displays" on page 24.

☞ Repairs at the device by the customer are not permitted. Exceptions are maintenance works listed in the chapter "Maintenance".

For further information in the event of repair, please contact the Bosch Rexroth Service.

# 14 Maintenance

☞ Only the maintenance works at the device listed in this chapter are permitted.

For further information in the event of repair, please contact the Bosch Rexroth Service.

## 14.1 Cleaning notes

***NOTICE*** **The foil surface is dissolved by solvents!**

- Do not use any solvents (e. g. diluents)!

## 14.2 Maintenance notes

The Safety function module runs without maintenance. Check the Safety function module IndraControl CFL01.1-F1 at least annually. The check includes:

- Correct position
- Damage or rupture
- Tight screw connection of the end brackets on the left and right of the control

Replace the function module IndraControl CFL01.1-F1 immediately if it is damaged. In case of damages, please contact the Bosch Rexroth Service.

## 14.3 Replacing SD card

***NOTICE*** **Unintended exchange of the SD card can damage the Safety function module IndraControl CFL01.1-F1**

Only qualified service personnel is allowed to exchange the SD card.

- Approved SD cards may be used, see tab. 5-1 "Ordering data of the SD card" on page 9!
- Formatting: 1 GB, FAT (standard), size of the allocation units: 16 kilobytes
- For the position of the SD card, refer to fig. 10-1 "Dimension drawing of the Safety function module IndraControl CFL01.1-F1 (dimensions in mm)" on page 19.

To replace the SD card, proceed as follows:

1. Disconnect the complete system from voltage. This includes the IndraControl L control. The Safety function module IndraControl CFL01.1-F1 is connected to this control.
2. Secure the system against restart.
3. Remove the Safety function module IndraControl CFL01.1-F1 from the top-hat rail as described in chapter 10.3 "Dismounting" on page 21.
4. Carefully open the housing of the SD card slot.
5. Move the SD card lock forward towards the protective cap until stop.
6. Flap the SD card lock up.
7. Remove the SD card from the slot.
8. Insert the new SD card into the slot with the labeling up.
9. Move the SD card lock backward until stop.
10. Close the cover until it engages audibly.
11. Connect the Safety function module IndraControl CFL01.1-F1 again to the IndraControl L control as described in fig. 10-2 "Mounting the Safety function module IndraControl CFL01.1-F1" on page 20.
12. Commission the system again.

# 15 Ordering information

## 15.1 Accessories and spare parts

For ordering information on accessories and spare parts, refer to chapter 5 "Spare parts and accessories" on page 9.

## 15.2 Hardware prerequisites

For IndraControl L controls supporting the Safety function module IndraControl CFL01.1-F1, refer to the documentation "IndraControl L25, L45, L65, L75 and L85 Controls" in tab. 1-2 "Related documents" on page 3.

## 15.3 Ordering data

| Type code | Product description | Part number |
|---|---|---|
| CFL01.1-F1 | Safety Function Module | R911170129 |

# 16 Disposal

## 16.1 Return

For disposal, our products can be returned free of charge. However, the products must be free of remains like oil and grease or other impurities.

Furthermore, the products returned for disposal must not contain any undue foreign substances or components.

Send the products free of charge to the following address:

Bosch Rexroth AG
Electric Drives and Controls
Bürgermeister-Dr.-Nebel-Straße 2
97816 Lohr, Germany

## 16.2 Packaging

The packaging material consists of cardboard, plastics, wood or styrofoam. Packaging material can be recycled anywhere.

For ecological reasons, please do not return empty packages.

# 17 Service and support

Our worldwide service network provides an optimized and efficient support. Our experts offer you advice and assistance should you have any queries. You can contact us **24/7**.

**Service Germany**

Our technology-oriented Competence Center in Lohr, Germany, is responsible for all your service-related queries for electric drive and controls.

Contact the **Service Hotline** and **Service Helpdesk** under:

| | |
|---|---|
| Phone: | **+49 9352 40 5060** |
| Fax: | **+49 9352 18 4941** |
| E-mail: | service.svc@boschrexroth.de |
| Internet: | http://www.boschrexroth.com |

Additional information on service, repair (e.g. delivery addresses) and training can be found on our internet sites.

### Service worldwide

Outside Germany, please contact your local service office first. For hotline numbers, refer to the sales office addresses on the internet.

### Preparing information

To be able to help you more quickly and efficiently, please have the following information ready:

- Detailed description of malfunction and circumstances
- Type plate specifications of the affected products, in particular type codes and serial numbers
- Your contact data (phone and fax number as well as your e-mail address)

# Index

## T



## U



## V



## W

## Notes

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