

Flexi Soft Gateways

Hardware

SICK
Sensor Intelligence.



Described product

Flexi Soft Gateways
Hardware

Manufacturer

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Original document

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1 About this document

1.1 Purpose of this document

These operating instructions contain the information needed during the life cycle of the Flexi Soft gateways.

These operating instructions must be made available to all people who work with the Flexi Soft gateways and the Flexi Soft Designer configuration software.

For the Flexi Soft system, there are operating instructions and mounting instructions, each covering clearly defined fields of application.

Table 1: Overview of the Flexi Soft documentation

Document type	Title	Contents	Purpose	Part number
Operating instructions	Flexi Soft Modular Safety Controller Hardware	Description of the Flexi Soft modules and their functions	Instructions for technical personnel working for the machine manufacturer or operator on the safe mounting, electrical installation, and maintenance of the Flexi Soft safety controller	8012999
Operating instructions	Flexi Soft in the Flexi Soft Designer Configuration software	Description of the software-based configuration of the Flexi Soft safety controller along with important diagnostics functions and detailed notes on identifying and rectifying errors	Instructions for technical personnel working for the machine manufacturer or operator on the safe configuration and commissioning, as well as the safe operation, of the Flexi Soft safety controller	8012998
Operating instructions	Safety Designer Configuration software	Description of the installation and general basic principles of operation	To provide technical personnel working for the machine manufacturer/operator with instructions so that they can use the Safety Designer configuration software	8018178
Operating instructions	Flexi Soft in the Safety Designer Configuration software	Description of the software-based configuration of the Flexi Soft safety controller along with important diagnostics functions and detailed notes on identifying and rectifying errors	Instructions for technical personnel working for the machine manufacturer or operator on the safe configuration and commissioning, as well as the safe operation, of the Flexi Soft safety controller	8013926
Operating instructions	Flexi Soft Gateways Hardware	Description of the Flexi Soft gateways and their functions	To provide technical personnel working for the machine manufacturer/operator with instructions so that they can safely carry out the mounting, electrical installation, and maintenance work for the Flexi Soft gateways	8012662
Operating instructions	Flexi Soft Gateways in Flexi Soft Designer Configuration software	Description of the software-based configuration of the Flexi Soft gateway, information about data exchange in networks as well as about the status, planning, and associated mapping	To provide technical personnel working for the machine manufacturer/operator with instructions so that they can safely configure and commission the Flexi Soft gateways	8012483

Document type	Title	Contents	Purpose	Part number
Operating instructions	Flexi Soft Gateways in the Safety Designer Configuration software	Description of the software-based configuration of the Flexi Soft gateway, information about data exchange in networks as well as about the status, planning, and associated mapping	To provide technical personnel working for the machine manufacturer/operator with instructions so that they can safely configure and commission the Flexi Soft gateways	8018170
Operating instructions	Flexi Loop safe series connection Hardware	Description of the Flexi Loop safe series connection and its functions	To provide technical personnel working for the machine manufacturer/operator with instructions so that they can safely carry out the mounting, electrical installation, and maintenance work for the Flexi Loop safe series connection	8015834
Operating instructions	Flexi Loop in the Flexi Soft Designer configuration software	Description of how to configure and set the parameters for the Flexi Loop safe series connection using software	To provide technical personnel working for the machine manufacturer/operator with instructions so that they can safely configure and commission the Flexi Loop safe series connection	8014521
Operating instructions	Flexi Loop in Safety Designer Configuration software	Description of how to configure and set the parameters for the Flexi Loop safe series connection using software	To provide technical personnel working for the machine manufacturer/operator with instructions so that they can safely configure and commission the Flexi Loop safe series connection	8018174
Mounting instructions	Flexi Soft FX3-EBX3 and FX3-EBX4 Encoder/Motor Feedback Connection Boxes	Description of FX3-EBX3 and FX3-EBX4 encoder/motor feedback connection boxes	To provide technical personnel working for the machine manufacturer/operator with instructions so that they can safely carry out the mounting, electrical installation, commissioning, and maintenance work for FX3-EBX3 and FX3-EBX4 encoder/motor feedback connection boxes	8015600
Mounting instructions	Flexi Soft FX3-EBX1 Optimized Dual Encoder/Motor Feedback Connection Box	Description of the FX3-EBX1 optimized dual encoder/motor feedback connection box	To provide technical personnel working for the machine manufacturer/operator with instructions so that they can safely carry out the mounting, electrical installation, commissioning, and maintenance work for the FX3-EBX1 optimized dual encoder/motor feedback connection box	8019030

1.2 Scope

Product

These operating instructions apply to all Flexi Soft gateways.

Document identification

Document part number:

- This document: 8012664
- Available language versions of this document: 8012662

You can find the current version of all documents at www.sick.com.

1.3 Target groups of these operating instructions

Some sections of these operating instructions are intended for certain target groups. However, the entire operating instructions are relevant for intended use of the product.

Table 2: Target groups and selected sections of these operating instructions

Target group	Sections of these operating instructions
Project developers (planners, developers, designers)	"Configuration", page 32 "Technical data", page 74
Installers	"Mounting", page 25
Electricians	"Electrical installation", page 27
Safety experts (such as CE authorized representatives, compliance officers, people who test and approve the application)	"Configuration", page 32 "Commissioning", page 52 "Technical data", page 74
Operators	"Operation", page 53 "Troubleshooting", page 59
Maintenance personnel	"Maintenance", page 58 "Troubleshooting", page 59

1.4 Further information

www.sick.com

The following information is available via the Internet:

- Other language versions
- Data sheets and application examples
- CAD data for drawings and dimensional drawings
- Certificates (such as the EU declaration of conformity)
- Guide for Safe Machinery (six steps to a safe machine)

The following files are also available for download from this site:

- EDS file for the FX0-GENT for EtherNet/IP™
- GSDML file for the FX0-GPNT for PROFINET IO
- GSD file for the FX0-GPRO for PROFIBUS DP
- EDS file for the FX0-GCAN for CANopen
- EDS file for the FX0-GDEV for DeviceNet
- ESI file for the FX0-GETC for EtherCAT
- EDS file for the FX3-GEPR for EFI-pro

1.5 Symbols and document conventions

The following symbols and conventions are used in this document:

Warnings and other notes



DANGER

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



WARNING

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



CAUTION

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



NOTICE

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



NOTE

Highlights useful tips and recommendations as well as information for efficient and trouble-free operation.

Instructions to action

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

LED symbols

These symbols indicate the status of an LED:

- The LED is off.
- ◐ The LED is flashing.
- The LED is illuminated continuously.

2 Safety information

2.1 General safety notes

Integrating the product



DANGER

The product can not offer the expected protection if it is integrated incorrectly.

- ▶ Plan the integration of the product in accordance with the machine requirements (project planning).
 - ▶ Implement the integration of the product in accordance with the project planning.
-

Mounting and electrical installation



DANGER

Death or severe injury due to electrical voltage and/or an unexpected startup of the machine

- ▶ Make sure that the machine is (and remains) disconnected from the voltage supply during mounting and electrical installation.
 - ▶ Make sure that the dangerous state of the machine is and remains switched off.
-



WARNING

Improper mounting or use

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

- ▶ When mounting, installing, and using the Flexi Soft safety controller, remember to observe all applicable standards and directives.
 - ▶ Observe the relevant national and international legal provisions for the installation and use of the Flexi Soft safety controller, its commissioning, and technical inspections repeated at regular intervals.
 - ▶ The manufacturer and operator of the machine on which the Flexi Soft safety controller is used are responsible for liaising with the relevant authorities about all applicable safety regulations/rules and for ensuring compliance with these.
 - ▶ The notes, in particular the test notes, in these operating instructions (e.g. regarding use, mounting, installation, or integration into the machine controller) must always be observed.
 - ▶ The thorough checks must be carried out by qualified safety personnel or specially qualified and authorized personnel, and must be recorded and documented by a third party to ensure that the tests can be reconstructed and retraced at any time.
-

Configuration



WARNING

Ineffectiveness of the protective device due to incorrect configuration

The dangerous state may not be stopped or not be stopped in a timely manner in the event of non-compliance.

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

- ▶ Check whether the configured safety application monitors the machine or plant as intended and if the safety of the configured application is maintained at all times. This must be ensured in every operating mode and secondary application. Document the results of this thorough check.
 - ▶ Check the safety function again after any change to the configuration.
 - ▶ Observe the testing information in the operating instructions for the connected protective devices.
-

Repairs and modifications



DANGER

Improper work on the product

A modified product may not offer the expected protection if it is integrated incorrectly.

- ▶ Apart from the procedures described in this document, do not repair, open, manipulate or otherwise modify the product.
-

2.2 Intended use

The Flexi Soft gateways can only be operated in conjunction with a Flexi Soft system.

Different firmware and software versions are required depending on the configuration software used:

- With Flexi Soft Designer: The main module used must have a firmware version of at least V1.11.0; the Flexi Soft Designer configuration software must be at least V1.3.0.
- With Safety Designer: The main module used must have a firmware version of at least V4.00.0; the Safety Designer configuration software must be at least V1.6.x.

The product is only suitable for use in industrial environments.

The product must only be used within the limits of the prescribed and specified technical specifications and operating conditions at all times.

Incorrect use, improper modification or manipulation of the product will invalidate any warranty from SICK; in addition, any responsibility and liability of SICK for damage and secondary damage caused by this is excluded.

UL applications

In UL applications, the Flexi Soft system must be operated with a class 2 voltage supply or a class 2 transformer in accordance with UL 1310 or UL 1585.

The Flexi Soft gateways do not have their own voltage supply.

2.3 Inappropriate use

The Flexi Soft gateways (FX0-Gxxx) do not support any of the security mechanisms that are required for communication within a safety network. The Flexi Soft gateways (FX0-Gxxx) are therefore not suitable for operation on a safety fieldbus. These Flexi Soft gateways only generate non-safety-related fieldbus data (status bytes) for control and diagnostic purposes.

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

- ▶ Never operate Flexi Soft gateways (FX0-Gxxx) on a safety fieldbus.

With the Flexi Soft gateways (FX0-Gxxx), it is possible to integrate non-safety-related data into the logic editor in such a way as to impair the safety function of the Flexi Soft system.

The dangerous state may not be stopped or not be stopped in a timely manner in the event of non-compliance.

- ▶ Do not use the Flexi Soft gateways (FX0-Gxxx) for safety-related applications.
- ▶ Before integrating a gateway into a Flexi Soft system, have this source of danger thoroughly checked by a safety specialist.

Exception: The FX3-GEPR EFI-pro gateway

The FX3-GEPR EFI-pro gateway also allows safety-related data to be exchanged.

2.4 Security information

Security advisories exist for these devices.

Observe the security advisories under: www.sick.com/psirt

2.5 Requirements for the qualification of personnel

The product must be configured, installed, connected, commissioned, and serviced by qualified safety personnel only.

Project planning

You need safety expertise to implement safety functions and select suitable products for that purpose. You need expert knowledge of the applicable standards and regulations.

Mounting, electrical installation and commissioning

You need suitable expertise and experience. You must be able to assess if the machine is operating safely.

Configuration

You need suitable expertise and experience. You must be able to assess if the machine is operating safely.

Operation and maintenance

You need suitable expertise and experience. You must be instructed in machine operation by the machine operator. For maintenance, you must be able to assess if the machine is operating safely.

3 Product description

The Flexi Soft gateways enable the Flexi Soft system to send data to external fieldbus systems for control and diagnostic purposes, and also to receive data from them.



NOTE

In these operating instructions, data exchange between the Flexi Soft system and the respective network is always viewed from the perspective of the network master (PLC). Consequently, data sent to the network by the Flexi Soft system is referred to as “input data” and data received from the network is referred to as “output data”.

You can configure the Flexi Soft gateways using either the Flexi Soft Designer or the Safety Designer configuration software. This must be installed on a computer that is connected to the main module via the RS-232 or USB interface or to an Ethernet gateway via Ethernet TCP/IP.

The safety-related logic of the Flexi Soft system functions independently of the gateway. However, this is not the case if the Flexi Soft system has been configured in such a way that non-safety-related information from the fieldbus is integrated into the logic editor. In this case, availability problems may occur if the gateway is switched off.

An individual Flexi Soft gateway can only be operated on one Flexi Soft system. It does not have its own voltage supply. Two Flexi Soft gateways can be operated on one system at the same time.

The gateways are housed in a 22.5 mm wide surface-mounted housing for standard 35 mm rails in accordance with EN 60715 (DIN mounting rail).

Ordering information: see "[Ordering information](#)", page 82.

3.1 Device variants

Important information



NOTE

If two computers establish TCP/IP connections to the same Flexi Soft main module of a Flexi Soft Ethernet gateway in parallel (e.g., via port 9000), the Flexi Soft main module will only communicate via the most recently established connection. As a result, the second computer will establish a further connection without closing the ones already established. There comes a point when too many connections to the computers are open via the gateway and the only messages being exchanged on those computers are messages for maintaining these connections (known as keep-alive messages). This causes the Flexi Soft system to switch to the “Serious error” state.

Device variants

Table 3: Device variants and their main features

Gateway	Network type	Ethernet TCP/IP socket interface	TCP/IP configuration interface ¹⁾
FX0-GENT	EtherNet/IP™ with explicit messaging	Client/server	TCP port 9000 UDP port 30718
FX0-GMOD	Modbus TCP with master and slave operation	Client/server	TCP port 9000 UDP port 30718
FX0-GPNT	PROFINET IO slave, conformance class A	Client/server	TCP port 9000 UDP port 30718
FX0-GETC	EtherCAT slave	–	TCP port 9000 and UDP port 30718 via EoE ²⁾
FX0-GPRO	PROFIBUS DP slave	–	–
FX0-GCAN	CANopen slave	–	–
FX0-GDEV	DeviceNet slave	–	–
FX3-GEPR ²⁾	EFI-pro master and slave operation EtherNet/IP™ CIP Safety™ master EtherNet/IP™ slave	–	TCP port 2122 UDP port 30718

- 1) The TCP/IP communication interface of the FX0-GETC gateway can only be used with the Flexi Soft Designer configuration software. The TCP/IP configuration interface is not available in Safety Designer for FX0-GENT, FX0-GPNT and FX0-GMOD from version 1.7.0.
- 2) The TCP/IP configuration interface for the FX0-GETC will only be available if EoE (Ethernet over EtherCAT) has been configured in advance.
- 3) To configure the FX3-GEPR, version V1.4.0.75 or higher of the Safety Designer configuration software is required. Flexi Soft systems that include an FX3-GEPR cannot be configured with the Flexi Soft Designer configuration software.

Complementary information

You will find the date of manufacture of a device in the **S/N** field on the type label in the format yywwnnnn (yy = year, ww = calendar week, nnnn = sequential serial number in the calendar week).

3.2 Ethernet gateways

This chapter describes the following Flexi Soft gateways:

- The FX0-GENT EtherNet/IP™ gateway
- The FX0-GMOD Modbus TCP gateway
- The FX0-GPNT PROFINET IO gateway
- The FX0-GETC EtherCAT gateway

3.2.1 Firmware versions

The FX0-GENT, FX0-GMOD, and FX0-GPNT Ethernet gateways and the FX0-GDEV DeviceNet gateway are available with a variety of firmware versions. In order to add a gateway to a Flexi Soft system in the configuration software, you have to select the appropriate step of the respective gateway.

Table 4: Firmware versions of the Ethernet gateways

Firmware version	Step
V1.xx.x	1.xx
V2.xx.x	2.xx

Firmware version	Step
≥ V3.00.0	3.xx



NOTE

- You will find the firmware version on the device type label.
- When you use the configuration software to read in a Flexi Soft system, the firmware version of the devices is detected automatically.

3.2.2 The FX0-GENT EtherNet/IP™ gateway

Important information



NOTE

Flexi Soft EtherNet/IP™ gateways with firmware version V1.xx.x only support EtherNet/IP™ explicit messaging (class 3). Implicit messaging (class 1) is not supported. Flexi Soft EtherNet/IP™ gateways with a firmware version ≥ V2.00.0 support both EtherNet/IP™ implicit messaging (class 1) and explicit messaging (class 3).

Description

The FX0-GENT features an integrated 3-port switch for the Ethernet connection. There are two RJ45 female connectors ready for connection. The switch allows you to connect the FX0-GENT to another Ethernet component (e.g., to a computer) without having to break the Ethernet network connection.

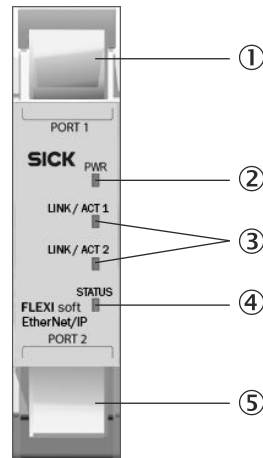


Figure 1: Interfaces and status indicators on the FX0-GENT with firmware V1.xx.x or V2.xx.x

- ① PORT1, RJ45 female Ethernet connector
- ② PWR LED (voltage supply)
- ③ LINK/ACT 1 and 2 LEDs (network activity for Ethernet ports 1 and 2)
- ④ STATUS LED
- ⑤ PORT2, RJ45 female Ethernet connector

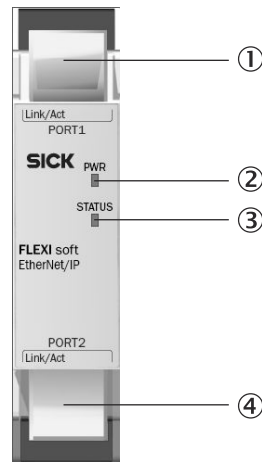


Figure 2: Interfaces and status indicators on the FX0-GENT with firmware \geq V3.00.0

- ① PORT1, RJ45 female Ethernet connector with Link/Act LED
- ② PWR LED (voltage supply)
- ③ STATUS LED
- ④ PORT2, RJ45 female Ethernet connector with Link/Act LED

3.2.3 The FX0-GMOD Modbus TCP gateway

Important information



NOTE

To configure a FX0-GMOD with firmware \geq V3.00.0, Flexi Soft Designer Version 1.9.7 or Safety Designer Version 2023.02 is required.

Description

The Flexi Soft Modbus TCP gateway supports:

- Modbus TCP with client and server operation
- Ethernet TCP/IP socket interface, polling, and auto-update function
- With a firmware version \geq V2.01.0: Data can also be read out in words.

The FX0-GMOD features an integrated 3-port switch to enable connection to the Ethernet network. There are two RJ45 female connectors ready for connection. The switch allows you to connect the FX0-GMOD to another Ethernet component (e.g., to a computer) without having to break the Ethernet network connection.

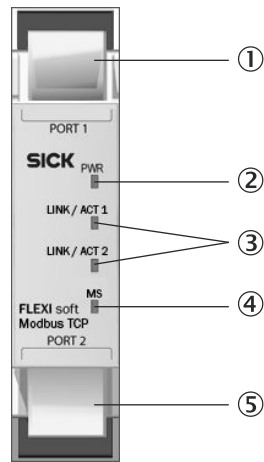


Figure 3: Interfaces and status indicators on the FX0-GMOD with firmware V1.xx.x or V2.xx.x

- ① PORT1, RJ45 female Ethernet connector
- ② PWR LED (voltage supply)
- ③ LINK/ACT 1 and 2 LEDs (network activity for Ethernet ports 1 and 2)
- ④ MS LED (module status)
- ⑤ PORT2, RJ45 female Ethernet connector

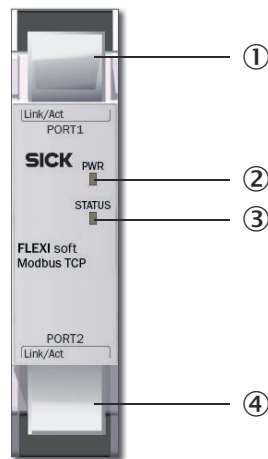


Figure 4: Interfaces and status indicators on the FX0-GMOD with firmware ≥ V3.00.0

- ① PORT1, RJ45 female Ethernet connector with Link/Act LED
- ② PWR LED (voltage supply)
- ③ STATUS LED
- ④ PORT2, RJ45 female Ethernet connector with Link/Act LED

3.2.4 The FX0-GPNT PROFINET IO gateway

Important information



NOTICE

FX0-GPNT with firmware ≥ V3.00.0 supports only network class 1. PROFINET devices with network class 2 and higher are not supported.

Description

The FX0-GPNT supports

- PROFINET IO, conformance class A
- LLDP

- SNMP
- MIB-II
- Fast integrated switching
- Auto MDI
- Auto-negotiation
- Cyclical I/O communication

As of firmware version \geq V3.00.0, the FX0-GPNT also supports

- PROFINET IO, conformance class B
- Netload class 1
- MRP client

The FX0-GPNT features an integrated 3-port switch for the Ethernet connection. There are two RJ45 female connectors ready for connection. The switch allows you to connect the FX0-GPNT to another Ethernet component (e.g., to a computer) without having to break the Ethernet network connection.

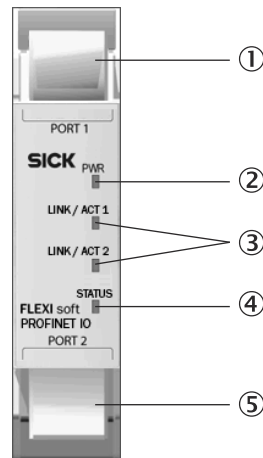


Figure 5: Interfaces and status indicators on the FX0-GPNT with firmware V1.xx.x or V2.xx.x

- ① PORT1, RJ45 female Ethernet connector
- ② PWR LED (voltage supply)
- ③ LINK/ACT 1 and 2 LEDs (network activity for Ethernet ports 1 and 2)
- ④ STATUS LED
- ⑤ PORT2, RJ45 female Ethernet connector

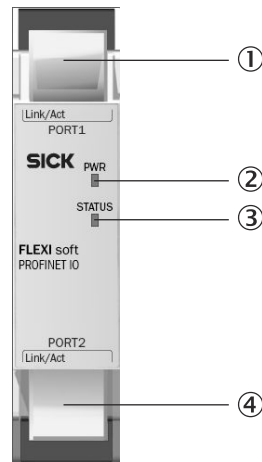


Figure 6: Interfaces and status indicators on the FX0-GPNT with firmware \geq V3.00.0

- ① PORT1, RJ45 female Ethernet connector with Link/Act LED
- ② PWR LED (voltage supply)
- ③ STATUS LED
- ④ PORT2, RJ45 female Ethernet connector with Link/Act LED

3.2.5 The FX0-GETC EtherCAT gateway

Description

The FX0-GETC is an EtherCAT slave device. It supports the following services, which are mandatory to enable the full range of functions:

- Flexi Soft system configuration and diagnostics via TCP/IP, tunneled in EtherCAT via the EoE (Ethernet over EtherCAT) protocol
- CoE (CAN application layer over EtherCAT)
- Station diagnostics via CoE object 10F3h

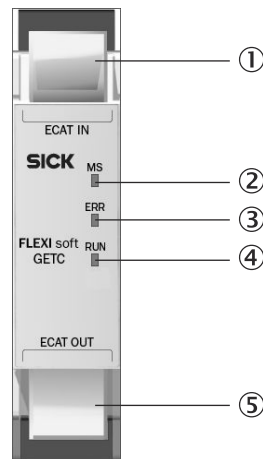


Figure 7: Interfaces and status indicators on the FX0-GETC

- ① RJ45 EtherCAT input with Link/Act LED
- ② MS LED (module status)
- ③ ERR LED (EtherCAT error)
- ④ RUN LED (EtherCAT running)
- ⑤ RJ45 EtherCAT output with Link/Act LED

3.2.6 Features shared by all the Ethernet gateways

3.2.6.1 TCP/IP configuration interface

The Flexi Soft Ethernet gateways feature a TCP/IP configuration interface for configuring the Flexi Soft system via Ethernet TCP/IP. The interface works in parallel with Ethernet TCP/IP or other Ethernet protocols.



NOTE

The TCP/IP communication interface of the FX0-GETC gateway can only be used with the Flexi Soft Designer configuration software.

The TCP/IP configuration interface is not available in Safety Designer for FX0-GENT, FX0-GPNT and FX0-GMOD from version 1.7.0.



WARNING

Configuration, diagnostics or operation errors due to several simultaneous configuration connections

The dangerous state may not be stopped or not be stopped in a timely manner in the event of non-compliance.

- ▶ Do not establish concurrent configuration connections to a Flexi Soft system. This applies regardless of the configuration software used and the selected interface (RS-232, Ethernet, USB).



NOTE

Remote TCP/IP connections with excessive signal propagation times can be unstable. Signal propagation times > 300 ms may result in the connection being terminated.

- ▶ Take account of signal propagation times in the case of remote TCP/IP connections.
- ▶ Use the ping command to check the signal propagation time to the gateway.
- ▶ Make sure that the connection is fast enough or change the routing (if possible).

Or:

- ▶ Use a piece of remote maintenance software such as TeamViewer to control the local computer that has the configuration software installed on it and is connected locally to the Flexi Soft system.

Or:

- ▶ Contact SICK Support.

3.2.6.2 Ethernet TCP/IP socket interface

The FX0-GENT, FX0-GMOD, and FX0-GPNT Ethernet gateways each support four TCP/IP socket interfaces. This enables multiple applications to communicate with the gateway via Ethernet TCP/IP at the same time. The number of possible connections depends on the firmware version of the gateway.

Table 5: Number of possible TCP/IP connections

Firmware version	Number of connections possible per socket	Total number of possible connections
V1.xx.x	1 per socket	4
≥ V2.00.0	6 per socket	24

The specific network interface for the relevant gateway (e.g., Modbus TCP) functions in parallel. As a result, the TCP/IP socket configuration is not affected by the configuration or operation of this interface and continues to be executed regardless.

3.3 Fieldbus gateways

This chapter describes the following fieldbus gateways:

- The FX0-GPRO PROFIBUS DP gateway
- The FX0-GCAN CANopen gateway
- The FX0-GDEV DeviceNet gateway

3.3.1 The FX0-GPRO PROFIBUS DP gateway

Description

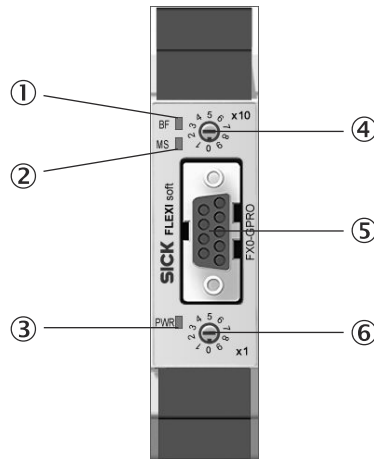


Figure 8: Interfaces and status indicators on the FX0-GPRO

- ① BF LED (bus fault)
- ② MS LED (module status)
- ③ PWR LED (voltage supply)
- ④ Address switch 1
- ⑤ PROFIBUS connection
- ⑥ Address switch 2

3.3.2 The FX0-GCAN CANopen gateway

Description

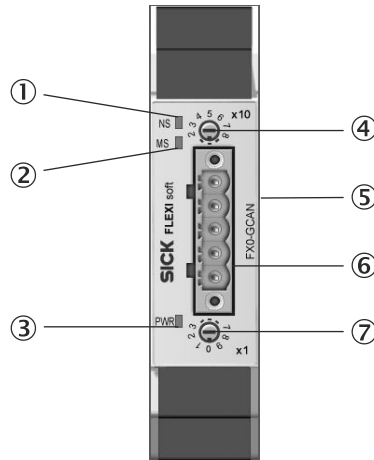


Figure 9: Interfaces and status indicators on the FX0-GCAN

- ① NS LED (network status)
- ② MS LED (module status)
- ③ PWR LED (voltage supply)
- ④ Address switch 1
- ⑤ DIP switches for setting the data transmission rate
- ⑥ CANopen connection
- ⑦ Address switch 2

3.3.3 The FX0-GDEV DeviceNet gateway

Description

DeviceNet implementation characteristics

- Group 2 server (fragmented)
- Acknowledge handling
- I/O messaging (polled or change of state/cyclic, also fragmented)
- Data transmission rate can be set via DIP switches (125 kbit/s, 250 kbit/s, 500 kbit/s)

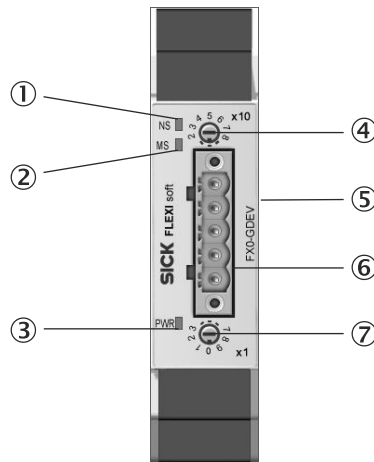


Figure 10: Interfaces and status indicators on the FX0-GDEV

- ① NS LED (network status)
- ② MS LED (module status)
- ③ PWR LED (voltage supply)
- ④ Address switch 1
- ⑤ DIP switches for setting the data transmission rate
- ⑥ DeviceNet connection
- ⑦ Address switch 2

3.4 Safe gateways

This chapter describes the following safe Flexi Soft gateway:

- The FX3-GEPR EFI-pro gateway

3.4.1 The FX3-GEPR EFI-pro gateway

Overview

The FX3-GEPR EFI-pro gateway can be used for EtherNet/IP™ with the CIP Safety™ profile.

Important information



NOTE

- Only one FX3-GEPR can be connected to each main module.
- An FX3-CPUx main module with firmware version V4.00.0 (step 4.xx) or higher is required.
- Version V1.4.0.75 or higher of the Safety Designer configuration software is required.
- The FX3-GEPR cannot be configured with the Flexi Soft Designer configuration software.
- The gateway is to be connected only to internal Ethernet networks without exiting a facility and being subjected to telecommunication network voltages (TNVs).



NOTICE

The USB interface is not suitable for continuous operation.

- ▶ Only use the USB interface during configuration and diagnostics.

Description

The Flexi Soft EFI-pro gateway supports the following operating modes:

- EFI-pro originator and target
- EtherNet/IP™ CIP Safety™ originator and target
- EtherNet/IP™ target

The FX3-GEPR features an integrated 3-port switch to enable connection to the Ethernet network. There are two RJ45 female connectors ready for connection. The switch allows you to connect the FX3-GEPR to another Ethernet component (e.g., to a computer) without having to interrupt the Ethernet network connection.

In addition, the FX3-GEPR features its own USB communication interface. This interface can be used to configure and diagnose the Flexi Soft system.

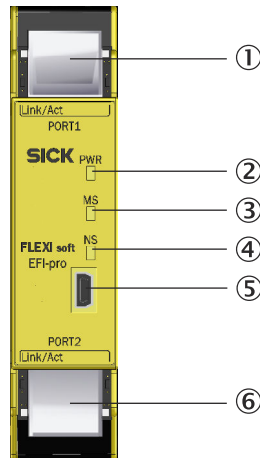


Figure 11: Interfaces and status indicators on the FX3-GEPR

- ① PORT1, RJ45 female Ethernet connector with Link/Act LED
- ② PWR LED (voltage supply)
- ③ MS LED (module status)
- ④ NS LED (network status)
- ⑤ USB configuration interface
- ⑥ PORT2, RJ45 female Ethernet connector with Link/Act LED

Complementary information

For information on EFI-pro, CIP, and CIP Safety™, please refer to the operating instructions for the configuration software.

4 Mounting

4.1 Mounting procedure

Overview

Assignment of the modules:

- The FX3-CPUx main module is located on the far left.
- You can use up to two gateways per safety controller. Mount the two optional gateways directly to the right of the main module.
- Mount all other expansion modules to the right of the gateway in any sequence.
- Mount any additional relay modules (UE410-2RO or UE410-4RO) to the right of the expansion modules.

Important information



WARNING

Electrical voltage

There is a risk of injury from electrocution while connecting the devices.

- ▶ Disconnect the power for the entire plant/machine.

Prerequisites

- The safety controller must be protected against condensation and conductive contamination, e.g. in an IP54 control cabinet.
- Mount the modules in accordance with EN 50274.
- Mount the modules on a 35 mm mounting rail in accordance with IEC 60715.
- The mounting rail is connected to the functional earth.
- Mounting in a vertical orientation (on a horizontal mounting rail). [figure 12](#)
- There is at least 50 mm of space for air circulation above and below the module.
- There is at least 25 mm of space in front of the module (front side). More space may be needed depending on the connections.
- Implement suitable measures to prevent any foreign bodies from entering the connector openings.
- Take suitable ESD protection measures.

Procedure

1. Attach module to mounting rail (①).
 2. Ensure the grounding clip (②) is seated flush against the DIN mounting rail so that it is secure and can conduct electricity effectively.
 3. Press the module into place on the DIN mounting rail in the direction of the arrow (③).
- ✓ The module engages with an audible click.

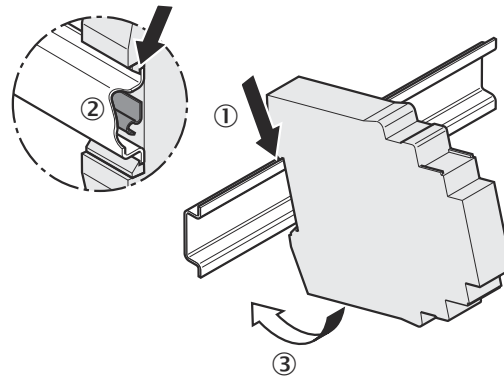


Figure 12: Mounting the module on the DIN mounting rail

4. Slide the modules together one by one (as indicated by the arrows) until the side-mounted plug connector engages.
5. Mount the end pieces on the left- and right-hand sides.

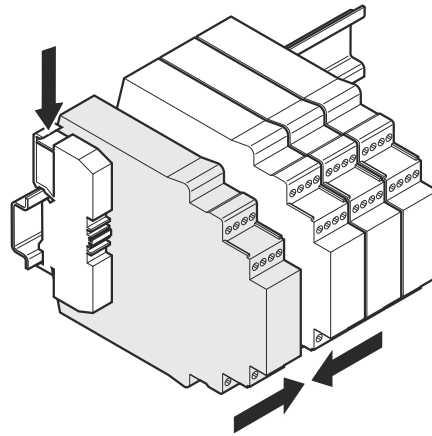


Figure 13: Attaching the end pieces

Complementary information

The modules are interconnected via a FLEXBUS+ plug connector, which is integrated into the housing. Before removing a module from the mounting rail, slide the modules approx. 10 mm apart.

5 Electrical installation

5.1 Requirements for the electrical installation work



WARNING

Electrical voltage

There is a risk of injury from electrocution while connecting the devices.

- ▶ Disconnect the power for the entire plant/machine.



WARNING

Unintended start of the plant/machine

The plant/machine could inadvertently start while you are connecting the devices.

- ▶ Disconnect the power for the entire plant/machine.



WARNING

Ineffectiveness of the protective device due to non-compliance with safety standards

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

- ▶ Observe the relevant safety standards (e.g. EN 62061, or EN ISO 13849-1) for all the safety-related parts of the plant (wiring, connected sensors and control devices, configuration, external device monitoring).



NOTE

- The Flexi Soft gateways meet the EMC requirements stipulated by generic standard EN 61000-6-2 for the industrial sector.
- To achieve full EMC safety, you must connect the DIN mounting rail to functional earth (FE).
- The Flexi Soft gateways are supplied with voltage via the system plug and the internal FLEXBUS+ bus.
- The external voltage supply for the devices must be capable of bridging short-term power outages of 20 ms as specified in EN 60204-1, for example.
- The voltage supply and all connected signals must meet the requirements for extra-low voltages with safe separation (SELV, PELV) as specified in EN 60664 and EN 50178 (Electronic equipment for use in power installations).

Electrical installation

- ▶ Carry out the electrical installation work in conformity with EN 60204-1.
- ▶ Connect the shielding of all fieldbus and Ethernet cables to the functional earth (FE) directly at the control cabinet entry point.
- ▶ Make sure that all the Flexi Soft system modules, the connected protective devices (e.g., the EFI-enabled devices), and the voltage supplies are all connected to the same ground. The ground of the RS-232 interface is connected internally to the ground of the main module's voltage supply (A2).

5.2 Ethernet gateways

The FX0-GENT, FX0-GMOD, FX0-GPNT, and FX0-GETC Ethernet gateways have an integrated 3-port switch for the Ethernet connection. Each Ethernet gateway features two RJ45 female connectors.

Cabling requirements

- Type: 100Base-TX
- RJ45 connections
- Twisted pair Ethernet cable, maximum length 100 m in accordance with EN 50173
- Use of wire pairs 1/2 and 3/6
- Shielded cables recommended

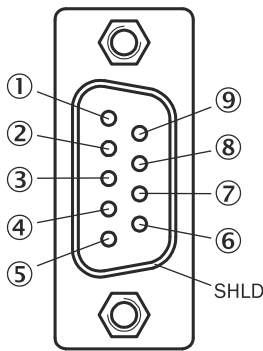
5.3 The FX0-GPRO PROFIBUS DP gateway

Pin assignment

The connection to the PROFIBUS DP fieldbus is established via a 9-pin D-SUB female connector.

Table 6: Pin assignment of the D-SUB female connector on the FX0-GPRO

Pin	Description
1	NC
2	NC
3	RxD/TxD-P
4	CNTR-P
5	GND-EXT
6	+5V-EXT
7	NC
8	RxD/TxD-N
9	CNTR-N (GND-EXT)
SHLD	Shield



Bus cable

The bus topology for PROFIBUS DP is a linear structure consisting of a shielded, two-wire twisted-pair cable with active bus termination at both ends. The bus lengths can range from 100 m with a speed of 12 Mbit/s up to 1,200 m with a speed of 94 kbit/s.

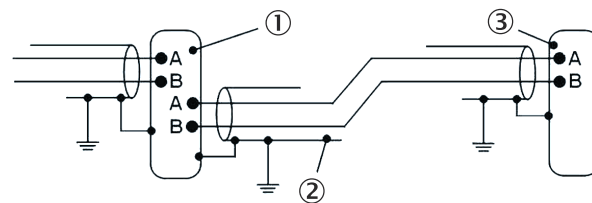


Figure 14: The FX0-GPRO bus cable

- ① PROFIBUS user, gray
- ② Shielded bus cable
- ③ PROFIBUS termination, yellow (with integrated terminating resistors)

Cable parameters

The characteristics of the bus cable are defined in EN 50170 as cable type A.

Table 7: Cable parameters for the FX0-GPRO

Characteristic	Value
Impedance	135 ... 165 Ω (with a frequency of 3 ... 20 MHz)
Capacitance per unit length	< 30 pF/m
Loop resistance	≤ 110 Ω/km

Characteristic	Value
Wire diameter	> 0.64 mm
Wire cross-section	> 0.34 mm ²

With these cable parameters, the following maximum lengths of cable are permitted for each bus section based on the data transmission rate:

Table 8: Maximum length of cable in accordance with the data transmission rate of the FX0-GPRO

Data transmission rate [kbit/s]	Maximum length of cable [m]
9.6/19.2/93.75	1200
187.5	1000
500	400
1500	200
12,000	100

5.4 The FX0-GCAN CANopen gateway

Pin assignment

The connection to the CANopen fieldbus is established by means of a 5-pin female open-style connector.

Table 9: Female open-style connector and pin assignment on the FX0-GCAN

Pin	Description	
5	-	-
4	H CAN_H	CAN high
3	DR (CAN_SHLD)	Shielding connection (optional)
2	L CAN_L	CAN low
1	-	-

Bus cable

CANopen is based on a linear topology involving shielded, two-wire twisted-pair cables and terminating resistors at both ends of the bus. The shielding is connected to ground at both ends. Depending on the length of the network, the transmission rate ranges between 125 kbit/s and 1,000 kbit/s. The length of the network can range from 20 m with a speed of 1,000 kbit/s up to 500 m with a speed of 125 kbit/s.

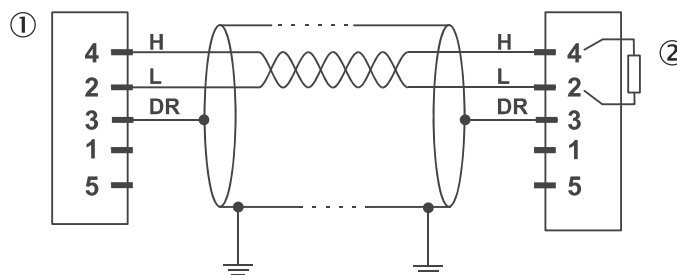


Figure 15: CANopen bus cable

- ① Node
- ② 120 Ω terminating resistor



NOTE

It is not necessary to connect a voltage supply (pins 1 and 5) to the FX0-GCAN.

The following maximum lengths of cable are possible based on the data transmission rate:

Table 10: Maximum length of cable in accordance with the data transmission rate of the FX0-GCAN

Data transmission rate [kbit/s]	Maximum length of cable [m]
125	500
250	250
500	100
800	40
1000	20

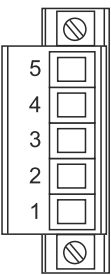
5.5 The FX0-GDEV DeviceNet gateway

Pin assignment

The connection to the DeviceNet fieldbus is established by means of a 5-pin female open-style connector.

Table 11: Female open-style connector and pin assignment on the FX0-GDEV

Pin	Description	
	5	V+ (24 V)
4	H CAN_H	DeviceNet high
3	DR (CAN_SHLD)	Shielding connection (optional)
2	L CAN_L	DeviceNet low
1	V- (GND)	GND/0 V



Bus cable

DeviceNet is based on CAN. Consequently, it is a two-wire bus system with all the stations connected to it in parallel. Short stubs are also possible. The H and L signal lines must be terminated by a 120 Ω resistor at both ends of the bus. The shielding must be connected so that it runs continuously along the entire length of the bus and it must be grounded at one point. We recommend using a twisted-pair cable with two twisted and shielded wire pairs. The 24 V supply voltage is connected to the second wire pair.

Depending on the length of the network, the transmission rate ranges between 125 kbit/s and 500 kbit/s. The length of the network can range from 100 m with a speed of 500 kbit/s up to 500 m with a speed of 125 kbit/s.

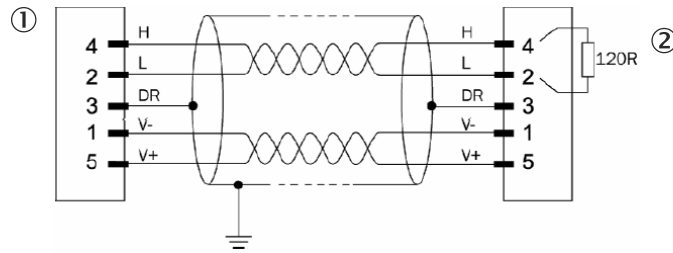


Figure 16: DeviceNet bus cable

- ① Node
 ② 120 Ω terminating resistor

The following maximum lengths of cable are possible based on the type of cable used and the data transmission rate set:

Table 12: Maximum lengths of cables for the FX0-GDEV

Length of cable	125 kbit/s	250 kbit/s	500 kbit/s
Total length with thick cable ($\geq 0.34 \text{ mm}^2$)	500 m	250 m	100 m
Total length with thin cable	100 m	100 m	100 m
Total length with flat cable	380 m	200 m	75 m
Maximum stub length	6 m	6 m	6 m
Maximum length of all stubs	156 m	78 m	39 m

5.6 The FX3-GEPR EFI-pro gateway

The FX3-GEPR features an integrated 3-port switch to enable connection to an Ethernet network. It has two RJ45 female connectors.

Cabling requirements

- Type: 100Base-TX
- RJ45 connections
- Twisted pair Ethernet cable (Cat 5 cable or higher), maximum length 100 m in accordance with EN 50173
- Use of wire pairs 1/2 and 3/6
- Shielded cables recommended

Network topology

The FX3-GEPR can be operated in the following Ethernet topologies:

- Star
- Linear
- Device level ring (DLR) with additional ring supervisor

6 Configuration

6.1 Configuring the FX0-GENT EtherNet/IP™ gateway

Electronic data sheet (EDS file)

Before you can use the FX0-GENT in the network configuration tool, you must install the EDS file in the tool hardware catalog.



NOTE

There are different versions of the EDS file and the firmware version of the FX0-GENT determines which one should be used.

Table 13: Versions of the EDS file for the FX0-GENT

Firmware version of the FX0-GENT	EDS file	Functionality
V1.xx.x	SICK_FX0_GENT_1.00.eds	EtherNet/IP™ explicit messaging (class 3)
V2.xx.x	SICK_FX0_GENT_with_Icon_2.06.eds SICK_FX0_GENT_without_Icon_2.06.eds	EtherNet/IP™ implicit messaging (class 1) and explicit messaging (class 3)
≥ V3.00.0	SICK_FX0_GENT_with_Icon_3.01.eds	EtherNet/IP™ implicit messaging (class 1) and explicit messaging (class 3)

The EDS files and the device symbol for integration into a PLC can be found in the following locations:

- On the FX0-GENT product page of the SICK website www.sick.com
- In the configuration software program directory on the computer
- ▶ Follow the instructions for installing EDS files provided by the online help system or the user manual for the EtherNet/IP™ configuration tool.

Further information

For further information on configuring the gateway, please refer to the operating instructions for the configuration software.

6.2 Configuring the FX0-GMOD Modbus TCP gateway

Further information

For further information on configuring the gateway, please refer to the operating instructions for the configuration software.

6.3 Configuring the FX0-GPNT PROFINET IO gateway

The steps described below are necessary to configure communication between the PLC and the gateway.



NOTE

This documentation does not cover how to set up the PROFINET IO network in the network configuration tool. Nor does it deal with the other components of the automation system project within this tool. It is assumed that the PROFINET IO project has already been set up in the configuration software. The examples shown here relate to configurations that have been created using the SIEMENS SIMATIC Manager software.

Step 1: Install the generic station description

Before you can use the FX0-GPNT in the network configuration tool, you must install the generic station description (GSDML file) in the tool hardware catalog.



NOTE

There are different versions of the GSDML file and the firmware version of the FX0-GPNT determines which one should be used.

Table 14: Versions of the GSDML file for the FX0-GPNT

Firmware version of the FX0-GPNT	GSDML file	Functionality
≤ V2.06.0	GSDML-V2.1-SICK-FLEXI-SOFT-20111025.xml	
≥ V2.08.0	GSDML-V2.3-SICK-FLEXI-SOFT-20170102.xml	Also contains error messages for FX3-ANA0 and FX3-MOCx

The GSDML file and the device symbol for integration into a PLC that supports PROFINET can be found in the following locations:

- On the FX0-GPNT product page of the SICK website www.sick.com
- In the configuration software program directory on the computer
- ▶ Follow the instructions for installing GSDML files provided by the online help system or the user manual for the PROFINET configuration tool.

If you are using SIEMENS SIMATIC Manager – HW Config, the gateway will subsequently appear in the hardware catalog under >>PROFINET IO > Additional Field Devices > Gateway > FlexiSoft.

Step 2: Add the gateway to the project

To make the system data of the Flexi Soft system available in the process image of the PLC, you must first add the gateway to the hardware configuration. The procedure that should be followed depends on the hardware configuration software for the PLC that is being used. For further information, please see the documentation for the relevant software.

The following example shows how to add the gateway to a project in the SIEMENS SIMATIC Manager software.

- ▶ Drag and drop the device into the Ethernet PROFINET IO network. **Example:**

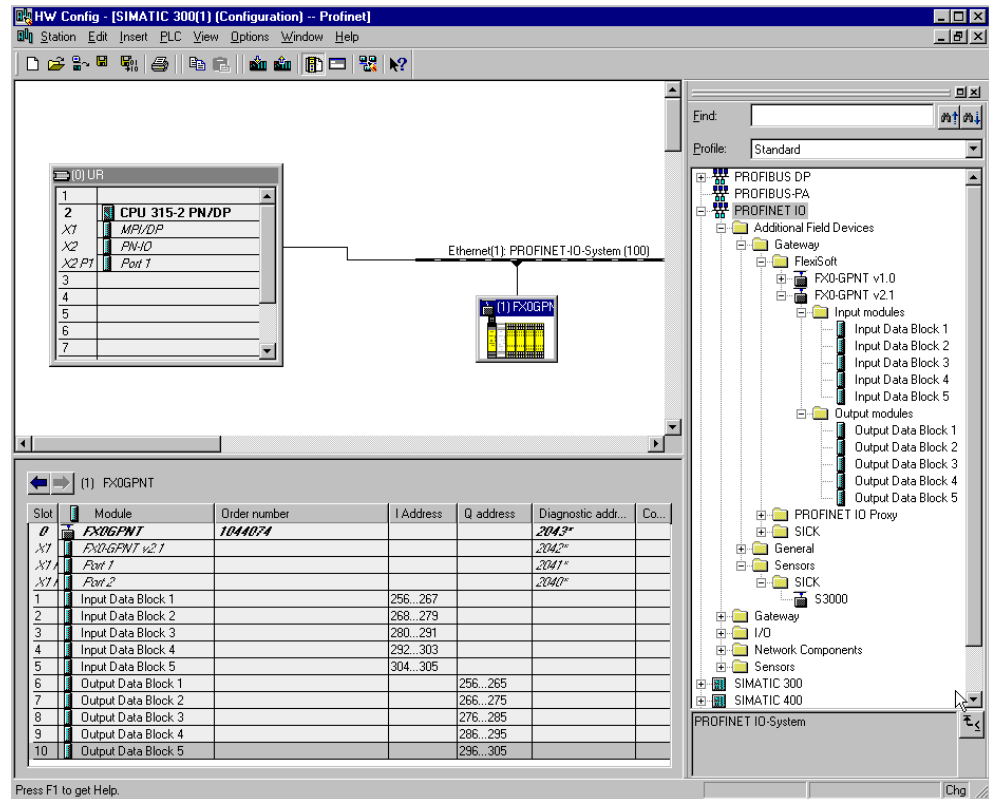


Figure 17: PROFIBUS IO gateway in PROFIBUS IO HW Config

Once the device has been added to the automation network, the next step is to configure which cyclic data sets are to be used and where these are to be addressed in the memory. For additional information about this, please refer to the operating instructions for the configuration software.

Step 3: Configure the gateway properties

- ▶ Double-click the hardware symbol representing the gateway.
- ▶ Configure the update time for cyclic I/O data exchange. Click the **IO Cycle** tab and select the required time interval from the **Update time** pull-down menu.

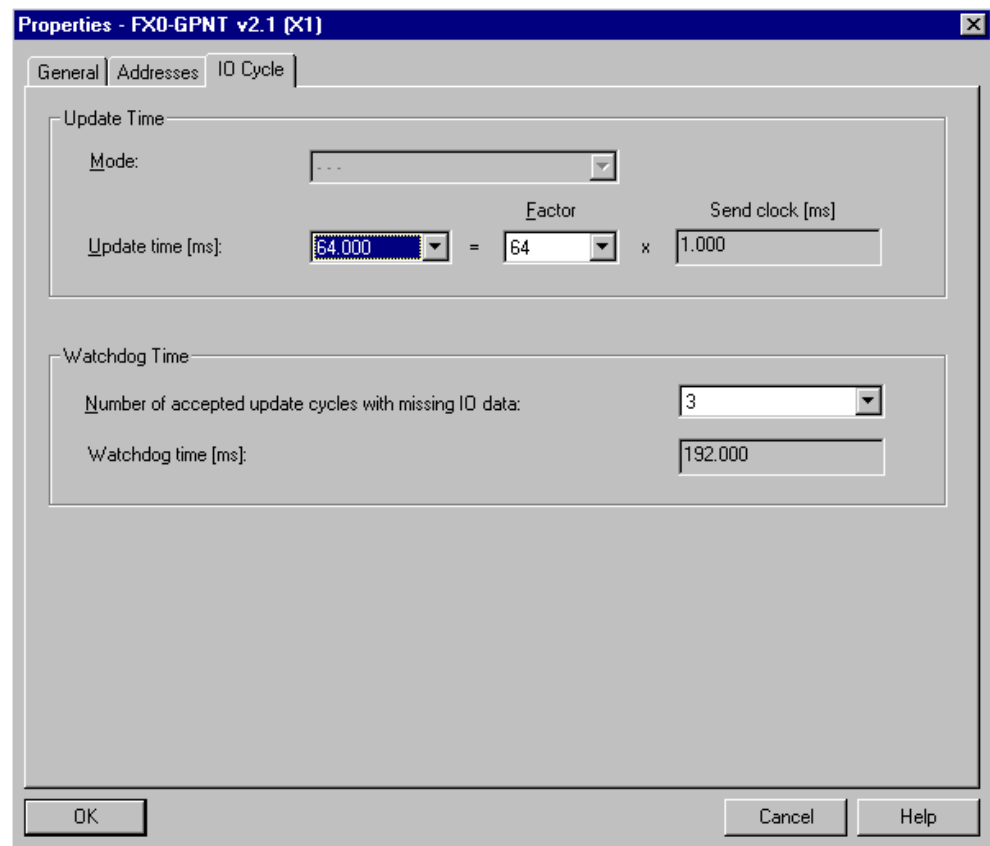


Figure 18: Configuring the FX0-GPNT update time

Step 4: Assign the device name

The PLC will only be able to communicate with the FX0-GPNT if the PLC software and the gateway both refer to the gateway by the same name.

Determining the PROFINET IO device name for the gateway

- ▶ Double-click the hardware symbol representing the gateway.
- ▶ Select the **General** tab.
- ▶ Enter the desired device name.

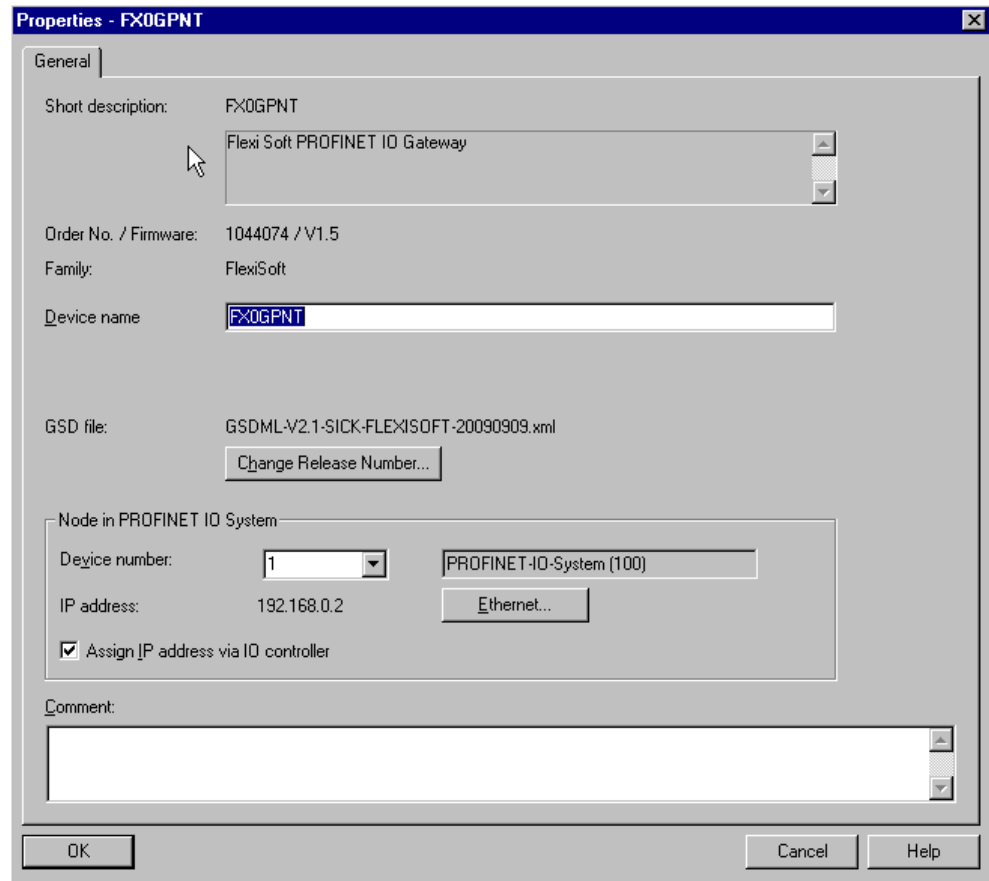


Figure 19: Entering the device name for the FX0-GPNT



NOTE

The format you use for the device name must correspond to the specifications of the PROFINET IO standard.

Assigning the device name to the gateway

- ▶ Select **PLC > Ethernet > Assign device name**. The **Assign device name** dialog box opens.
- ▶ In the list of available devices, select the SICK gateway that you want to assign the device name to.
- ▶ Click the **Assign name** button.

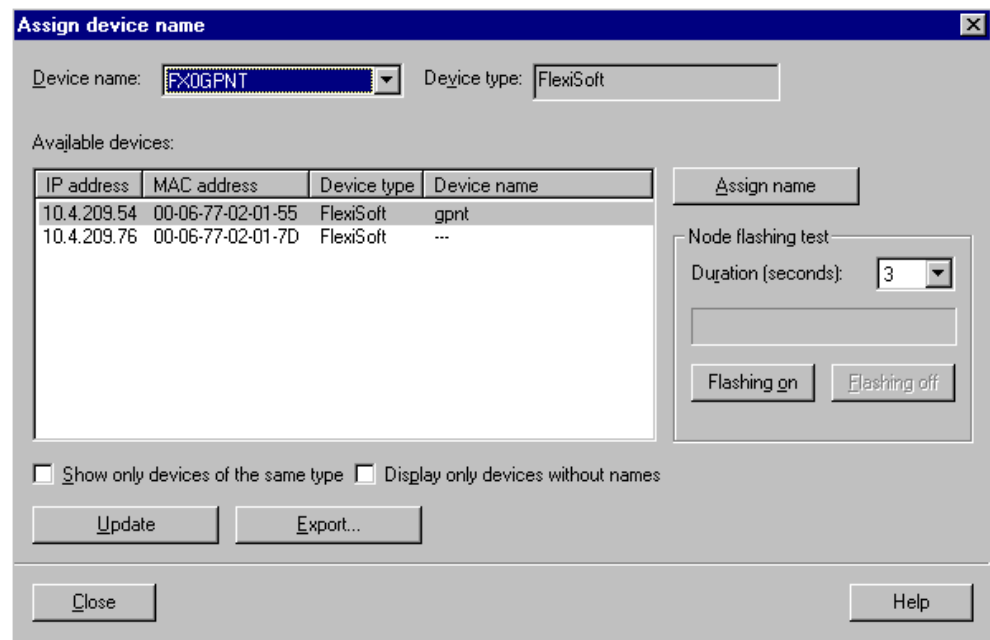


Figure 20: Assigning the device name for the FX0-GPNT

Further information

For further information on configuring the gateway, please refer to the operating instructions for the configuration software.

6.4 Configuring the FX0-GETC EtherCAT gateway

EtherCAT slave information (ESI file)

Before you can use the FX0-GETC in the network configuration tool, you must install the ESI file in the tool hardware catalog.

The ESI file and the device symbol for integration into a PLC that supports EtherCAT can be found in the following locations:

- On the FX0-GETC product page of the SICK website www.sick.com
- In the configuration software program directory on the computer
- ▶ Follow the instructions for installing ESI files provided by the online help system or the user manual for the EtherCAT configuration tool.

Further information

For further information on configuring the gateway, please refer to the operating instructions for the configuration software.

6.5 Configuring the FX0-GPRO PROFIBUS DP gateway

Setting the PROFIBUS DP address

The PROFIBUS DP address can be set via the address switches on the gateway or by using the configuration software.

Setting the PROFIBUS DP address using the address switches on the gateway

- ▶ Use the address switches on the front of the device to set the PROFIBUS DP address. Then switch the Flexi Soft system off and back on again.

Table 15: PROFIBUS DP address switches on the FX0-GPRO

Switch	Function
× 10	Address switch 1 Rotary switch with 10 positions for setting the PROFIBUS DP address for the gateway (tens)
× 1	Address switch 2 Rotary switch with 10 positions for setting the PROFIBUS DP address for the gateway (units)



NOTE

- The hardware address switches can be used to set an address ranging from 1 to 99.
- With the configuration software, an address can be set ranging from 3 to 125. You can only set the PROFIBUS DP address using the configuration software if the hardware address setting on the gateway is "00". For further information on setting the PROFIBUS DP address using the configuration software, please refer to the operating instructions for the configuration software.
- The PROFIBUS master is not able to overwrite the PROFIBUS DP address.
- When an address setting is changed, it only takes effect once the Flexi Soft system has been switched off and back on again.
- In online mode, you can use the configuration software to read out the address that has been set on the PROFIBUS DP gateway.

Data transmission rate

The data transmission rate is set automatically.

The maximum data transmission rate is 12 Mbit/s.

6.5.1 Configuring the gateway for PROFIBUS



NOTE

This documentation does not cover how to set up the PROFIBUS DP network in the network configuration tool. Nor does it deal with the other components of the automation system project within this tool. It is assumed that the PROFIBUS project has already been set up in the configuration software, e.g., SIEMENS SIMATIC Manager. The examples shown here relate to configurations that have been created using the SIEMENS SIMATIC Manager software.

The steps described below are necessary to configure communication between the PLC and the gateway.

Step 1: Install the generic station description

Before you can use the FX0-GPRO in the network configuration tool, you must install the generic station description (GSD) file in the tool hardware catalog.



NOTE

There are two different versions of the GSD file and the firmware version of the FX0-GPRO determines which one should be used.

Table 16: Versions of the GSD file for the FX0-GPRO

Firmware version of the FX0-GPRO	GSD file	Functionality
V1.00.0 ... V1.29.0	SICK0C18.gsd	DP-V0 slave
≥ V1.30.0	SIC_OC18.gsd	DP-V1 slave

FX0-GPRO gateways with a firmware version \geq V1.30.0 also work in conjunction with GSD file **SICKOC18.gsd** but if this file is used they will only support DP-V0 slave functions. FX0-GPRO gateways with a firmware version of V1.00.0 to V1.29.0 do not work in conjunction with GSD file **SIC_OC18.gsd**.

**NOTE**

I&M data can only be read in DP-V1 slave mode. This can be controlled by a class 1 or class 2 master.

The GSD file and the device symbol for integration into a PLC that supports PROFIBUS can be found in the following locations:

- On the FX0-GPRO product page of the SICK website: www.sick.com
- In the configuration software program directory on the computer
- ▶ Follow the instructions for installing GSD files provided by the online help system or the user manual for the PROFIBUS configuration tool.

When using SIEMENS SIMATIC Manager – HW Config, the gateway will subsequently appear in the hardware catalog under >>PROFIBUS DP > Additional Field Devices > Gateway > SICK > Flexi Soft.

Step 2: Add the gateway to the project

To make the system data of the Flexi Soft system available in the process image of the PLC, you must first add the gateway to the hardware configuration. The procedure that should be followed depends on the hardware configuration software for the PLC that is being used. For further information, please see the documentation for the relevant software.

The following example shows how to add the gateway to a project in the SIEMENS SIMATIC Manager software.

In the SIEMENS SIMATIC Hardware Manager, you will find the gateway listed in the hardware catalog under >>PROFIBUS DP > Additional Field Devices > Gateway > SICK > Flexi Soft.

- ▶ Drag and drop the gateway into the PROFIBUS network.

Example:

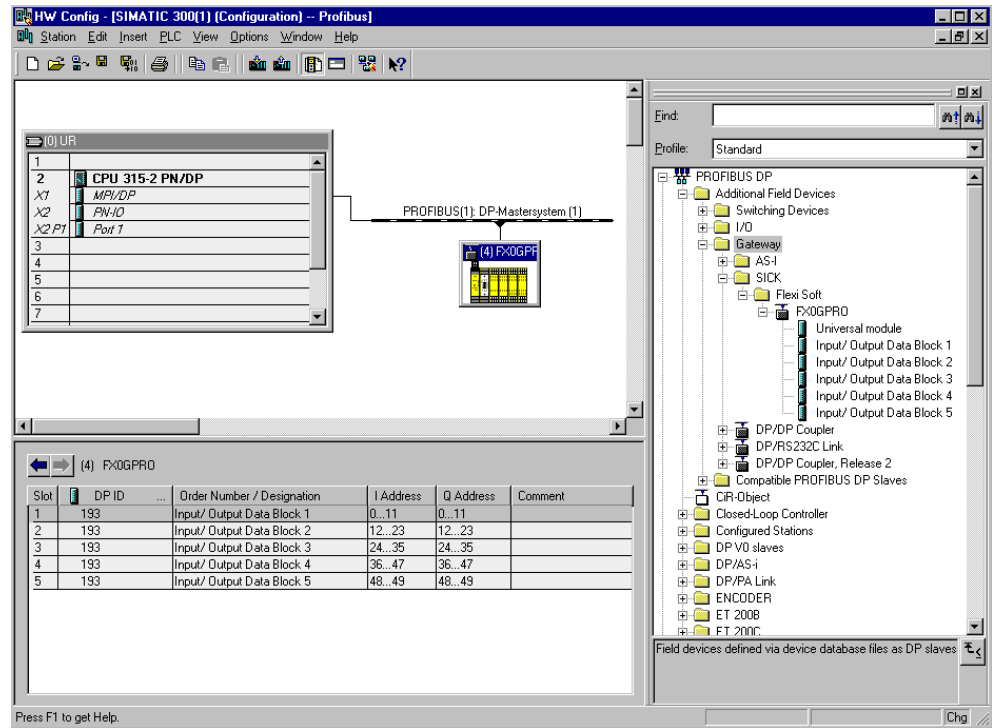


Figure 21: PROFIBUS DP gateway in PROFIBUS HW Config



NOTE

The universal module does not support data exchange of any kind. Please only select input/output data blocks 1 through 5.

Step 3: Configure the operating data transmitted by the FX0-GPRO

The GSD file of the FX0-GPRO provides input and output data blocks (virtual I/O device modules) that contain operating data. These five blocks have to be projected in a DP configurator in their natural numerical order (1, 2, 3, 4, 5). No other order is possible.

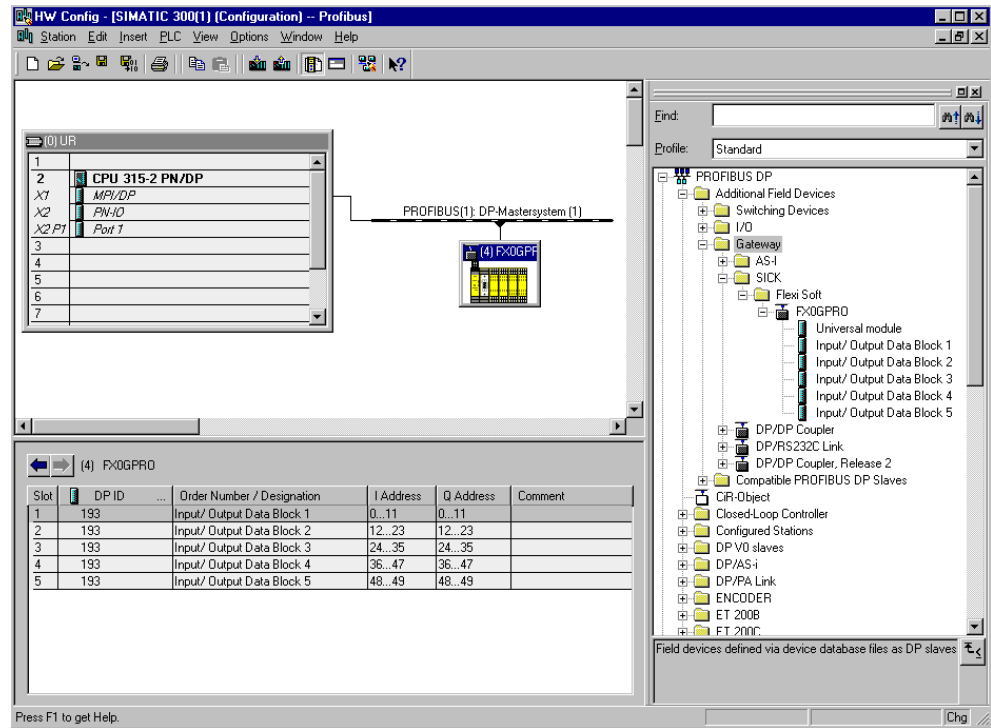


Figure 22: Example of a PROFIBUS DP configuration in the SIEMENS SIMATIC Manager software



NOTE

- Depending on what PLC you are using, further modules may be displayed (e.g., “universal module”). These modules are not required and should be ignored.
- Data blocks 1 to 4 each contain 12 bytes while data block 5 contains 2 bytes.
- The content of the data blocks can be freely selected but it is pre-configured.

Further information

For further information on configuring the gateway, please refer to the operating instructions for the configuration software.

6.6 Configuring the FX0-GCAN CANopen gateway

Setting the CANopen address and data transmission rate

The CANopen address and the data transmission rate can be set using the switches on the gateway or by using the configuration software.

Setting the CANopen address using the address switches on the gateway

- ▶ Use the address switches on the front of the device to set the CANopen address. Then switch the Flexi Soft system off and back on again.

Table 17: CANopen address switches on the FX0-GCAN

Switch	Function
× 10	Address switch 1 Rotary switch with 10 positions for setting the CANopen address for the gateway (tens)
× 1	Address switch 2 Rotary switch with 10 positions for setting the CANopen address for the gateway (units)

Setting the data transmission rate using the DIP switches

- ▶ Use the DIP switches on the device to set the data transmission rate. Then switch the Flexi Soft system off and back on again.

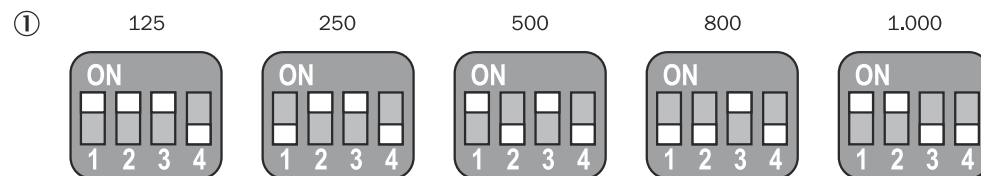


Figure 23: DIP switch settings on the FX0-GCAN

- ① Data transmission rate in kbit/s

Table 18: DIP switch settings on the FX0-GCAN

Data transmission rate [kbit/s]	DIP 1	DIP 2	DIP 3	DIP 4
125	ON	ON	ON	OFF
250	OFF	ON	ON	OFF
500	ON	OFF	ON	OFF
800	OFF	OFF	ON	OFF
1.000	ON	ON	OFF	OFF



NOTE

- All other DIP switch settings result in a data transmission rate of 125 kbit/s.
- If you set the CANopen address switches on the device to “00”, the DIP switch settings will be ignored. Instead, the settings in the configuration software will be used for the CANopen address and data transmission rate.



NOTE

- The hardware address switches can be used to set a CANopen address ranging from 1 to 99.
- With the configuration software, a CANopen address can be set ranging from 1 to 127. You can only set the CANopen address using the configuration software if the hardware address setting on the gateway is “00”. For further information on setting the CANopen address using the configuration software, please refer to the operating instructions for the configuration software.
- The CANopen master is not able to overwrite the CANopen address.
- If you use the configuration software to set the CANopen address and the data transmission rate, the settings will take effect as soon as the configuration is transferred (i.e., without having to switch the Flexi Soft system off and on first). Exception: If the Flexi Soft system is in the “Bus Off” state, the Flexi Soft system has to be switched off and back on again for the changes to take effect.

6.6.1 Configuring the gateway for CANopen



NOTE

This documentation does not cover how to set up the CANopen network in the network configuration tool. Nor does it deal with the other components of the automation system project within this tool. It is assumed that the CANopen project has already been set up in the configuration software, e.g., CoDeSys 2.x from 3S Software. The examples shown here relate to configurations that have been created using CoDeSys 2.3.

The steps described below are necessary to configure communication between the PLC and the gateway.

Step 1: Install the electronic data sheet (EDS file)

Before you can use the FX0-GCAN in the network configuration tool, you must install the electronic data sheet (EDS file) in the tool hardware catalog.

The EDS file and the device symbol for integration into a PLC can be found in the following locations:

- On the FX0-GCAN product page of the SICK website: www.sick.com
 - In the configuration software program directory on the computer
- ▶ Follow the instructions for installing EDS files provided by the online help system or the user manual for the CANopen configuration tool.

Example – Installing the EDS file with CoDeSys 2.3

- ▶ Open the window for editing the PLC configuration.

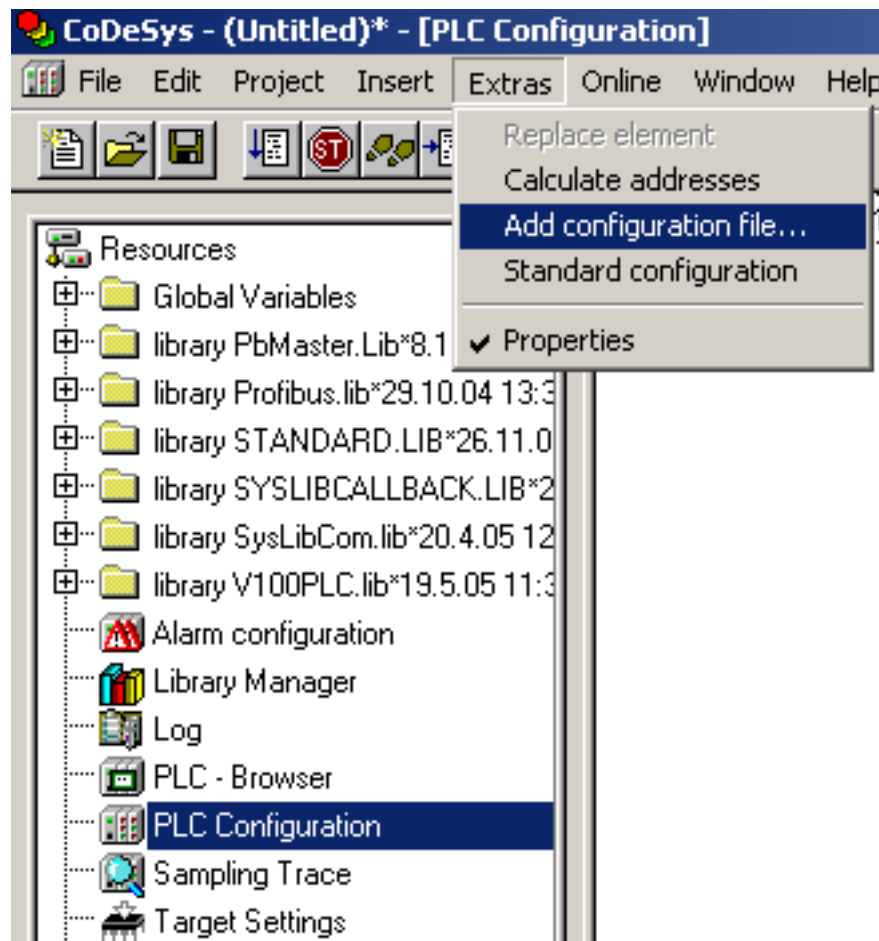


Figure 24: CoDeSys window for editing the PLC configuration

- ▶ Go to the **Extras** menu and select the **Add configuration file...** command. A file selection window opens.
- ▶ Select the EDS file for the FX0-GCAN and click the **Open** button.

Step 2: Add the gateway to the controller

To make the system data of the Flexi Soft system available in the process image of the PLC, you must add the gateway to the hardware configuration. The procedure that should be followed depends on the hardware configuration software for the PLC that is being used. For further information, please see the documentation for the relevant software.

Example – Adding the gateway with CoDeSys 2.3

- ▶ Open the window for editing the **PLC configuration** and select the controller.
- ▶ Right-click the controller or open the **Insert** menu.
- ▶ Select the **CAN master...** command from either of the two menus under **Append subelement**. A CAN master is appended to the controller.

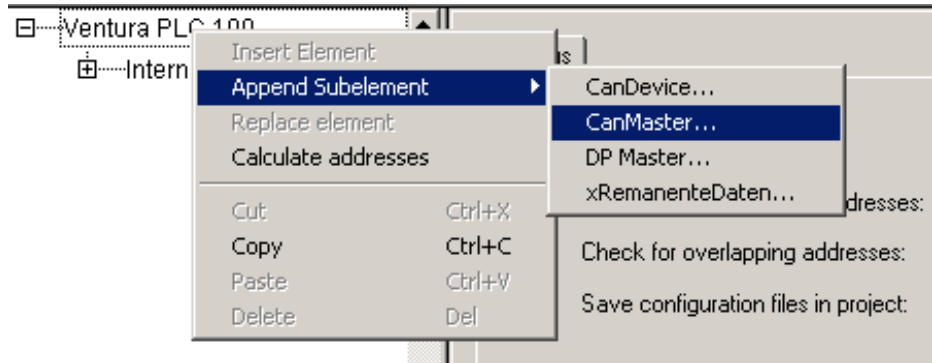


Figure 25: Appending a CAN master with CoDeSys 2.3

- ▶ Right-click the CAN master or select the CAN master and open the **Insert** menu.
- ▶ Select the **FX0-GCAN00000 (EDS)...** command from either of the two menus under **Append subelement** to append the FX0-GCAN to the CAN master.

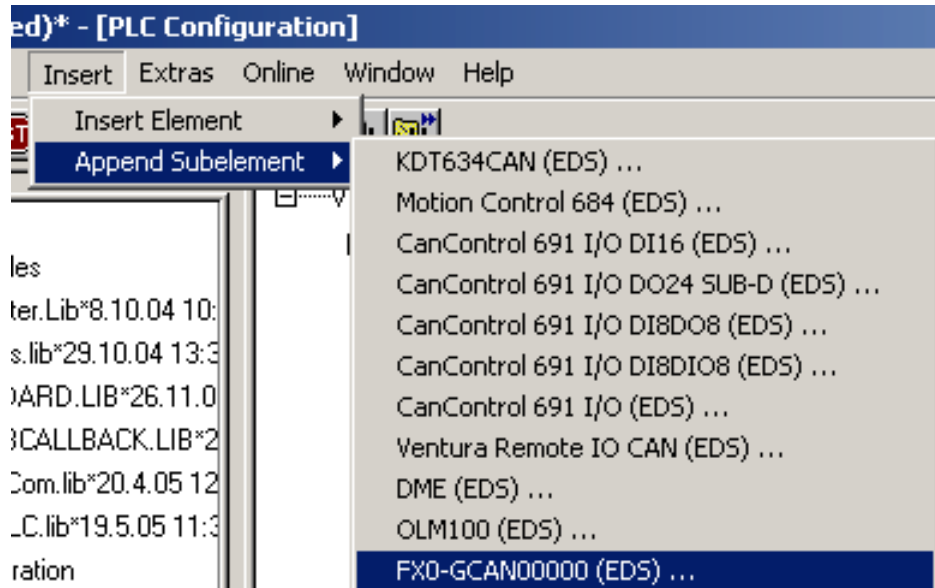


Figure 26: Appending the FX0-GCAN with CoDeSys 2.3

Step 3: Select and configure process data objects (PDOs)

Once you have added the device to the automation network, you must configure which process data objects are to be used and how they should be transmitted.

Example – Defining the PDO transmission type with CoDeSys 2.3

- ▶ In the window for editing the **PLC configuration**, select the FX0-GCAN. Then click the **Send PDO mapping** tab.

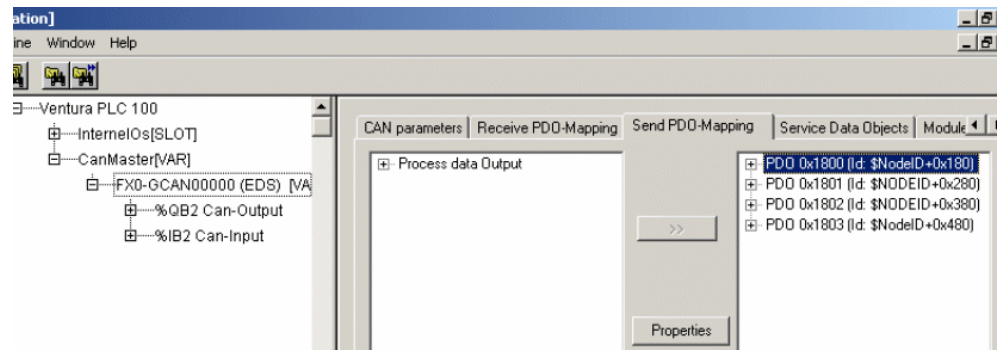


Figure 27: Configuring PDOs with CoDeSys 2.3

- ▶ Select one of the PDOs displayed (e.g., PDO1) and click the **Properties** button. The **PDO properties** dialog window opens.

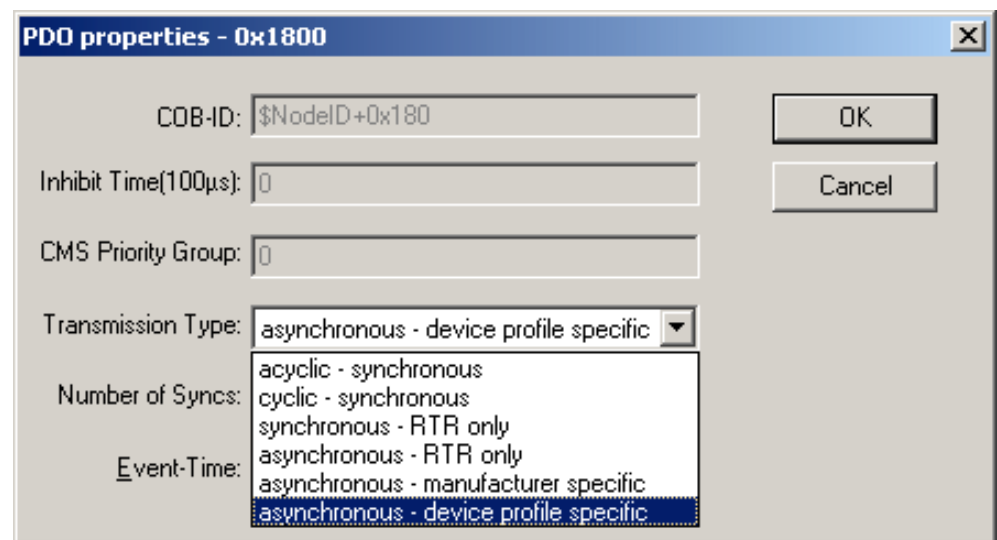


Figure 28: PDO properties dialog window in CoDeSys 2.3

- ▶ From the drop-down list, select the **transmission type** required for the PDO, enter the **event time** in milliseconds, and click **OK**.
- ▶ Repeat these steps for the other sender and receiver PDOs.

Further information

For further information on configuring the gateway, please refer to the operating instructions for the configuration software.

6.7 Configuring the FX0-GDEV DeviceNet gateway

Setting the DeviceNet address and data transmission rate

The DeviceNet address and the data transmission rate can be set using the switches on the gateway or by using the configuration software.

Setting the DeviceNet address using the address switches on the gateway

- ▶ Use the address switches on the front of the device to set the DeviceNet address. Then switch the Flexi Soft system off and back on again.

Table 19: DeviceNet address switches on the FX0-GDEV

Switch	Function
× 10	Address switch 1 Rotary switch with 10 positions for setting the DeviceNet address for the gateway (tens)
× 1	Address switch 2 Rotary switch with 10 positions for setting the DeviceNet address for the gateway (units)

Setting the data transmission rate using the DIP switches

- ▶ Use the DIP switches on the device to set the data transmission rate. Then switch the Flexi Soft system off and back on again.

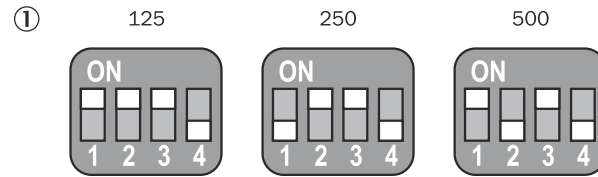


Figure 29: DIP switch settings on the FX0-GDEV

- ① Data transmission rate in kbit/s

Table 20: DIP switch settings on the FX0-GDEV

Data transmission rate [kbit/s]	DIP 1	DIP 2	DIP 3	DIP 4
125	ON	ON	ON	OFF
250	OFF	ON	ON	OFF
500	ON	OFF	ON	OFF



NOTE

- All other DIP switch settings result in a data transmission rate of 125 kbit/s.
- If you set the DeviceNet address switches on the device to “00”, the DIP switch settings will be ignored. Instead, the settings in the configuration software will be used for the DeviceNet address and data transmission rate.




NOTE

- The hardware address switches can be used to set a DeviceNet address ranging from 1 to 63.
- The configuration software can be used to set a DeviceNet address ranging from 0 to 63. You can only set the DeviceNet address using the configuration software if the hardware address setting on the gateway is “00”. For further information on setting the DeviceNet address using the configuration software, please refer to the operating instructions for the configuration software.
- The DeviceNet master is not able to overwrite the DeviceNet address.
- If you use the configuration software to set the DeviceNet address and the data transmission rate, the settings will take effect as soon as the configuration is transferred (i.e., without having to switch the Flexi Soft system off and on first). Exception: If the Flexi Soft system is in the “Bus Off” state, the device has to be switched off and back on again for the changes to take effect.

Resetting the stored data to the default settings

There are two ways to reset the data stored in the device to the default settings:

- Via the address switches on the module: The module must be offline. Use the address switches to set the address to 99. The NS LED flashes  green (2 Hz). After ten seconds, the configuration data is reset to the default settings and the memory is rebooted.
- Via DeviceNet: Send a reset command to the device:
 - Reset command 05h to identity object (class ID = 1)
 - Instance 1 (instance ID = 1)
 - Vendor ID 1 (attribute ID = 1)

The following reset types are supported:

0: Reset the values to the start-up state. The stack is reset but the parameter configuration is retained.

1: Reset the values to the as-delivered state. The stack is reset and the parameter configuration is reset to the preset values.

The reset command is sent as a reset parameter byte. Unless the reset parameter is expressly set to 1, the preset value of 0 will be sent.



NOTE

Because the DeviceNet address and data transmission rate are set via the address switches or the configuration software, these settings remain unchanged in the event of a reset.

The DeviceNet configuration software usually offers a reset function as well.

6.7.1 Configuring the gateway for DeviceNet



NOTE

This documentation does not cover how to set up the DeviceNet network in the network configuration tool. Nor does it deal with the other components of the automation system project within this tool. It is assumed that the DeviceNet project has already been set up in the configuration software. The examples shown here relate to configurations that have been created using the DeviceNetManager™ software from Allen-Bradley.

To set up DeviceNet communication between the gateway and the higher-level controller, you must complete the following steps:

Step 1: Install the electronic data sheet (EDS file)

Before you can use the FX0-GDEV in the network configuration tool, you must install the electronic data sheet (EDS file) in the tool hardware catalog.

The EDS file and the device symbol for integration into a PLC that supports DeviceNet can be found in the following locations:

- On the FX0-GDEV product page of the SICK website: www.sick.com
 - In the configuration software program directory on the computer
- Follow the instructions for installing EDS files provided by the online help system or the user manual for the DeviceNet configuration tool.

Step 2: Determine the communication type

- Select how the gateway and higher-level controller should communicate with one another (“Polled” or “Change of State/Cyclic”).

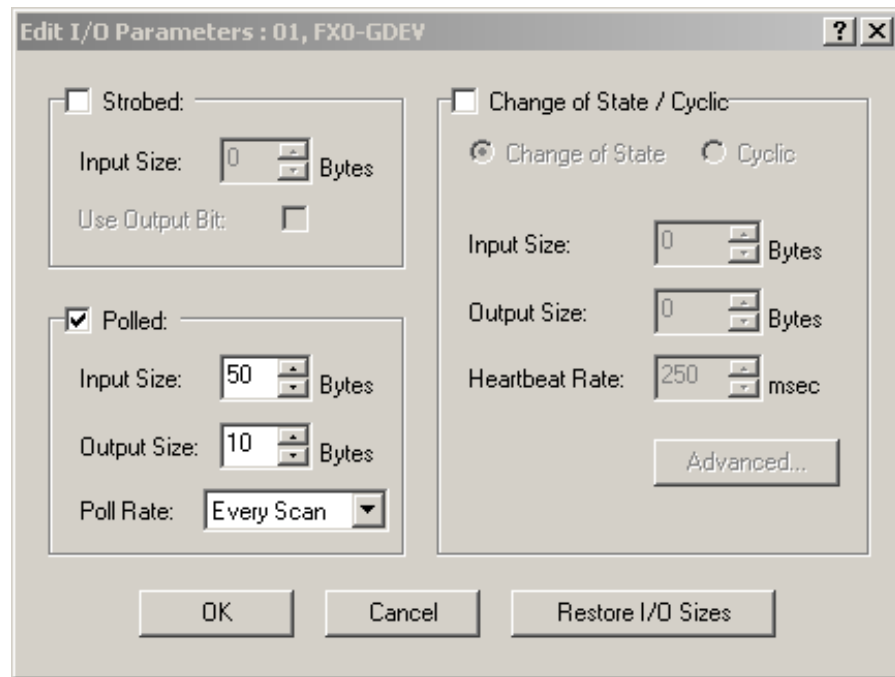


Figure 30: Example of how to configure the communication type with the DeviceNetManager™ software from Allen-Bradley

Step 3: Select the data to be transmitted

- ▶ Select the input and output data sets for transmission between the gateway and controller.

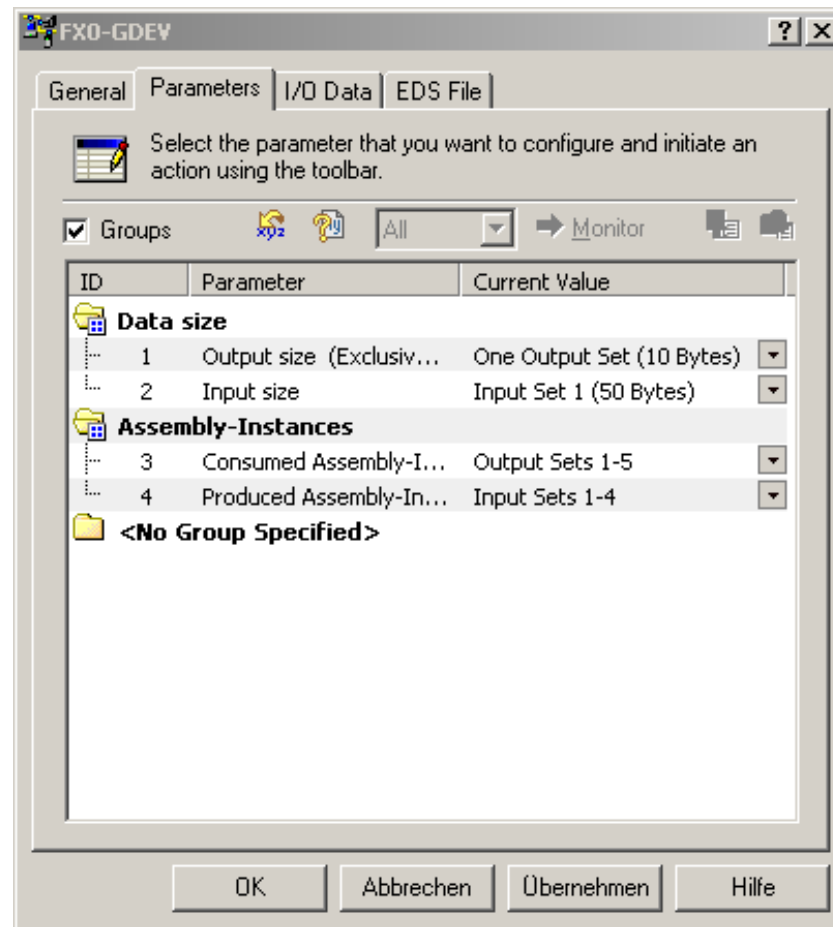


Figure 31: Selecting input data set 1 and output data set 1 with the DeviceNetManager™ software from Allen-Bradley

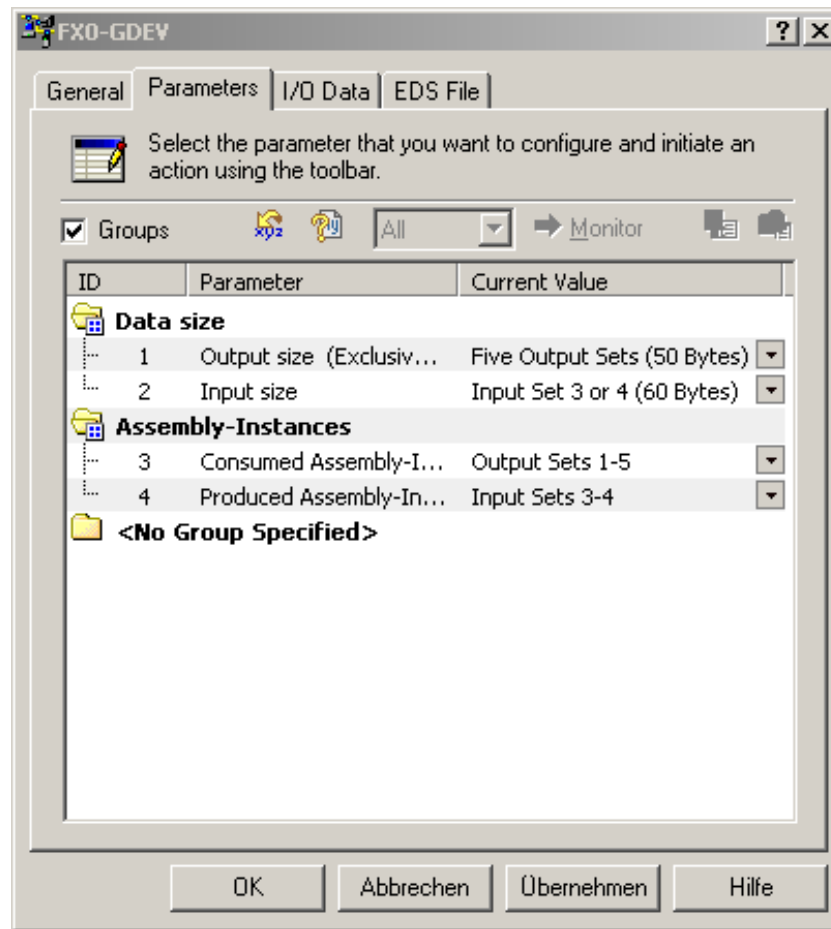


Figure 32: Selecting input data set 3 and output data sets 1-5 with the DeviceNetManager™ software from Allen-Bradley

Further information

For further information on configuring the gateway, please refer to the operating instructions for the configuration software.

6.8 Configuring the FX3-GEPR EFI-pro gateway

You configure the FX3-GEPR EFI-pro gateway via the Safety Designer configuration software from SICK.



NOTE

- Version 1.4.0.75 or higher of the Safety Designer configuration software is required.
- The FX3-GEPR cannot be configured with the Flexi Soft Designer configuration software.

Electronic data sheet (EDS file)

To use the FX3-GEPR in conjunction with a controller other than Flexi Soft, you must first install the EDS file for the FX3-GEPR in the hardware catalog of the configuration tool used for the controller concerned. The FX3-GEPR can then be operated as a target.

The EDS file and the device symbol for integration into a PLC can be found in the following locations:

- On the FX3-GEPR product page of the SICK website: www.sick.com
- In the program directory of the Safety Designer configuration software
- ▶ Instructions for installing EDS files can be found in the online help system or the user manual for the CIP/CIP Safety™ configuration tool used.

Further information

For further information on configuring the gateway, please refer to the operating instructions for the configuration software.

6.9 Changing the Telnet password

Overview

The following devices with serial numbers $\leq 2311xxxx$ contain a Telnet server:

- FX0-GMOD
- FX0-GPNT V2
- FX0-GENT V2

The Telnet password for accessing the Telnet server is blank by default. For better security, change the Telnet password before commissioning.

Allowed password length: 15 characters

Procedure

1. Open the Windows command prompt.
2. Enter the following commands with appropriate values:


```
$ telnet <Gateway-IP-Address>
Password: <old password> [Enter]
passwd <utmost secure password> [Enter]
quit [Enter]
```
3. Use the following commands to test whether the new password has been saved.


```
$ telnet <Gateway-IP-Address>
Password: <new password> [Enter]
```

7 Commissioning

7.1 Thorough check during commissioning and modifications

Overview

Before commissioning the machine and after making changes, you must check whether the safety functions are fulfilling their planned purpose and whether persons are being adequately protected.

Prerequisites

- The system/machine must be inspected, documented and approved by qualified safety personnel before it is commissioned for the first time.
- Before commissioning, make sure that there are no persons in the hazardous area.
- Secure the hazardous area to prevent entry (e.g. by setting up warning signs, attaching barriers, and so on).

Thorough check during commissioning and modifications

The thorough check is intended to ensure that the safety functions are fulfilling their planned purpose and whether persons are being adequately protected.

- ▶ Carry out the checks specified in the test plan of the manufacturer of the machine and the operating entity.

8 Operation

8.1 Status signals of the FX0-GENT EtherNet/IP™ gateway

Table 21: Meaning of the LED indicators on the FX0-GENT

LED		Meaning
PWR	○	No voltage supply
	● Green	Voltage supply is switched on.
LINK/ACT 1 LINK/ACT 2	○	No Ethernet connection
	● Green	Ethernet connection active, no data transmission
	◐ Green	Ethernet connection active, data transmission in progress
STATUS ¹⁾	○	Power up
	● Green	Running (process data is being transferred from/to main module)
	◐ Green	1 Hz: Stopped
	◑ Red	1 Hz: Configuration running/configuration required 2 Hz: Serious error on gateway
	● Red	Serious error on another module
	◐ Red/green	Running, but there is no Ethernet connection or it is faulty

¹⁾ On older versions of the FX0-GENT, the STATUS LED is called the MS LED.

8.2 Status signals of the FX0-GMOD Modbus TCP gateway

Table 22: Meaning of the LED indicators on the FX0-GMOD

LED		Meaning
PWR	○	No voltage supply
	● Green	Voltage supply is switched on.
LINK/ACT 1 LINK/ACT 2	○	No Ethernet connection
	● Green	Ethernet connection active, no data transmission
	◐ Green	Ethernet connection active, data transmission in progress
STATUS ¹	○	Power up
	● Green	Running (process data is being transferred from/to main module)
	◐ Green	1 Hz: Stopped
	◑ Red	1 Hz: Configuration running/configuration required 2 Hz: Serious error on gateway
	● Red	Serious error on another module
	◐ Red/green	Running, but there is no Ethernet connection or it is faulty

¹⁾ For older device versions, the LED is called MS.

8.3 Status signals of the FX0-GPNT PROFINET IO gateway

Table 23: Meaning of the LED indicators on the FX0-GPNT

LED		Meaning
PWR	○	No voltage supply
	● Green	Voltage supply is switched on.
LINK/ACT 1 LINK/ACT 2	○	No Ethernet connection
	● Green	Ethernet connection active, no data transmission
	◐ Green	Ethernet connection active, data transmission in progress
STATUS	○	Power up
	● Green	Running (process data is being transferred from/to main module)
	◐ Green	1 Hz: Stopped 2 Hz: LED flashing at the request of the PROFINET IO master for the purpose of physically identifying the device
	◐ Red	1 Hz: Configuration running/configuration required 2 Hz: Serious error on gateway
	● Red	Serious error on another module
	◐ Red/green	Running, but there is no Ethernet connection or it is faulty (can be deactivated, see below)

Deactivating the STATUS LED for PROFINET IO communication

If the firmware version is \geq V2.00.0, you can use the configuration software to stop the STATUS LED from flashing red/green. Otherwise, the LED will flash constantly in the absence of PROFINET IO communication (e.g., if the gateway is being used purely for TCP/IP communication).

For additional information about this, please refer to the operating instructions for the configuration software.

8.4 Status signals of the FX0-GETC EtherCAT gateway

Table 24: Meaning of the LED indicators on the FX0-GETC

LED		Meaning
MS	○	Power up
	● Green	The Flexi Soft system is in the “Run” state.
	◐ Green (1 Hz)	The Flexi Soft system is in the “Stopped” state.
	◐ Red (1 Hz)	Invalid configuration
	◐ Red (2 Hz)	Serious error on gateway
	● Red	Serious error on another module
	◐ Red/green	Remediable external error
ERR	○	No error
	◐ Red (2.5 Hz)	Invalid configuration
	◐ Red (flashes once)	Pre-operational, caused by system behavior (e.g., configuration in progress or configuration required)
	◐ Red (flashes twice)	Timeout (connection broken)
	● Red	System error

LED		Meaning
RUN	○	Init
	● Green (2.5 Hz)	Pre-operational
	● Green (flashes once)	Safe operational
	● Green	Operational
Link/Act	○	No EtherCAT connection
	● Green	EtherCAT connection active, no data transmission
	● Green	EtherCAT connection active, data transmission in progress

8.5 Status signals of the FX0-GPRO PROFIBUS DP gateway

Table 25: Meaning of the LED indicators on the FX0-GPRO

LED		Meaning
BF	○	Connection to DP master established
	● Red	No bus connection: There is a break in the fieldbus cabling, an address error, or the master is not sending/has stopped sending data to the bus
MS	○	Voltage supply is switched on, wait for "Bus Off" state
	● Green	Running
	● Green	Stopped
	● Red/green	Running, but there is a gateway error
	● Red	1 Hz: Configuration required or currently in progress 2 Hz: Serious error on gateway
	● Red	Serious error on another module
PWR	○	No voltage supply
	● Green	Voltage supply is switched on, no error
	● Red	Serious error.

8.6 Status signals of the FX0-GCAN CANopen gateway

Table 26: Meaning of the LED indicators on the FX0-GCAN

LED		Meaning
NS	○	CANopen status: Stopped (apart from node guarding and heartbeat, if activated)
	● Green	CANopen status: Ready for operation (PDO and SDO data exchange)
	● Green	CANopen status: Pre-operational (SDO data exchange only)
	● Red	CAN bus OFF (hardware problem on CAN physical layer) or passive error
	● Red (1 Hz)	Node guarding has failed (NMT master no longer monitoring slave) or heartbeat consumer failure

LED		Meaning
MS	○	Power up
	● Green	Executing, FLEXBUS+ and PDO status: all "Good"
	● Green	Idle (cable not connected or node guarding has failed)
	● Red/green	Executing, FLEXBUS+ and PDO status: at least one status is "Bad"
	● Red	Serious error, caused by emergency bit
	● Red (1 Hz)	Configuration required or currently in progress
	● Red (2 Hz)	Serious error, caused by the gateway itself
PWR	○	No voltage supply
	● Green	Ready for operation, voltage supply is switched on.
	● Red	System error

8.7 Status signals of the FX0-GDEV DeviceNet gateway

Table 27: Meaning of the LED indicators on the FX0-GDEV

LED		Meaning
NS	○	Duplicate MAC ID check in progress.
	● Green	Ready for operation
	● Green	No connection to the master
	● Red	Duplicate MAC ID check has failed
	● Red (1 Hz)	Connection timeout
MS	○	Power up
	● Green	Executing, FLEXBUS+ and PDO status: all "Good"
	● Green	Idle (cable not connected)
	● Red/green	Executing, FLEXBUS+ and PDO status: at least one status is "Bad"
	● Red	Serious error, caused by emergency bit
	● Red (1 Hz)	Configuration required or currently in progress
	● Red (2 Hz)	Serious error, caused by the gateway itself
PWR	○	No voltage supply
	● Green	Ready for operation, voltage supply is switched on.
	● Red	System error

8.8 Status signals of the FX3-GEPR EFI-pro gateway



CAUTION

Unexpected machine startup

The dangerous state may not be stopped or not be stopped in a timely manner in the event of non-compliance.

- ▶ Do not use LED indicators for safety-relevant functions; they must only be used for general diagnostic purposes during commissioning or for troubleshooting. (ODVA SRS105)

Table 28: Meaning of the LED indicators on the FX3-GEPR

LED		Meaning
PWR	○	No voltage supply
	● Green	The FX3-GEPR is in the “Run” state.
	◐ Green	The FX3-GEPR is in the “Stopped” state.
	◑ Red (1 Hz)	Configuration required
	◒ Red (2 Hz)	Serious internal error
	● Red	Serious error in system
MS	○	No voltage supply
	● Green	The FX3-GEPR is in the “Run” state.
	◐ Green	The FX3-GEPR is in the “Stopped” state.
	◑ Red	Serious error in system Or: Recoverable configuration error (depending on PWR LED)
	● Red	Serious internal error
	◑ Red/green	Configuration required
NS	○	No voltage supply Or: No IP address assigned
	◑ Green	The device is online but there is no CIP connection.
	● Green	The device is online and there is at least one CIP connection.
	◑ Red	At least one connection is in the “Timeout” state.
	● Red	The assigned IP address is already being used by another device.
	◑ Red/green	Self-test during power-on Or: The device has detected a network access error.
Link/Act 1 Link/Act 2	○	No Ethernet connection
	● Green	Ethernet connection active, no data transmission
	◑ Green	Ethernet connection active, data transmission in progress

9 Maintenance

9.1 Regular thorough check

The thorough check is intended to ensure that the safety functions are fulfilling their planned purpose and whether persons are being adequately protected.

- ▶ Carry out the checks specified in the test plan of the manufacturer of the machine and the operating entity.

10 Troubleshooting

10.1 The FXO-GENT EtherNet/IP™ gateway

Table 29: Troubleshooting the FXO-GENT

Fault	Possible cause	Possible measures
The computer is unable to establish a connection to the Flexi Soft gateway.	<p>The supply voltage of the FXO-GENT is too low or missing.</p> <p>The FXO-GENT is not located on the same physical network as the computer.</p> <p>A different subnet mask has been configured in the TCP/IP settings of the computer.</p> <p>The FXO-GENT has been configured already at some point and either has a fixed IP address or an IP address that has been assigned by an unrecognized DHCP server.</p>	<p>Switch on the voltage supply.</p> <p>Check the Ethernet cabling and network settings of the computer and make any necessary corrections.</p> <p>Set the subnet mask of the computer to 255.255.0.0 (as-delivered state of the FXO-GENT).</p> <p>Check the communication settings of the FXO-GENT.</p>
<p>The FXO-GENT is not supplying any data.</p> <p>PWR ● Green</p> <p>LINK/ACT ●/● Green</p> <p>STATUS ¹⁾ ● Red/green</p>	<p>The FXO-GENT has been configured for transmitting data to the PLC but no Ethernet communication has been established yet or this communication is faulty.</p> <p>Duplicate IP address detected.</p> <p>Another device on the network has the same IP address.</p>	<p>At least one Ethernet connection must be established. Set up an Ethernet connection on the computer and check the Ethernet cabling. Check the Ethernet settings for the Flexi Soft system on the PLC and in the configuration software. If no Ethernet communication is required, deactivate the Ethernet connections/PLC interfaces on the FXO-GENT.</p> <p>Correct the IP address. Then switch the device off and back on again.</p>
<p>The FXO-GENT is not supplying any data.</p> <p>PWR ● Green</p> <p>LINK/ACT ●/● Green</p> <p>STATUS ¹⁾ ● Red (1 Hz)</p>	<p>Configuration required.</p> <p>The configuration has not yet been transferred in full.</p>	<p>Configure the FXO-GENT and transfer the configuration to the device.</p> <p>Wait until the configuration has been fully transferred.</p>
<p>The FXO-GENT is not supplying any data.</p> <p>PWR ● Green</p> <p>LINK/ACT ●/● Green</p> <p>STATUS ¹⁾ ● Green</p>	<p>No data set has been activated.</p> <p>No Ethernet communication interface has been activated.</p>	<p>Activate at least one data set.</p>
<p>The FXO-GENT is not supplying any data.</p> <p>PWR ● Green</p> <p>LINK/ACT ●/● Green</p> <p>STATUS ¹⁾ ● Green (1 Hz)</p>	<p>The FXO-GENT is in the “Stopped” state.</p>	<p>Start the main module (switch to the “Run” state).</p>

Fault	Possible cause	Possible measures
The FX0-GENT was functioning correctly following configuration but has suddenly stopped supplying data. PWR ● Green LINK/ACT ●/● Green STATUS ¹⁾ ● Red/green	The FX0-GENT is being operated in slave mode, with the IP address assigned by a DHCP server. Following a restart of the FX0-GENT or the DHCP server, a different IP address was assigned to the FX0-GENT that is not recognized by the PLC.	Either assign a fixed IP address to the FX0-GENT or allocate a fixed IP address for the FX0-GENT on the DHCP server (assigned manually via the MAC address of the FX0-GENT).
The FX0-GENT is in the “Serious error” state. PWR ● Green LINK/ACT ●/● Green STATUS ¹⁾ ● Red (2 Hz)	Internal device error on the FX0-GENT. The FX0-GENT is in an incorrect position. No Flexi Soft gateways are supported by the firmware version of the main module.	Switch the voltage supply for the Flexi Soft system off and then back on again. Check whether the FX0-GPNT is positioned correctly in the Flexi Soft system. Use the configuration software to check the diagnostic messages. Use a main module with the required firmware version. If the fault persists, replace the gateway.
The FX0-GENT/ Flexi Soft system is in the “Serious error” state. PWR ● Green LINK/ACT ●/● Green STATUS ¹⁾ ● Red	The FX0-GENT has not been connected correctly to the other Flexi Soft modules. The module connector is contaminated or damaged. The FX0-GENT is in an incorrect position. There is an internal serious error on another Flexi Soft module.	Plug in the FX0-GENT correctly. Check whether the FX0-GPNT is positioned correctly in the Flexi Soft system. Clean the male and female connectors. Switch the voltage supply back on. Check the other Flexi Soft modules.

¹⁾ On older versions of the FX0-GENT, the STATUS LED is called the MS LED.

10.2 The FX0-GMOD Modbus TCP gateway

Table 30: Troubleshooting the FX0-GMOD

Fault	Possible cause	Possible measures
The computer is unable to establish a connection to the Flexi Soft gateway.	The supply voltage of the FX0-GMOD is too low or missing. The FX0-GMOD is not located on the same physical network as the computer. A different subnet mask has been configured in the TCP/IP settings of the computer. The FX0-GMOD has been configured already at some point and either has a fixed IP address or an IP address that has been assigned by an unrecognized DHCP server.	Switch on the voltage supply. Check the Ethernet cabling and network settings of the computer and make any necessary corrections. Set the subnet mask of the computer to 255.255.0.0 (as-delivered state of the FX0-GMOD). Check the communication settings of the FX0-GMOD.

Fault	Possible cause	Possible measures
<p>The FX0-GMOD is not supplying any data. PWR ● green LINK/ACT ●/● green STATUS 1) ● red/green</p>	<p>The FX0-GMOD has been configured for transmitting data to the PLC but no Ethernet communication has been established yet or this communication is faulty. Duplicate IP address detected. Another device on the network has the same IP address.</p>	<p>At least one Ethernet connection must be established. Set up an Ethernet connection on the computer and check the Ethernet cabling. Check the Ethernet settings for the Flexi Soft system on the PLC and in the configuration software. If no Ethernet communication is required, deactivate the Ethernet connections/PLC interfaces on the FX0-GMOD. Correct the IP address. Then switch the device off and back on again. On the PLC, check the Modbus port number for Modbus TCP communication. The Modbus port number must be set to 502. (Do not confuse this with the TCP/IP socket port number, which must be set to a value > 1023.)</p>
<p>The FX0-GMOD is not supplying any data. PWR ● green LINK/ACT ●/● green STATUS 1) ● red (1 Hz)</p>	<p>Configuration required. The configuration has not yet been transferred in full.</p>	<p>Configure the FX0-GMOD and transfer the configuration to the device. Wait until the configuration has been fully transferred.</p>
<p>The FX0-GMOD is not supplying any data. PWR ● green LINK/ACT ●/● green STATUS 1) ● green</p>	<p>No data set has been activated. No Ethernet communication interface has been activated.</p>	<p>Activate at least one data set.</p>
<p>The FX0-GMOD is not supplying any data. PWR ● green LINK/ACT ●/● green STATUS 1) ● green (1 Hz)</p>	<p>The FX0-GMOD is in the “Stopped” state.</p>	<p>Start the main module (switch to the “Run” state).</p>
<p>The FX0-GMOD was functioning correctly following configuration but has suddenly stopped supplying data. PWR ● green LINK/ACT ●/● green STATUS 1) ● red/green</p>	<p>The FX0-GMOD is being operated in slave mode, with the IP address assigned by a DHCP server. Following a restart of the FX0-GMOD or the DHCP server, a different IP address was assigned to the FX0-GMOD that is not recognized by the PLC.</p>	<p>Either assign a fixed IP address to the FX0-GMOD or allocate a fixed IP address for the FX0-GMOD on the DHCP server (assigned manually via the MAC address of the FX0-GMOD).</p>
<p>The FX0-GMOD is in the “Serious error” state. PWR ● green LINK/ACT ●/● green STATUS 1) ● red (2 Hz)</p>	<p>Internal device error on the FX0-GMOD. No Flexi Soft gateways are supported by the firmware version of the main module.</p>	<p>Switch the voltage supply for the Flexi Soft system off and then back on again. Use the configuration software to check the diagnostic messages. Use a main module with the required firmware version. If the fault persists, replace the gateway.</p>

Fault	Possible cause	Possible measures
The FX0-GMOD/ Flexi Soft system is in the “Serious error” state. PWR ● green LINK/ACT ●/● Green STATUS ¹⁾ ● red	The FX0-GMOD has not been connected correctly to the other Flexi Soft modules. The module connector is contami- nated or damaged. There is an internal serious error on another Flexi Soft module.	Plug in the FX0-GMOD correctly. Clean the male and female con- nectors. Switch the voltage supply back on. Check the other Flexi Soft mod- ules.

¹⁾ For older device versions, the LED is called MS.

10.3 The FX0-GPNT PROFINET IO gateway

Table 31: Troubleshooting the FX0-GPNT

Fault	Possible cause	Possible measures
The computer is unable to establish a connec- tion to the Flexi Soft gateway.	The supply voltage of the FX0- GPNT is too low or missing. The FX0-GPNT is not located on the same physical network as the computer. A different subnet mask has been configured in the TCP/IP settings of the computer. The FX0-GPNT has been config- ured already at some point and either has a fixed IP address or an IP address that has been assigned by an unrecognized DHCP server. ¹⁾	Switch on the voltage supply. Check the Ethernet cabling and network settings of the computer and make any necessary correc- tions. Set the subnet mask of the com- puter to 255.255.0.0 (as-deliv- ered state of the FX0-GPNT). Check the communication set- tings of the FX0-GPNT. Check the IP address of the FX0- GPNT.
The FX0-GPNT is not supplying any data. PWR ● Green LINK/ACT ●/● Green STATUS ●/● Red/ green ¹⁾	The FX0-GPNT has been config- ured for transmitting data to the PLC but no Ethernet communica- tion has been established yet or this communication is faulty. Duplicate IP address detected. Another device on the network has the same IP address. Incorrectly formatted PROFINET IO device name.	At least one Ethernet connection must be established. Set up an Ethernet connection on the com- puter and check the Ethernet cabling. Check the Ethernet set- tings for the Flexi Soft system on the PLC and in the configuration software. If no Ethernet communi- cation is required, deactivate the Ethernet connections/PLC interfa- ces on the FX0-GPNT. Correct the IP address. Then switch the device off and back on again. Compare the device name on the PROFINET IO master with the one on the FX0-GPNT.
The FX0-GPNT is not supplying any data. PWR ● Green LINK/ACT ●/● Green STATUS ●/● Red (1 Hz)	Configuration required. The configuration has not yet been transferred in full.	Configure the FX0-GPNT and transfer the configuration to the device. Wait until the configuration has been fully transferred.
The FX0-GPNT is not supplying any data. PWR ● Green LINK/ACT ●/● Green STATUS ●/● Green (1 Hz)	No data set has been activated. The Flexi Soft system is in the “Stopped” state.	Activate at least one data set. Start the main module (switch to the “Run” state).

Fault	Possible cause	Possible measures
The FX0-GPNT is not supplying any data. PWR ● Green LINK/ACT ●/● Green STATUS ● Green (2 Hz)	LED flashing at the request of the PROFINET IO master for the purpose of physically identifying the device.	Stop the LED from flashing with the SIEMENS SIMATIC Manager software or switch the voltage supply for the Flexi Soft system off and then back on again.
The FX0-GPNT was functioning correctly following configuration but has suddenly stopped supplying data. PWR ● Green LINK/ACT ●/● Green STATUS ● Red/green ¹⁾	The FX0-GPNT is being operated in slave mode, with the IP address assigned by a DHCP server. Following a restart of the FX0-GPNT or the DHCP server, a different IP address was assigned to the FX0-GPNT that is not recognized by the PLC. ¹⁾	Either assign a fixed IP address to the FX0-GPNT or allocate a fixed IP address for the FX0-GPNT on the DHCP server (assigned manually via the MAC address of the FX0-GPNT).
The FX0-GPNT is in the "Serious error" state. PWR ● Green LINK/ACT ●/● Green STATUS ● Red (2 Hz)	Internal device error on the FX0-GPNT. The FX0-GPNT is in an incorrect position. No Flexi Soft gateways are supported by the firmware version of the main module.	Switch the voltage supply for the Flexi Soft system off and then back on again. Check whether the FX0-GPNT is positioned correctly in the Flexi Soft system. Use the configuration software to check the diagnostic messages. Use a main module with the required firmware version. If the fault persists, replace the gateway.
The FX0-GPNT/ Flexi Soft system is in the "Serious error" state. PWR ● Green LINK/ACT ●/● Green STATUS ● Red	The FX0-GPNT has not been connected correctly to the other Flexi Soft modules. The module connector is dirty or damaged. The FX0-GPNT is in an incorrect position. There is an internal serious error on another Flexi Soft module.	Plug in the FX0-GPNT correctly. Check whether the FX0-GPNT is positioned correctly in the Flexi-Soft system. Clean the male and female connectors. Switch the voltage supply back on. Check the other Flexi Soft modules.

¹⁾ FX0-GPNT with firmware ≥ V3.00.0 do not support DHCP.

²⁾ If the firmware version is ≥ V2.00.0, you can use the configuration software to stop the STATUS LED from flashing red/green ●. In this case, the STATUS LED will light up steady ● green if the configuration is valid.

10.4 The FX0-GETC EtherCAT gateway

Table 32: Troubleshooting the FX0-GETC

Fault	Possible cause	Possible measures
The computer is unable to establish a connection to the Flexi Soft gateway.	The supply voltage of the FX0-GETC is too low or missing.	Switch on the voltage supply. Check the communication settings of the FX0-GETC.
The FX0-GETC is not supplying any data. MS ● Red (1 Hz) ERR ● Red (2.5 Hz) RUN ○ OFF	Configuration required. The configuration has not yet been transferred in full.	Configure the FX0-GETC and transfer the configuration to the device. Wait until the configuration has been fully transferred.

Fault	Possible cause	Possible measures
The FX0-GETC is not supplying any data. MS ● Red/green ERR ○ OFF RUN ● Green (2.5 Hz)	No input PDO activated.	Activate an input PDO.
The FX0-GETC is not supplying any data. MS ● Green (1 Hz) ERR ○ OFF RUN ● Green	The Flexi Soft system is in the “Stopped” state.	Start the main module (switch to the “Run” state).
The FX0-GETC is not supplying any data. MS ● Green ERR ○ OFF RUN ● Green	The EtherCAT PLC is in the “Stopped” state.	Start the EtherCAT PLC (switch to the “Run” state).
The FX0-GETC is in the “Serious error” state. MS ● Red (2 Hz) ERR ● Red RUN ○ OFF	Internal device error on the FX0-GETC. No Flexi Soft gateways are supported by the firmware version of the main module.	Switch the voltage supply for the Flexi Soft system off and then back on again. Use the configuration software to check the diagnostic messages. Use a main module with the required firmware version. If the fault persists, replace the gateway.
The FX0-GETC/ Flexi Soft system is in the “Serious error” state. MS ● Red ERR ● Red RUN ○ OFF	The FX0-GETC has not been connected correctly to the other Flexi Soft modules. The module connector is contaminated or damaged. There is an internal serious error on another Flexi Soft module.	Plug in the FX0-GETC correctly. Clean the male and female connectors. Switch the voltage supply back on. Check the other Flexi Soft modules. Use the configuration software to check the diagnostic messages.

10.5 The FX0-GPRO PROFIBUS DP gateway

Table 33: Troubleshooting the FX0-GPRO

Fault	Possible cause	Possible measures
The computer is unable to establish a connection to the Flexi Soft gateway.	The supply voltage of the FX0-GPRO is too low or missing.	Switch on the voltage supply. Check the communication settings of the FX0-GPRO.
The FX0-GPRO is not supplying any data. PWR ● Green BF ○ OFF MS ● Red (1 Hz)	Configuration required. The configuration has not yet been transferred in full.	Configure the FX0-GPRO and transfer the configuration to the device. Wait until the configuration has been fully transferred.
The FX0-GPRO is not supplying any data. PWR ● Green BF ○ OFF MS ● Green	No data set has been activated.	Activate at least one data set.

Fault	Possible cause	Possible measures
The FX0-GPRO is not supplying any data. PWR ● Green BF ○ OFF/● Red MS ● Green (1 Hz)	The FX0-GPRO is in the “Stopped” state.	Start the main module (switch to the “Run” state).
The FX0-GPRO is not supplying any data. PWR ● Green BF ○ OFF MS ● Green	The PROFIBUS master is in the “Stopped” state.	Start the PROFIBUS master (switch to the “Run” state).
The FX0-GPRO was functioning correctly following configuration but has suddenly stopped supplying data. PWR ● Green BF ● Red MS ● Green/Red	The PROFIBUS hardware address of the FX0-GPRO has been changed. The PROFIBUS cable has been interrupted.	Check the PROFIBUS address settings on the hardware. Check the PROFIBUS cable. Check the PROFIBUS master.
The FX0-GPRO is in the “Serious error” state. PWR ● Green BF ● Red MS ● Green (2 Hz)	Internal device error on the FX0-GPRO. No Flexi Soft gateways are supported by the firmware version of the main module.	Switch the voltage supply for the Flexi Soft system off and then back on again. Use the configuration software to check the diagnostic messages. Use a main module with the required firmware version. If the fault persists, replace the gateway.
The FX0-GPRO/ Flexi Soft system is in the “Serious error” state. PWR ● Red BF ○ OFF MS ● Red	The FX0-GPRO has not been connected correctly to the other Flexi Soft modules. The module connector is contaminated or damaged. There is an internal serious error on another Flexi Soft module.	Plug in the FX0-GPRO correctly. Clean the male and female connectors. Switch the voltage supply back on. Check the other Flexi Soft modules.

10.6 The FX0-GCAN CANopen gateway

Table 34: Troubleshooting the FX0-GCAN

Fault	Possible cause	Possible measures
The computer is unable to establish a connection to the Flexi Soft gateway.	The supply voltage of the FX0-GCAN is too low or missing.	Switch on the voltage supply. Check the communication settings of the FX0-GCAN.
The FX0-GCAN is not supplying any data. PWR ● Green NS ○ OFF MS ● Green (1 Hz)	Configuration required, the node guarding or heartbeat messages have not been sent. The configuration has not yet been transferred in full.	Configure the FX0-GCAN and transfer the configuration to the device. Wait until the configuration has been fully transferred.
The FX0-GCAN is not supplying any data. PWR ● Green NS ● Green MS ● Green (1 Hz)	The configuration has not yet been transferred in full.	Wait until the configuration has been fully transferred.

Fault	Possible cause	Possible measures
The FX0-GCAN is not supplying any data. PWR ● Green NS ● Green MS ⚡ Red/green	No PDO transmission has taken place since switching on	Start PDO transmission. Transmit the PDO via SDO 6000h or SDO 6200h.
The FX0-GCAN is not supplying any data. PWR ● Green NS ⚡ Green MS ⚡ Red/green	No PDO transmission has taken place since switching on Incorrect data transmission rate (CAN transceiver may be in the "Passive error" state) Wrong node ID or CANopen address The CAN cable has been interrupted.	Start PDO transmission. Transmit the PDO via SDO 6000h or SDO 6200h. Check and correct the data transmission rate. Check and correct the CANopen address. Check the CANopen cabling.
The FX0-GCAN is not supplying any data. PWR ● Green NS ○ OFF/● Red/ ● Green MS ⚡ Green (1 Hz)	The FX0-GCAN is in the "Idle" state. The node guarding or heartbeat messages have not been sent. The Flexi Soft configuration has not been verified and the main module has been stopped.	Start the main module (switch to the "Run" state). Use the configuration software to verify the configuration and start the main module.
The FX0-GCAN is not supplying any data. PWR ● Green NS ● Green MS ○ OFF	Supply voltage too low	Check the supply voltage.
The FX0-GCAN is not supplying any data. PWR ● Red NS ● Red MS ● Red	Brief supply voltage drop	Check the supply voltage. Reset the Flexi Soft system.
The FX0-GCAN is not supplying any data. PWR ● Green NS ⚡ Green (1 Hz) MS ⚡ Green (1 Hz)	Wrong node ID or CANopen address Incorrect data transmission rate (CAN transceiver may be in the "Passive error" state), FX0-GCAN is in the "Idle" state.	Check and correct the CANopen address. Check and correct the data transmission rate.
The FX0-GCAN is not supplying any data. PWR ● Green NS ● Red MS ⚡ Red/green	The data transmission rate is incorrect and the FX0-GCAN transceiver is in the "Busoff" state (hardware problem on the physical CAN layer). The CAN cable has been interrupted.	Check and correct the data transmission rate. Check the CANopen cabling. Reset the Flexi Soft system.
The FX0-GCAN is not supplying any data. PWR ● Green NS ⚡ Green (1 Hz) MS ● Green	The CANopen master is in the "Stop" or "Pre-operational" status. Unable to initialize another slave during bus system initialization. The CANopen status of the FX0-GCAN is "Pre-operational". Wrong node ID or CANopen address.	Start the CANopen master (switch to the "Operational" CANopen status). Check that all the slaves on the bus are switched on. Check the CANopen cabling. Check whether the CAN master starts automatically. Check and correct the CANopen address.

Fault	Possible cause	Possible measures
The FX0-GCAN is not supplying any data. PWR ● Green NS ● Red MS ● Green	The FX0-GCAN transceiver is in the "Passive error" state. The CAN cable has been interrupted.	Check the CANopen cabling. Use the configuration software to check the diagnostic messages. Reset the Flexi Soft system.
The FX0-GCAN is not supplying any data. PWR ● Green NS ⚡ Red (1 Hz) MS ⚡ Red/green	Node guarding or heartbeat consumer failure The guarding configuration has been changed.	Check the CANopen cabling. Check the life guarding time (life time factor ≥ 1). Check the heartbeat consumer time (should be $\geq 1.5 \times$ heartbeat producer time). Use the configuration software to check the diagnostic messages. Reset the Flexi Soft system.
The FX0-GCAN is in the "Serious error" state. PWR ● Green NS ● Red MS ⚡ Red (2 Hz)	Internal device error on the FX0-GCAN. No Flexi Soft gateways are supported by the firmware version of the main module.	Switch the voltage supply for the Flexi Soft system off and then back on again. Use the configuration software to check the diagnostic messages. Use a main module with the required firmware version. If the fault persists, replace the gateway.
The FX0-GCAN/ Flexi Soft system is in the "Serious error" state. PWR ● Red NS ○ OFF MS ● Red	The FX0-GCAN has not been connected correctly to the other Flexi Soft modules. The module connector is contaminated or damaged. There is an internal serious error on another Flexi Soft module.	Plug in the FX0-GCAN correctly. Clean the male and female connectors. Switch the voltage supply back on. Check the other Flexi Soft modules.

10.7 The FX0-GDEV DeviceNet gateway

Table 35: Troubleshooting the FX0-GDEV

Fault	Possible cause	Possible measures
The computer is unable to establish a connection to the Flexi Soft gateway.	The supply voltage of the FX0-GDEV is too low or missing.	Switch on the voltage supply. Check the communication settings of the FX0-GDEV.
The FX0-GDEV is not supplying any data. PWR ● Green NS ○ OFF MS ⚡ Red (1 Hz)	Configuration required, the node guarding or heartbeat messages have not been sent. The configuration has not yet been transferred in full.	Configure the FX0-GDEV and transfer the configuration to the device. Wait until the configuration has been fully transferred.
The FX0-GDEV is not supplying any data. PWR ● Green NS ● Green MS ⚡ Red (1 Hz)	The configuration has not yet been transferred in full.	Wait until the configuration has been fully transferred.
The FX0-GDEV is not supplying any data. PWR ● Green NS ● Green MS ⚡ Red/green	No data transmission has taken place since switching on	Start data transmission.

Fault	Possible cause	Possible measures
The FX0-GDEV is not supplying any data. PWR ● Green NS 🟡 Green MS 🟡 Red/green	No data transmission has taken place since switching on Incorrect data transmission rate Wrong node ID or DeviceNet address The cable has been interrupted.	Start data transmission. Check and correct the data transmission rate. Check and correct the node ID and DeviceNet address. Check the cabling.
The FX0-GDEV is not supplying any PDO data. PWR ● Green NS ○ OFF/● Red/ ● Green MS 🟡 Green (1 Hz)	The FX0-GDEV is in the “Idle” state. The node guarding or heartbeat messages have not been sent. The Flexi Soft configuration has not been verified and the main module has been stopped.	Start the main module (switch to the “Run” state). Use the configuration software to verify the configuration and start the main module.
The FX0-GDEV is not supplying any PDO data. PWR ● Green NS ● Green MS ○ OFF	Supply voltage too low	Check the supply voltage.
The FX0-GDEV is not supplying any data. PWR ● Red NS ● Red MS ● Red	Brief supply voltage drop	Check the supply voltage. Reset the Flexi Soft system.
The FX0-GDEV is not supplying any data. PWR ● Green NS 🟡 Green (1 Hz) MS 🟡 Green (1 Hz)	Wrong node ID or DeviceNet address Incorrect data transmission rate The FX0-GDEV is in the “Idle” state.	Check and correct the node ID and DeviceNet address. Check and correct the data transmission rate.
The FX0-GDEV is not supplying any data. PWR ● Green NS ● Red MS 🟡 Red/green	The data transmission rate is incorrect and the FX0-GDEV transceiver is in the “Busoff” state (hardware problem on the physical DeviceNet layer). The cable has been interrupted.	Check and correct the data transmission rate. Check the cabling. Reset the Flexi Soft system.
The FX0-GDEV is not supplying any data. PWR ● Green NS 🟡 Green (1 Hz) MS ● Green	The DeviceNet master is in the “Stopped” or “Pre-operational” state. Unable to initialize another slave during bus system initialization. The DeviceNet status of the FX0-GDEV is “Pre-operational”. Wrong node ID or DeviceNet address	Start the DeviceNet master (switch to the “Operational” DeviceNet state). Check that all the slaves on the bus are switched on. Check the cabling. Check whether the DeviceNet master starts automatically. Check and correct the DeviceNet address.
The FX0-GDEV is not supplying any data. PWR ● Green NS ● Red MS ● Green	The FX0-GDEV transceiver is in the “Passive error” state. The cable has been interrupted.	Check the cabling. Use the configuration software to check the diagnostic messages. Reset the Flexi Soft system.

Fault	Possible cause	Possible measures
The FX0-GDEV is not supplying any data. PWR ● Green NS ● Red (1 Hz) MS ● Red/green	Node guarding or heartbeat consumer failure The guarding configuration has been changed.	Check the cabling. Check the life guarding time (life time factor ≥ 1). Check the heartbeat consumer time (should be $\geq 1.5 \times$ heartbeat producer time). Use the configuration software to check the diagnostic messages. Reset the Flexi Soft system.
The FX0-GDEV is in the "Serious error" state. PWR ● Green NS ● Red MS ● Red (2 Hz)	Internal device error on the FX0-GDEV No Flexi Soft gateways are supported by the firmware version of the main module.	Switch the voltage supply for the Flexi Soft system off and then back on again. Use the configuration software to check the diagnostic messages. Use a main module with the required firmware version. If the fault persists, replace the gateway.
The FX0-GDEV/ Flexi Soft system is in the "Serious error" state. PWR ● Red NS ○ OFF MS ● Red	The FX0-GDEV has not been connected correctly to the other Flexi Soft modules. The module connector is contaminated or damaged. There is an internal serious error on another Flexi Soft module.	Plug in the FX0-GDEV correctly. Clean the male and female connectors. Switch the voltage supply back on. Check the other Flexi Soft modules.

10.8 The FX3-GEPR EFI-pro gateway



CAUTION

Unexpected machine startup

The dangerous state may not be stopped or not be stopped in a timely manner in the event of non-compliance.

- ▶ Do not use LED indicators for safety-relevant functions; they must only be used for general diagnostic purposes during commissioning or for troubleshooting. (ODVA SRS105)



NOTE

- In online mode, the current status of the diagnostic bits of the FX3-GEPR is displayed under **Configuration**.
- Error messages and the diagnostic history of the FX3-GEPR are displayed under **Diagnostics**.
- The status of each configured incoming connection of the FX3-GEPR can be found in the logic editor of the main module under **Inputs => GEPR => Status** as a diagnostic bit and can be evaluated in the logic program.

Table 36: Troubleshooting the FX3-GEPR

Fault	Possible cause	Possible measures
The Flexi Soft gateway cannot be found in the Safety Designer.	The supply voltage of the FX0-GEPR is too low or missing. The Ethernet connection has been interrupted.	Switch on the voltage supply. Check the Ethernet cabling.

Fault	Possible cause	Possible measures
The FX3-GEPR is not supplying any data. PWR ●/● Green MS ●/● Green NS ● Green	The FX3-GEPR has been configured for transmitting data but no connection has been established yet. The Ethernet cabling is not correct or the configuration is incompatible with the communication partner which means that the connection is rejected.	Check the Ethernet cabling. Check the diagnostic entries of the FX3-GEPR for information about a rejected connection. Check and retransmit the configuration of both connection partners.
The FX3-GEPR is not supplying any data. NS ○ OFF	The Ethernet connection has been interrupted.	Check the Ethernet cabling.
The FX3-GEPR is not supplying any data. PWR ● Red (1 Hz) MS ● Red/green	Configuration required. The configuration has not yet been transferred in full.	Configure the FX3-GEPR and transfer the configuration to the device. Wait until the configuration has been fully transferred.
The FX3-GEPR is not supplying any data. PWR ● Green Link/Act ●/● Green MS ● Red (1 Hz) NS ● Red	There is a second device with an identical IP address on the network.	Correct the IP address of the FX3-GEPR and then switch the device off and back on again, or change the IP address of the other device.
The FX3-GEPR is not supplying any data. PWR ●/● Green Link/Act ●/● Green MS ● Green NS ● Red (1 Hz)	At least one EFI-pro or CIP connection has reached the maximum data age limit or has timed out.	Check the physical connection running to the connected devices. Check the data transmission rate and network delay parameters for the connections. Check the compatibility of the minimum RPIs that have been set for the devices. Use the configuration software to check the diagnostic messages.
The FX3-GEPR is not supplying any data. PWR ● Green Link/Act ●/● Green MS ● Green NS ● Green	The FX3-GEPR is in the “Run” state. The assemblies have not been configured correctly (e.g., assemblies configured incorrectly in the logic).	Configure the FX3-GEPR correctly and transfer the configuration to the device.
The FX3-GEPR is not supplying any data. PWR ● Green (1 Hz) MS ● Green (1 Hz)	The FX3-GEPR is in the “Stopped” state.	Start the main module (switch to the “Run” state).
The FX3-GEPR is in the “Serious error” state. PWR ● Red (2 Hz) Link/Act ●/● Green MS ● Red	Internal device error on the FX3-GEPR	Use the configuration software to check the diagnostic messages. Switch the voltage supply for the Flexi Soft system off and then back on again. If the fault persists, replace the gateway.

Fault	Possible cause	Possible measures
The FX3-GEPR/ Flexi Soft system is in the "Serious error" state. PWR ● Red MS ☹ Red (2 Hz)	The FX3-GEPR has not been con- nected correctly to the other Flexi Soft modules. The module connector is dirty or damaged. There is an internal serious error on another Flexi Soft module.	Plug in the FX0-GEPR correctly. Clean the male and female con- nectors. Switch the voltage supply back on. Check the other Flexi Soft mod- ules.

11 Decommissioning

11.1 Removal

Procedure

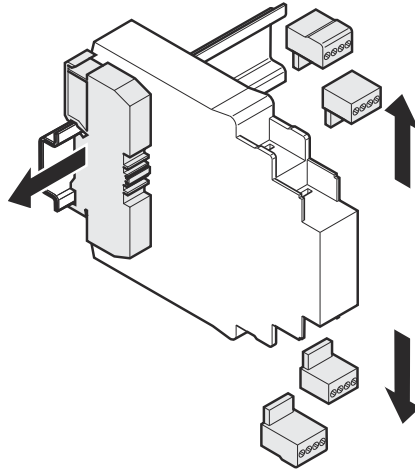


Figure 33: Detaching the plug-in terminals

1. Remove the plug-in terminals along with the wiring and the end pieces.

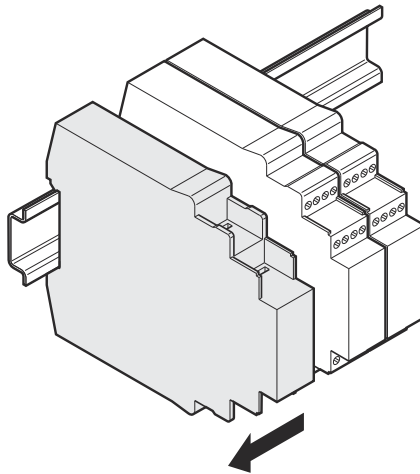


Figure 34: Disconnecting the plug connections

2. Slide the modules apart one by one in the direction of the arrow until the side-mounted plug connection is disconnected.

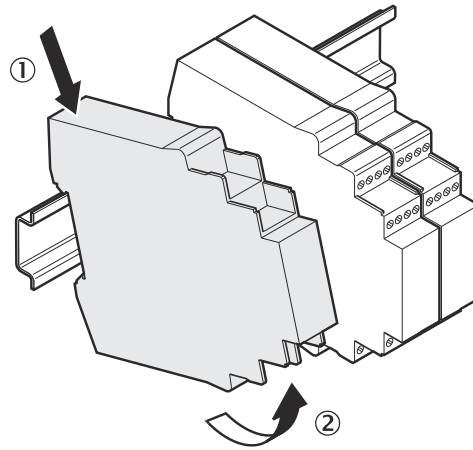


Figure 35: Removing the modules from the DIN mounting rail

3. Push the module down at the back (①). With the module still pushed down, move it in the direction of the arrow to remove it from the DIN mounting rail (②).

11.2 Disposal

Procedure

- ▶ Always dispose of unusable devices in accordance with national waste disposal regulations.



Complementary information

SICK will be glad to help you dispose of these devices on request.

12 Technical data

12.1 Data sheet

Overview

This technical data applies to all gateways.

General data

Table 37: General data

Protection class (IEC 61140)	III
Immunity to interference	EN 61000-6-2
Emitted interference	EN 61000-6-4

Interfaces

Table 38: Interfaces

FLEXBUS+	10-pin male connector for internal safety bus (left) 10-pin female connector (right)

Electrical data

Table 39: Supply circuit (e.g., via FLEXBUS+)

Supply voltage	24 V DC (16.8 V DC ... 30 V DC)
Power consumption	
FX0-GPRO, FX0-GCAN, FX0-GDEV	Max. 1.6 W
FX0-GENT V2, FX0-GMOD V2, FX0-GPNT V2	Max. 2.4 W
FX0-GETC, FX0-GENT V3, FX0-GMOD V3, FX0-GPNT V3	Max. 3 W
FX3-GEPR	Max. 3.5 W

Mechanical data

Table 40: Mechanical data

Housing material	Polycarbonate
Housing color	
FX0-GENT, FX0-GMOD, FX0-GPNT, FX0-GPRO, FX0-GETC, FX0-GCAN, FX0-GDEV	Light gray
FX3-GEPR	Colza yellow
Weight	
FX0-GENT, FX0-GMOD, FX0-GPNT	125 g (± 10%)
FX0-GPRO, FX0-GETC, FX0-GCAN, FX0-GDEV	150 g (± 10%)
FX3-GEPR	135 g (± 10%)
Mounting rail	Mounting rail according to EN 60715 (DIN mounting rail)

Ambient data

Table 41: Ambient data

Enclosure rating (IEC 60529)	IP20
Ambient operating temperature	-25 ... +55 °C
Storage temperature	-25 ... +70 °C (≤ 24 h)
Air humidity	≤ 95%, non-condensing
Operating altitude	Max. 2,000 m above sea level (80 kPa)
Vibration resistance	10 ... 500 Hz / 5 g (EN 60068-2-6)
Shock resistance, continuous shock	10 g, 16 ms (EN 60068-2-29)
Shock resistance, single shock	30 g, 11 ms (EN 60068-2-27)

12.2 Technical data for gateways

12.2.1 EtherNet/IP™, Modbus TCP, PROFINET IO

Interfaces

Table 42: Interfaces

	FX0-GENT, FX0-GMOD, FX0-GPNT
Fieldbus	EtherNet/IP™, Modbus TCP, PROFINET IO
Integrated switch	3-port layer-2 managed switch with Auto-MDI-X for automatic detection of crossed Ethernet cables
Connection type	RJ45 female connector
Transmission rate	10 Mbit/s (10Base-T) or 100 Mbit/s (100Base-TX), auto sensing
Configuration interface to FX0-GENT, FX0-GMOD and FX0-GPNT	TCP port 9000 UDP port 30718
Update rate (heartbeat rate)	Configurable from 40 to 65,535 ms
Update rate for change of state (COS)	
FX0-GENT with firmware < V3.00.0 FX0-GMOD with firmware < V3.00.0 FX0-GPNT with firmware < V3.00.0	10 ms
FX0-GENT with firmware ≥ V3.00.0 FX0-GMOD with firmware ≥ V3.00.0 FX0-GPNT with firmware ≥ V3.00.0	Min. 1 ms
Default settings for addressing	
FX0-GENT with firmware < V3.00.0 FX0-GMOD with firmware < V3.00.0 FX0-GPNT with firmware < V3.00.0	IP: 192.168.250.250 Subnet mask: 255.255.0.0 Default gateway: 0.0.0.0
FX0-GENT with firmware ≥ V3.00.0 FX0-GMOD with firmware ≥ V3.00.0 FX0-GPNT with firmware ≥ V3.00.0	No default settings for addressing
MAC address	Printed on the type label, e.g.: 00:06:77:02:00:A7

12.2.2 EtherCAT

Interfaces

Table 43: Interfaces

	FX0-GETC
Fieldbus	EtherCAT
Connection type	RJ45 female connector
Configuration interface to FX0-GETC	TCP port 9000 and UDP port 30718 via EoE
EtherCAT application cycle time	4 ms
Process data watchdog time	≥ 5 ms
Process data interface (PDI) watchdog time	≥ 55 ms

12.2.3 PROFIBUS DP

Interfaces

Table 44: Interfaces

	FX0-GPRO
Fieldbus	PROFIBUS-DP-V0
Interface level	RS-485
Connection type	9-pin D-SUB female connector
Slave address (via rotary switch)	1 ... 99
Slave address (via configuration software) ¹⁾	3 ... 125
Data transmission rate (automatic adjustment)	Max. 12 MBaud
Max. data transmission rate with standard cable	
100 m	12,000 kbit/s
200 m	1,500 kbit/s
400 m	500 kbit/s
1,000 m	187.5 kbit/s
1,200 m	93.75 kbit/s

¹⁾ You can only set the slave address via software, if the hardware address setting is "00".

For information on the cable parameters, see ["The FX0-GPRO PROFIBUS DP gateway"](#), page 28.

12.2.4 CANopen

Interfaces

Table 45: Interfaces

	FX0-GCAN
Fieldbus	CANopen DS 301
Interface level	CAN 5 V
Connection type	5-pin female open-style connector
Slave address (via rotary switch)	1 ... 99
Slave address (via configuration software) ¹⁾	1 ... 127
Max. data transmission rate with standard cable	
20 m	1,000 kbit/s

	FX0-GCAN
40 m	800 kbit/s
100 m	500 kbit/s
250 m	250 kbit/s
500 m	125 kbit/s

¹⁾ You can only set the slave address via software, if the hardware address setting is "00".

For information on the cable parameters, see ["The FX0-GCAN CANopen gateway"](#), page 29.

12.2.5 DeviceNet

Interfaces

Table 46: Interfaces

	FX0-GDEV
Fieldbus	DeviceNet
Interface level	CAN 5 V
Connection type	5-pin female open-style connector
Slave address (via rotary switch)	1 ... 63
Slave address (via configuration software) ¹⁾	0 ... 63
Max. data transmission rate with standard cable	
100 m	500 kbit/s
250 m	250 kbit/s
500 m	125 kbit/s

¹⁾ You can only set the slave address via software, if the hardware address setting is "00".

For information on the cable parameters, see ["The FX0-GDEV DeviceNet gateway"](#), page 30.

12.2.6 EFI-pro

Safety-related parameters

The data apply to an ambient temperature of +40 °C.

Table 47: Safety-related parameters

	FX3-GEPR
Safety integrity level (IEC 61508) Safety integrity level (IEC 62061)	SIL 3
Category (ISO 13849)	Category 4
Performance level (ISO 13849)	PL e
PFH _D	0.3 × 10 ⁻⁹
PFD _{avg}	2.5 × 10 ⁻⁵
T _M (mission time, ISO 13849)	20 years

Interfaces

Table 48: Interfaces

	FX3-GEPR
Interfaces for process data, configuration, and diagnostics	2 × RJ45 female connector

	FX3-GEPR
Configuration and diagnostic interface	High-speed USB 2.0, mini USB connection
Configuration interface	
On FX3-GEPR	TCP port 2122 UDP port 30718
On computer with Safety Designer	TCP port 2123 UDP port 30719
Communication protocols	EFI-pro, EtherNet/IP™ (CIP, CIP Safety™), CoLa 2.0
Integrated switch	3-port layer-2 managed switch with Auto-MDI-X for automatic detection of crossed Ethernet cables
Transmission rate	10 Mbit/s (10Base-T) or 100 Mbit/s (100Base-TX), auto sensing
Data packets per second (Packets per second)	3,000 PPS
Requested Packet Interval (RPI)	
producing	4 ... 500 ms (multiple of 4 ms)
consuming	4 ... 500 ms (multiple of 1 ms)
Max. number of RX/TX data bytes	48/50 bytes
Max. number of safe connections	10 EFI-pro/EtherNet/IP™ CIP Safety™ consuming 10 EFI-pro/EtherNet/IP™ CIP Safety™ producing 2 EFI-pro/EtherNet/IP™ CIP Safety™ consuming (4 bytes or 10 bytes) 2 EFI-pro/EtherNet/IP™ CIP Safety™ producing (4 bytes or 10 bytes)
Default settings for addressing	IP: 0.0.0.0 Subnet mask: 0.0.0.0 Default gateway: 0.0.0.0
MAC address	Printed on the type label, example: 00:06:77:02:00:A7

12.3 Dimensional drawings

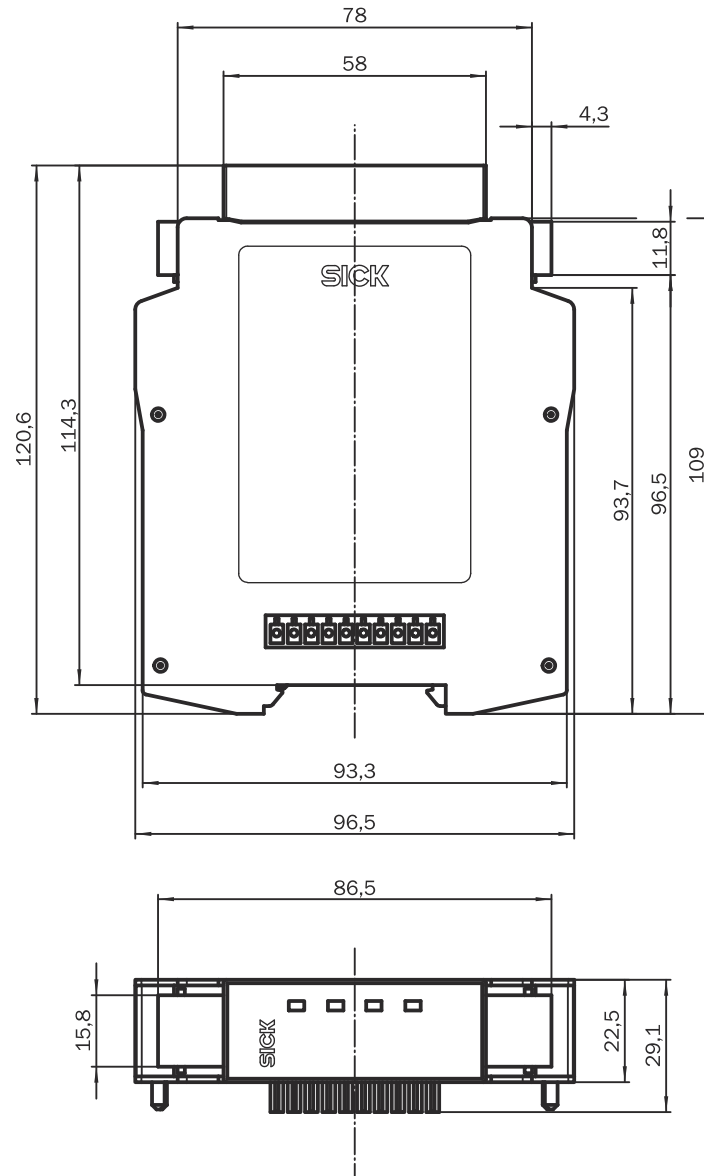


Figure 36: Dimensional drawing for FX0-GENT, FX0-GMOD, FX0-GPNT and FX0-GETC (mm)

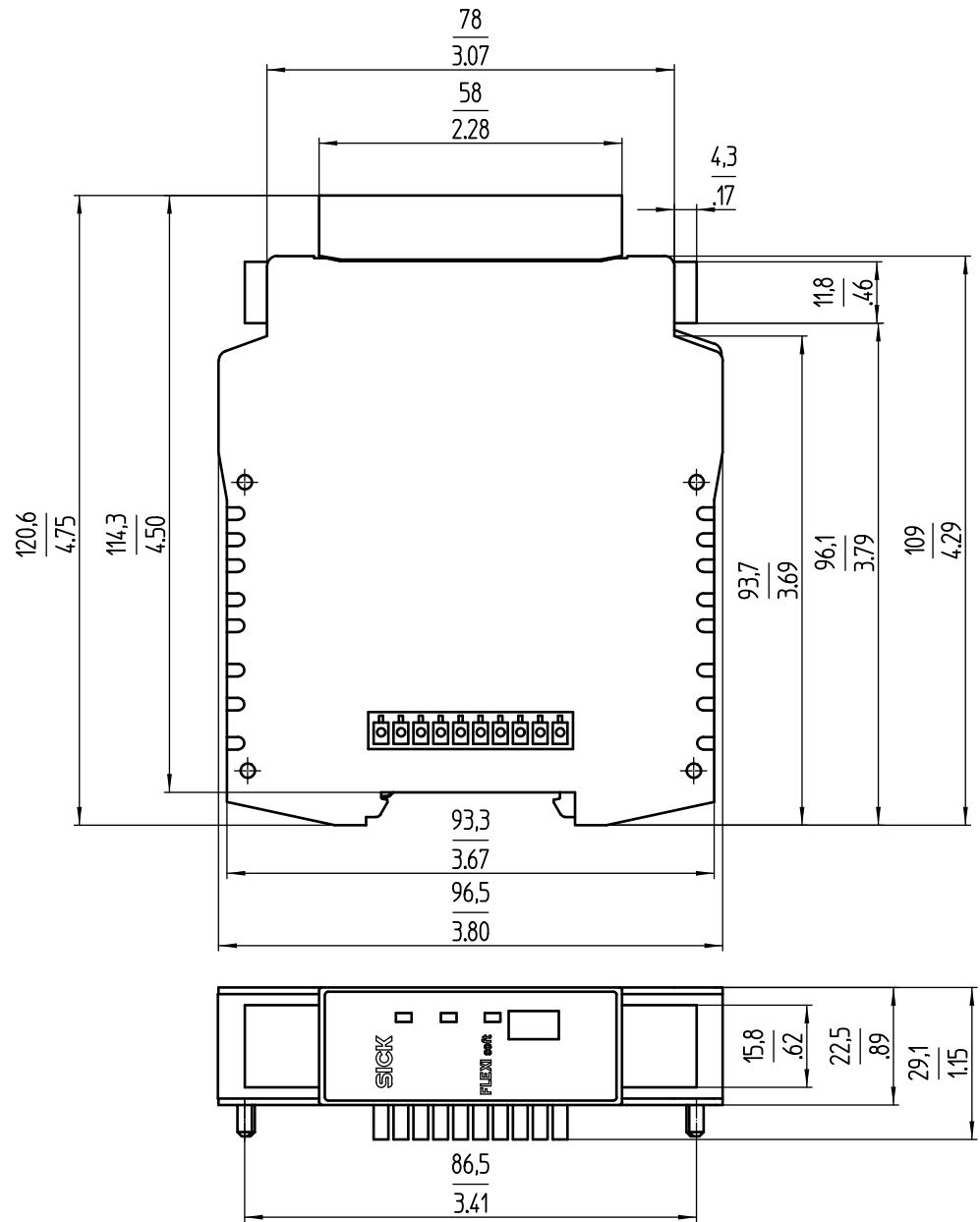


Figure 37: Dimensional drawing for FX3-GEPR (mm/in)

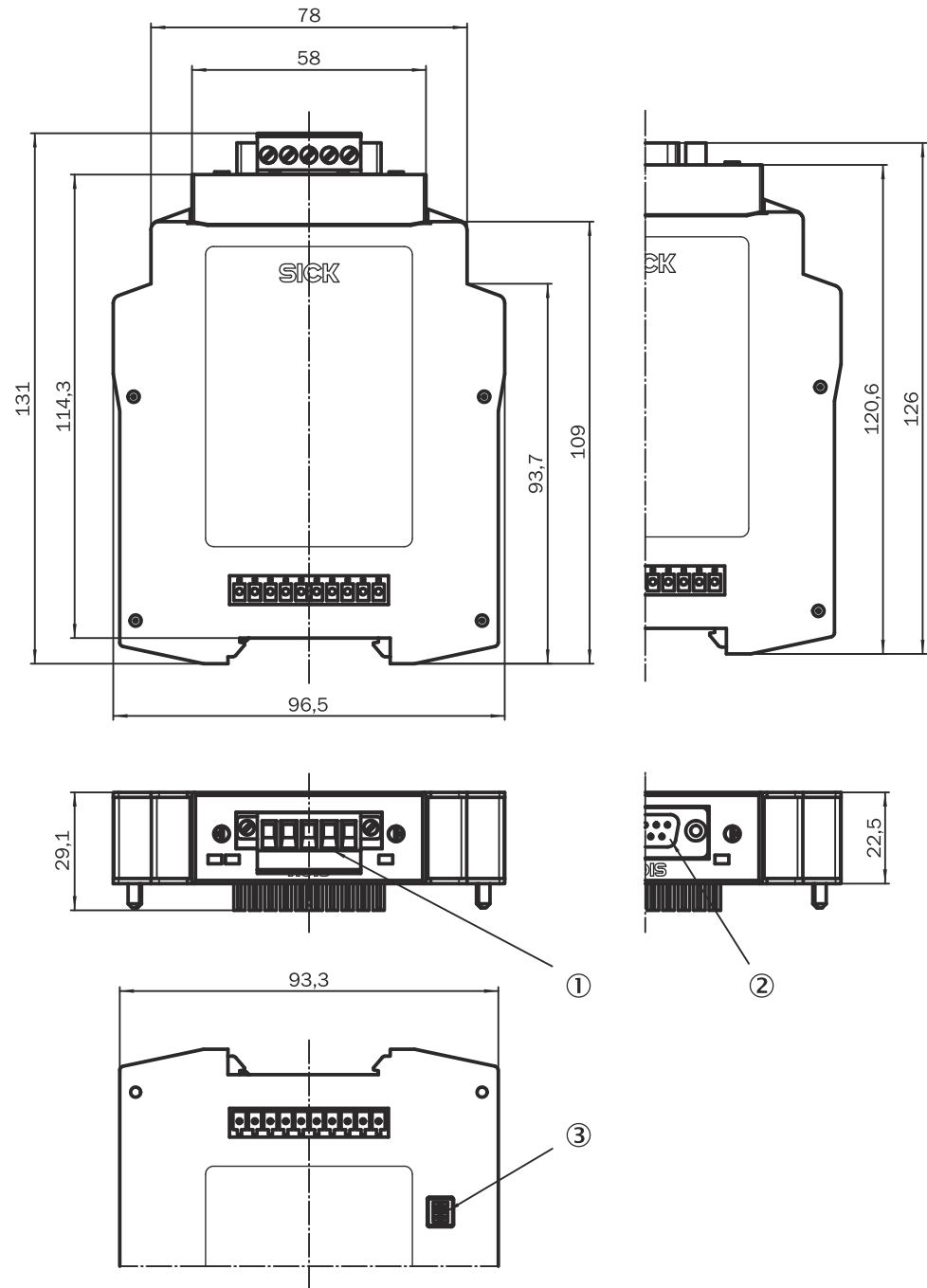


Figure 38: Dimensional drawing for FX0-GPRO, FX0-GCAN and FX0-GDEV (mm)

- ① FX0-GCAN and FX0-GDEV only
- ② FX0-GPRO only
- ③ FX0-GCAN and FX0-GDEV only

13 Ordering information

Table 49: Ordering information for gateways

Part	Protective coating ¹⁾	Type code	Part number
The V3 EtherNet/IP™ gateway	No	FX0-GENT00000	1044072
	Yes	FX0-GENT00010	1121596
The V2 EtherNet/IP™ gateway	No	FX0-GENT00030	1099830
The V3 Modbus® TCP gateway	No	FX0-GMOD00000	1044073
	Yes	FX0-GMOD00010	1127717
The V2 Modbus® TCP gateway	No	FX0-GMOD00030	1130282
The V3 PROFINET IO gateway	No	FX0-GPNT00000	1044074
	Yes	FX0-GPNT00010	1121597
The V2 PROFINET IO gateway	No	FX0-GPNT00030	1099832
EtherCAT gateway	No	FX0-GETC00000	1051432
	Yes	FX0-GETC00010	1127487
PROFIBUS DP gateway	No	FX0-GPRO00000	1044075
	Yes	FX0-GPRO00010	1121598
CANopen gateway	No	FX0-GCAN00000	1044076
	Yes	FX0-GCAN00010	1118379
DeviceNet gateway	No	FX0-GDEV00000	1044077
CC-Link gateway	No	FX0-GCC100200	1085195
EFI-pro gateway	No	FX3-GEPR00000	1069070
	Yes	FX3-GEPR00010	1112296

¹⁾ For more challenging ambient conditions (e.g., resistance to sulfur).

14 List of abbreviations

ACR

Automatic Configuration Recovery = a function that allows automatic recovery or duplication of the configuration for connected EFI-enabled safety sensors such as laser scanners or light curtains

CIP

Common Industrial Protocol

COB-ID

Communication Object Identifier = address of the communication object

CoLa

Command Language = SICK-specific configuration and diagnostic protocol

COS

Change Of State = e.g., of a process image

CSV

Comma Separated Values

EDS

Electronic Data Sheet

EFI

Enhanced Function Interface = safe SICK device communication

EIP

EtherNet/IP™ = CIP over Ethernet

EoE

Ethernet over EtherCAT

h

Hexadecimal notation (e.g., 72h = 114)

INT

Integer = 2 bytes = 1 word

Node ID

Node identifier

OUNID

Originator Unique Node Identifier

PDO

Process Data Object

RPI

Requested Packet Interval = data transmission rate requested by the target device

SCID

Safety Configuration Identifier

SDO

Service Data Object

SINT

Short integer = 1 byte

SNCT

Safety Network Configuration Tool

SNN

Safety Network Number

PLC

Programmable Logic Controller

TUNID

Target Unique Node Identifier

UDINT

Unsigned double integer = 4 bytes = 2 words

UINT

Unsigned integer = 2 bytes = 1 word

USINT

Unsigned short integer = 1 byte

15 Annex

15.1 Conformities and certificates

You can obtain declarations of conformity, certificates, and the current operating instructions for the product at www.sick.com. To do so, enter the product part number in the search field (part number: see the entry in the “P/N” or “Ident. no.” field on the type label).

15.1.1 EU declaration of conformity

Excerpt

The undersigned, representing the manufacturer, herewith declares that the product is in conformity with the provisions of the following EU directive(s) (including all applicable amendments), and that the standards and/or technical specifications stated in the EU declaration of conformity have been used as a basis for this.

- ROHS DIRECTIVE 2011/65/EU
- EMC DIRECTIVE 2014/30/EU

15.1.2 UK declaration of conformity

Excerpt

The undersigned, representing the following manufacturer herewith declares that this declaration of conformity is issued under the sole responsibility of the manufacturer. The product of this declaration is in conformity with the provisions of the following relevant UK Statutory Instruments (including all applicable amendments), and the respective standards and/or technical specifications have been used as a basis.

- Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations 2012
- Electromagnetic Compatibility Regulations 2016

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