rexroth
A Bosch Company

Application Manual

PROFINET Device App

PROFINET Device for ctrlX CORE 01VRS

R911417857, Edition 01

Liability

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DOK-XCORE*-PROFINETV01-AP01-EN-P

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Table of contents

1 About this documentation

Editions of this documentation

Edition	Release date	Note
01	2022-07	PROFINET Device App, Version PND-V-0114

2 Important directions on use

2.1 Intended use

2.1.1 Introduction

Rexroth products are developed and manufactured to the state-of-the-art.

The products are tested prior to delivery to ensure operational safety and reliability.

⚠ WARNING	**Personal injury and damage to property due to incorrect use of products!** The products may only be used as intended. Failure to use the products as intended may cause situations resulting in property damage and personal injury.

NOTICE	**Damages resulting from unintended use** Rexroth As the manufacturer does not assume any warranty, liability or compensatory claims for damages resulting from unintended use of the products. The user alone shall bear the risks of an unintended use of the products. Before using Rexroth products, make sure that all the prerequisites for an intended use of the products are met: – Personnel that in any way, shape or form uses Rexroth products must first read and understand the relevant safety instructions and be familiar with their intended use – Leave hardware products in their original state, i.e., do not make any structural modifications. It its not permitted to decompile software products or alter source codes – Do not install damaged or defective products or commission them – It has to be ensured that the products have been installed as described in the relevant documentation

2.1.2 Areas of use and application

Products of the ctrlX series are suitable for Motion/Logic applications.

NOTICE	Products of the ctrlX series may only be used with the accessories, mounting parts, and other components specified in this documentation. Components that are not expressly mentioned must neither be attached nor connected. The same applies to cables and lines. Only to be operated with the hardware component configurations and combinations expressly specified and with the software and firmware specified in the corresponding documentations and functional descriptions.

Products of the ctrlX series are suitable for single-axis as well as for multi-axis drive and control tasks. Device types with different equipment and interfaces are available for using the system in specific applications.

Typical areas of application:

- Building automation
- IoT and Security Gateway or Device
- Handling & Robotic

Controls of the ctrlX CORE series may only be operated under the mounting and installation conditions, in the position of normal use and under the ambient conditions (temperature, degree of protection, humidity, EMC, etc.) specified in the related documentations.

2.2 Unintended use

"Unintended use" refers to using the ctrlX products outside of the above-mentioned areas of application or under operating conditions and technical data other than described and specified in the documentation.

ctrlX products must not be used if they are exposed to following conditions:

- Operating conditions that do not meet the specified ambient conditions. Operation under water, under extreme temperature fluctuations or under extreme maximum temperatures is prohibited
- Applications that have not been expressly authorized by Rexroth

3 Safety instructions

The Safety instructions contained in the available application documentation feature specific signal words (DANGER, WARNING, CAUTION or NOTICE) and, where required, a safety alert symbol (in accordance with ANSI Z535.6-2006).

The signal word is meant to draw the reader's attention to the safety instruction and identifies the hazard severity.

The safety alert symbol (a triangle with an exclamation point), which precedes the signal words DANGER, WARNING and CAUTION, is used to alert the reader to personal injury hazards.

The Safety instructions in this documentation are designed as follows:

⚠ DANGER	In case of non-compliance with this safety instruction, death or serious injury **will** occur.
⚠ WARNING	In case of non-compliance with this safety instruction, death or serious injury **could** occur.
⚠ CAUTION	In case of non-compliance with this safety instruction, minor or moderate injury could occur.
NOTICE	In case of non-compliance with this safety instruction, property damage could occur.

4 Introduction and overview

4.1 PROFINET Device App – Introduction

The PROFINET Device app enables an interface for the real-time EtherNet system PROFINET IO and allows the ctrlX device to connect as subsystem below a PROFINET IO controller.

The PROFINET Device data are available for all apps on the ctrlX device via the real-time data layer (ctrlX Data Layer).

The PROFINET Device app is not supported by virtual ctrlX CORE devices.

Prerequisites

To operate the PROFINET Device app, the following requirements have to be met:

- ctrlX CORE hardware with MultiEthernet hardware extension
- PROFINET Device app license, see ➦PROFINET Device App – License
- “Automation Core” app installed by default

App installation on the ctrlX device

ctrlX app installation information is contained in the ctrlX Runtime web documentation, see:

➦App basics
➦Installing the app of the ctrlX store on the ctrlX device
➦ctrlX Store in the web

Configuring the PROFINET Device app

The PROFINET Device is configured in the ctrlX device web interface.

Start the web interface of the ctrlX device and navigate to the window: “PROFINET Device”, see:

➦Window – PROFINET Device

In the “PROFINET Device” window, the PROFINET Device can be enabled on the ctrlX device and the device configuration can be selected, see:

➦PROFINET Device – Configuration

4.2 PROFINET Device App – Features

The PROFINET Device app supports the following functions:

- Communication with a PROFINET IO network
- Configuring the PROFINET Device
- PROFINET Device administation

Technical data

Max. In-/Output	1440/1440 bytes
Cycle time	4 ms (expon. 2 multiples)
Max. Number of submodules	128
Max. Number of I/O connections (modules)	4 (input/output)
I&M data	0-3
Conformance class	B (RT, unsynchronous)

MRP client	No
Max. I/O connections	4 (shared device)

4.3 PROFINET Device App – License

The PROFINET Device instance operation is subject to a license.

Required license

Type code	Part number
SWL-XC*-PND-PROFINETDEV**-NNNN	R911412495

Purchasing a license

For more information on how to purchase and handle ctrlX licenses, please refer to the application manual for ctrlX Runtime, see: ➥Web documentation

Behavior in case of a missing license

The PROFINET Device app can be installed on the ctrlX device without any license.

The missing license has consequences if a PROFINET IO device instance is to be added to the ctrlX device.

In this case, a message in the “PROFINET Device” window informs the user that the required license is not available.

The PROFINET IO device instance cannot be operated without license.

5 PROFINET device – Creating/deleting an instance

5.1 PROFINET Device – Create instance

To operate the ctrlX device as PROFINET device, create a PROFINET device instance on the ctrlX device.

Only one PROFINET device instance can be created on the ctrlX device.

Creation procedure

1. Open the web interface of the ctrlX device and navigate to the window: “PROFINET device”, see:
   ➦ Window – PROFINET Device
2. Click on the [+] button in the window
   ➡ The “Add PROFINET device” dialog opens
3. Enter an instance name in the dialog as well as the selected port
4. Confirm the dialog with “Add”
   ➡ The PROFINET Device instance is created on the ctrlX device and is displayed in the “PROFINET device” window

5.2 PROFINET Device – Delete instance

Prerequisite

To delete a PROFINET Device instance, the Pre-OP communication state is required, see:

➦ PROFINET Device – State machine

Procedure to delete a PROFINET Device instance

1. Open the web interface of the ctrlX device and navigate to the window: “PROFINET device”, see:
   ➦ Window – PROFINET Device
2. In the table column of the PROFINET Device instance, click on the [🗑] button
3. Acknowledge the confirmation prompt
   ➡ The PROFINET Device instance is removed from the ctrlX device

6 PROFINET Device – Configuration

After creating a PROFINET Device instance on the ctrlX device, the device configuration of the PROFINET Device has to be set. The device configuration depends on which I/O components are connected to the ctrlX device (data type and number of inputs/outputs).

The installation scope of the PROFINET Device app provides a selection of configuration templates, covering common constellations of data types and input/output assignments.

Included configuration templates

Configuration template	Input	Output	Data type (Structure in the data layer)
default_in_4_out_4	4	4	BYTE
in_256_out_256	128	128	BYTE
	128	128	BYTE
in_128_out_128	128	128	BYTE
in_40_out_32	16	16	BYTE
	4	–	UINT
	4	4	UDINT
in_1280_out_1280	32	32	ARRAY OF REAL
	32	32	ARRAY OF REAL
	32	32	ARRAY OF REAL
	128	128	ARRAY OF REAL
	128	128	ARRAY OF REAL
	128	128	ARRAY OF REAL
	128	128	ARRAY OF REAL
	128	128	ARRAY OF REAL
	128	128	ARRAY OF REAL
	128	128	ARRAY OF REAL

Selecting the configuration template

1. In the ctrlX CORE web interface, navigate to the window PROFINET Device, see:
   ➦ Window – PROFINET Device
2. In the PROFINET Device table column, click on the [✎] button
   If the buttons have to be grayed out, the ctrlX device has to be switched to the "Pre-Operating" mode first. For switching, click on the [□] button
   .
   ➡ After clicking on the [✎] button, the configuration editor opens, see ➦ Editor - Configuration (PROFINET Device)
3. In the editor, select the configuration template from the list and click on “Save”
   ➡ The configuration is applied to the system
4. The ctrlX device can now be switched again to the "Operating" mode, click on the [▷] button

Saving and restoring the configuration file

The PROFINET Device configuration is backed up and restored centrally via the app data management of the ctrlX device, see ➦documentation in the web

7 PROFINET Device – State machine

The PROFINET Device state machine is coupled to the communication connection of the ctrlX device.

The states can be changed in the “PROFINET Device” window, see:

➦Window – PROFINET Device

PROFINET Device – States

State	Name	Description
init	Init	• No communication with application layer • Transition to „preop“: Establishing the communication to the application layer • Transition to „Fw_update_required“: Firmware update required
preop	Pre-OP	Pre-Operational • No process data communication • Transition to „safeop“
safeop	Safe-OP	Safe-Operational • Transition to „op“
op	OP	Operational • Process data communication • Input and output data is valid
Fw_update_required	Firmware update required	Firmware update of the communication connection is required
Fw_update	Updating firmware...	Firmware update of the communication connection is active

8 PROFINET Device – Firmware update

Communication connection update

By default, the PROFINET Device app is equipped with a device firmware to operate the PROFINET hardware.

However, if the firmware has to be updated, the communication state “Firmware update necessary” is displayed on the app interface, see:

➦ PROFINET Device – State machine

In this case, the update can be started in the “PROFINET Device” via the “Update firmware” button, see:

➦ Window – PROFINET Device

NOTICE	During the firmware update (approx. 5 minutes), the ctrlX device must not be switched off! After the update has been completed successfully, the PROFINET Device instance is restarted automatically.

9 PROFINET Device – diagnostics

The PROFINET Device diagnostic messages are transferred to the diagnostic logbook of the ctrlX device and contain the following categories:

- Status messages
- Warnings
- Errors

For more information about the diagnostic logbook of the ctrlX device, refer to the following web documentation, see ➦ link

10 PROFINET device – User interface

10.1 Windows

10.1.1 Window – PROFINET Device

The window is used to administer the PROFINET Device instance on the ctrlX device. A PROFINET Device instance can be added and configured on the ctrlX device in the window, see:

- ➦ PROFINET Device – Create instance
- ➦ PROFINET Device – Configuration

Only one PROFINET Device instance of the ctrlX device is supported.

Related topics

- ➦ PROFINET Device App – Introduction
- ➦ PROFINET Device App – Features
- ➦ PROFINET Device – Firmware update

Call

The window is displayed after the PROFINET Device app installation in the page navigation of the ctrlX CORE web interface.

Window elements

The window contains a command line and a PROFINET Device instance display as table.

An instance can be added via the + button in the command line o n the ctrlX device.

The table display provides the following information and commands:

Element	Function
“Name”	Name of the active PROFINET Device instance
“State”	Display of the current communication status, see ➦ PROFINET Device – State machine
“Status”	App license state display • “OK” The required license is available on the ctrlX device • “License not available” The required license to operate the instance is missing Please refer to ➦ PROFINET Device App – License
“Actions” For controlling and configuring the PROFINET Device instance	▷: Switches the PROFINET Device instance to the "Operational" mode and starts the real-time data communication to the ctrlX device, see: ➦ PROFINET Device – State machine
	□: Switches the PROFINET Device instance to the "Pre-Operational" mode and starts the real-time data communication on the ctrlX device. Option to edit the PROFINET Device settings

Element	Function
	: Only available in the "Pre-Operational" device mode. Opens the editor to configure the PROFINET Device instance, see: ➦ Editor - Configuration (PROFINET Device)
	: Only available in the "Pre-Operational" device mode. Deletes the current PROFINET Device instance.
	“Update firmware”: Only available if a firmware update is available. Command to update the PROFINET Device firmware, see: ➦ PROFINET Device – Firmware update

10.2 Editors

10.2.1 Editor - Configuration (PROFINET Device)

The editor manages the PROFINET Device device configuration.

The device configuration depends on which I/O components are connected to the ctrlX device (data type and number of inputs/outputs).

The editor provides the configuration templates for configuration but it is also possible to upload user-defined configurations:

➦ PROFINET Device – Configuration

Call

in the “PROFINET Device” window via the button [ ], see:

➦ Window – PROFINET Device

The editor can only be opened in the service mode of the ctrlX device.

Elements of the editor

The editor contains two tabs:

- “Select template”
- “Upload configuration”

“Select template” **tab**

To select and enable a PROFINET Device device configuration

Element	Function
“Active configuration template”	Shows the currently enabled device configuration (grayed out)
“Template”	Expandable list containing the available configuration templates (by default provided configurations and subsequently uploaded user-defined configurations)
“Description”	Shows a short description of the selected configuration
Button “Save”	Backs up and enables the selected device configuration

Element	Function
Button “Cancel”	Cancels the dialog without any changes

“Upload configuration” **tab**

To upload a user-defined PROFINET Device device configuration file

Element	Function
Input field	To specify the configuration file to be uploaded (path to the storage location on the Engineering PC, optionally manual search in the file system)
File preview	Preview in which the first 10.000 characters of the selected configuration are displayed
Button “Upload”	Uploads the selected configuration file (only active if a valid configuration is selected for the upload)

11 Related documentation

11.1 Overview

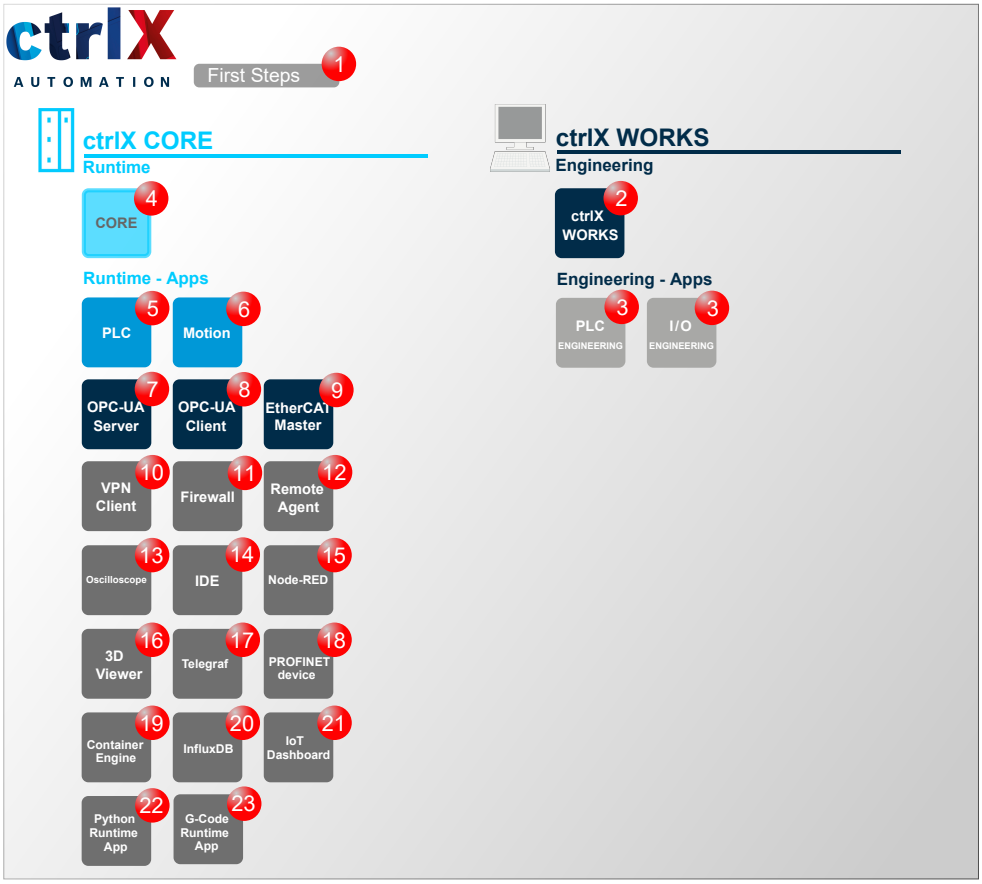

Fig. 1: Overview on further documentations

11.2 ctrlX AUTOMATION

No.	Documentation
1	**ctrlX WORKS First Steps 01VRS** Quick Start Guide ➦ Web documentation link Ordering information: • DOK-XWORKS-F*STEP**V01-QURS-EN-P • R911403760

11.3 ctrlX WORKS

No.	Documentation
2	**ctrlX WORKS Basic System 01VRS** Application Manual ➦ Web documentation link Ordering information: • DOK-XWORKS-********V01-APRS-EN-P • R911403761
3	**ctrlX PLC Engineering - PLC Programming System 01VRS** Application Manual ➦ Web documentation link Ordering information: • DOK-XPLC**-ENG*****V01-APRS-EN-P • R911403764
3	**ctrlX PLC Engineering - PLC Libraries 01VRS** Reference ➦ Web documentation link Ordering information: • DOK-XPLC**-LIBRARY*V01-RERS-EN-P • R911403766

11.4 ctrlX CORE

Nr.	Dokumentation
4	**ctrlX CORE - Runtime 01VRS** Application Manual ➦ Web documentation link Ordering information: • DOK-XCORE*-BASE****V01-APRS-EN-P • R911403768
	ctrlX CORE - Nodes of the Data Layer 01VRS Reference ➦ Link zur Web-Dokumentation Bestellinformationen: • DOK-XCORE*-BASE*DL*V01-RERS-EN-P • R911420072
	ctrlX CORE - Diagnostics 01VRS Reference ➦ Web documentation link Ordering information: • DOK-XCORE*-DIAG****V01-RERS-EN-P • R911403770

11.5 ctrlX CORE Apps

Nr.	Dokumentation
5	**PLC App - PLC Runtime Environment for ctrlX CORE 01VRS** Application Manual ➦ Web documentation link Ordering information: • DOK-XCORE*-PLC*****V01-APRS-EN-P • R911403787
6	**Motion App - Motion Runtime Environment for ctrlX CORE 01VRS** Application Manual ➦ Web documentation link Ordering information: • DOK-XCORE*-MOTION**V01-APRS-EN-P • R911403791
7	**OPC UA Server App - OPC UA Server for ctrlX CORE 01VRS** Application Manual ➦ Link zur Web-Dokumentation Ordering information: • DOK-XCORE*-OPCSERV*V01-APRS-EN-P • R911403778
8	**OPC UA Client App - OPC UA Client for ctrlX CORE 01VRS** Application Manual ➦ Web documentation link Ordering information: • DOK-XCORE*-OPCCLIENV01-APRS-EN-P • R911403781
9	**EtherCAT Master App - EtherCAT Master for ctrlX CORE 01VRS** Application Manual ➦ Web documentation link Ordering information: • DOK-XCORE*-ETHERCATV01-APRS-EN-P • R911403773
10	**VPN Client App - Remote Support Software for ctrlX CORE 01VRS** Application Manual ➦ Web documentation link Ordering information: • DOK-XCORE*-VPN*****V01-APRS-EN-P • R911403775
11	**Firewall App - Security Functions for ctrlX CORE 01VRS** Application Manual ➦ Web documentation link Ordering information: • DOK-XCORE*-FIREWALLV01-APRS-EN-P • R911403783

Nr.	Dokumentation
12	**Remote Agent App - ctrlX Device Portal Connection for ctrlX Devices 01VRS** Application Manual ➥ Web documentation link Ordering information: • DOK-XCORE*-REMOTE**V01-APRS-EN-P • R911403785
13	**Oscilloscope App - Oscilloscope Function for ctrlX Devices 01VRS** Application Manual ➥ Web documentation link Ordering information: • DOK-XCORE*-OSCI****V01-APRS-EN-P • R911409806
14	**IDE App - Integrated Development Environment 01VRS** Application Manual ➥ Web documentation link Ordering information: • DOK-XCORE*-IDE*****V01-APRS-EN-P • R911410625
15	**Node RED App - Graphic Programming for ctrlX CORE 01VRS** Application Manual ➥ Web documentation link Ordering information: • DOK-XCORE*-NODERED*V01-APRS-EN-P • R911403789
16	**3D Viewer App - Browser-based 3D Kinematic Simulation for ctrlX CORE 01VRS** Application Manual ➥ Web documentation link Ordering information: • DOK-XCORE*-3D*VIEW*V01-APRS-EN-P • R911416124
17	**Telegraf App - Server Agent for Collecting Data in the Data Layer 01VRS** Application Manual ➥ Web documentation link Ordering information: • DOK-XCORE*-TELEGRAFV01-APRS-EN-P • R911416836
18	**PROFINET Device App - PROFINET Device for ctrlX CORE 01VRS** Application Manual ➥ Web documentation link Ordering information: • DOK-XCORE*-PROFINETV01-APRS-EN-P • R911417857

Nr.	Dokumentation
19	**Container Engine App - Use of Docker® Images on ctrlX CORE 01VRS** Application Manual ➦ Web documentation link Ordering information: • DOK-XCORE*-DOCKER**V01-APRS-EN-P • R911417855
20	**InfluxDB App - Influx Database Connection for ctrlX CORE 01VRS** Application Manual ➦ Web documentation link Ordering information: • DOK-XCORE*-INFLUX**V01-APRS-EN-P • R911418738
21	**IoT Dashboard App - Data Visualization in Dynamic, Interactive Dashboards 01VRS** Application Manual ➦ Web documentation link Ordering information: • DOK-XCORE*-GDB*****V01-APRS-EN-P • R911420426
22	**Python Runtime App - Python Runtime Environment for ctrlX CORE 01VRS** Application Manual ➦ Link zur Web-Dokumentation Ordering information: • DOK-XCORE*-PYR*****V01-APRS-EN-P • R911420430
23	**G-Code Runtime App - G-Code Interpreter for ctrlX CORE 01VRS** Application Manual ➦ Link zur Web-Dokumentation Ordering information: • DOK-XCORE*-GCO*****V01-APRS-EN-P • R911420428

12 Service and support

Our worldwide service network provides an optimized and efficient support. Our experts provide you with advice and assistance. You can contact us **24/7**.

Service Germany

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

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

Phone:	**+49 9352 40 5060**
Fax:	**+49 9352 18 4941**
Email:	➦ service.svc@boschrexroth.de
Internet:	➦ http://www.boschrexroth.com

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

Service worldwide

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

Preparing information

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

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

13 Index

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