X2E
embedded system design

User Manual

XORAYA N2000

XORAYA
high performance automotive datalogger

Version: 1.0.0

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1 Introduction

1.1 About this user manual

- ▶ Read this user manual completely before using the XORAYA N2000 for the first time.
- ▶ Please consider this user manual as part of the product and make sure it is easily accessible.
- ▶ Provide this user manual upon transfer of the N2000 to a third party.
- ▶ Request a replacement user manual upon loss.

This user manual contains important information for safe, proper and efficient operation of the N2000. Following this user manual strictly helps in avoiding dangers, reduces repair costs and downtime, while increasing the reliability and service life of the N2000. It should be read, understood and applied by those using the N2000 according to the user manual.

Pay particular attention to:

- the safety section (➔ Safety and warranty)
- the text warnings of each section

Bear in mind that this user manual does not replace your responsibility as a N2000 user.

Subject to change without prior notice. This applies especially to changes relating to technical enhancements.

1.2 Validity of the user manual

This user manual applies to X2E's dataloggers of the XORAYA N2000 series. The exact type specifications can be found on the nameplate.
(➔ Identification)

The following instructions are key to operate the N2000 and must be strictly observed under all circumstances.

Information in this user manual is subject to change without prior notice due to further technical developments and subsequent modifications. New features may not be described yet or may be described incompletely. Please ensure that you have the most current and complete user manual.

Users can change certain properties and functions via the included software, so that the N2000 behaves differently than described herein. Users may revert to factory defaults at any time by pressing the default button on the front panel or via the supplied software.

1.3 Representation conventions

Representation	Meaning
▶ <Instruction>	User-executed action
▶ <Instruction option 1> *or* ▶ <Instruction option 2>	Instruction options
☑ <Outcome>	Outcome of an action or a series thereof
▪ <Level 1a> – <Level 2a> – <Level 2b> ▪ <Level 1b>	Maximum two-level enumeration
➔ <Cross-reference>	Clickable cross-reference to a section or heading (In most Windows programs, you can return to the previous position by pressing *ALT + Left arrow*)
<Text>	Housing label, GUI element or other highlighting
#	Placeholder for numbers
(1) or **(A)**	Reference to numbered markers in graphics

1.4 Pictograms

This manual uses pictograms to highlight and ensure faster recognition of important or especially useful information.

Warning:

These types of symbols indicate warnings that must be observed.

The following subsections contain a description of the basic structure and relevance of different warning levels.

General information:

This symbol indicates general information.

General information includes application tips and particularly useful information excluding warnings or hazards.

License information:

This symbol indicates license information.

License information contains either general information about licenses for the N2000 or indicates whether a license is required for a particular function.

1.4.1 Meaning of warnings

Warnings are systematized according to the severity and probability of their occurrence.

CAUTION

This pictogram in conjunction with the word *Caution* warns of a potentially dangerous situation, or an unsafe procedure.

Ignoring this warning information could result in injury or property and environmental damage.

WARNING

This pictogram used in conjunction with the word *Warning* warns of a potentially imminent danger to the health and lives of people.

Ignoring this warning could cause serious personal injury, including death in the worst case.

DANGER

This pictogram used in conjunction with the word *Danger* warns of an imminent danger to the health and life of people.

Ignoring this warning causes serious personal injury, including death in the worst case.

1.4.2 Structure of warnings

Warnings are separated from the surrounding text by lines set above and below.

SIGNAL WORD

Danger types and sources

Explanation and consequence of danger

▶ Actions to prevent danger

1.5 X2E-Wiki

The X2E-Wiki at *http://wiki.x2e.de* provides the following information:

- Latest software
- Latest firmware
- Latest license file

For access details, please send an email stating your contact data to *wiki@x2e.de*. We will send you the appropriate access data. You may request your access details at any time if necessary.

2 Safety and warranty

The XORAYA N2000 dataloggers were developed according to the latest state of the art and offer outstanding safety levels. During operation, however, this safety level can only be achieved if the user complies with all relevant safety regulations.

Upon measuring, safety regulations of the professional associations must be observed.

Please contact an expert or the service of X2E GmbH when in doubt about the operation, safety, or connection of the N2000.

2.1 Intended use

The N2000 is used for real-time acquisition of data communication in automotive bus systems. You can perform, store and transfer measurements to a PC, where you can read and analyze them using the GUI of the XORAYASuite.

- The N2000 is intended for use only by trained personnel.
- The N2000 must not be used in residential or living areas. Its use is strictly limited to industrial environments.
- The N2000 must also not be used in outdoor areas or hazardous areas.
- Always operate the N2000 within its technical specifications. (➔ Technical data)
- The N2000 may only be used under the conditions and for the purposes for which it was designed.
- Repairs may only be carried out by trained personnel of X2E GmbH.
- Operational safety cannot be guaranteed after modifications or conversions.
- Except for data buses, never perform measurements on live parts.
- The 4-mm plug of the power supply cable delivered must never be introduced in low-voltage sockets.
- The data lines may be extended up to a maximum of 30 m (USB: 3 m) provided that they are shielded like the supplied cables.
- The voltage supply may be extended up to a maximum of 3 m with sufficient cross-section.

2.2 Safety label on the device

You find the following safety label on the N2000 top side:

Burning hazard due to hot surfaces

Continuous operation can strongly heat up the N2000. As a result, it can burn the skin on the hands when touching it.

- ▶ Wear temperature-resistant ESD gloves when in contact with the N2000.

2.3 General safety instructions

DANGER

Electric shock caused by damage to components

Any damage to the N2000, power source or connection cable may cause an electric shock.

- ▶ Switch on the N2000 only if all components appear undamaged.
- ▶ Only commission the N2000 after a proper installation or repair.
- ▶ Check the connecting cable regularly for defects to prevent damage to the power source.
- ▶ Always install the N2000 in de-energized status.

WARNING

Defects influencing the environment

The incorrect N2000 configuration can lead to the temporary or permanent functional failure of connected vehicles.

Connected vehicles being operated on public roads bear an increased risk of injury and damage.

- ▶ If available, use configuration templates provided by the vehicle manufacturer.
- ▶ Use preferably the passive recording modes of the interfaces.

CAUTION

Device damage due to short circuit

Bent connector pins pose a short circuit risk. This can lead to abnormal behavior or destruction of the N2000.

Likewise, devices connected to the measurement setup may be also compromised.

- ▶ Make sure that connector pins are not bent.
- ▶ Check the N2000 regularly for any deficiencies.

CAUTION

Device damage due to electrostatic discharge

Electronic components can be destroyed by electrostatic discharge.

- ▶ Avoid touching connectors and connector pins.
- ▶ Ground yourself before carrying the N2000 in your hands.
- ▶ Operate the N2000 in an ESD-compliant environment.

CAUTION

Device damage due to overheating

Overheating can lead to abnormal behavior or destruction of the N2000.

- ▶ Do not operate the N2000 outside the specified temperature range.
- ▶ Never operate the N2000 near heat sources.
- ▶ Please ensure adequate air circulation for operation.
- ▶ Do not cover the N2000 with other objects.

CAUTION

Device damage due to shocks

Excessive vibration can lead to abnormal behavior or destruction of the N2000.

- ▶ Avoid exposing the N2000 to excessive vibration.

CAUTION

Device damage due to pollution

Avoid any contamination in plugs and sockets to ensure a reliable contact.

- ▶ Keep the N2000 clean.

CAUTION

Device damage due to device opening

Unauthorized opening of the N2000 can lead to abnormal behavior or destruction of the device.

- ▶ Never open the N2000.
- ▶ Contact X2E GmbH should maintenance and repairs be required.

CAUTION

Device damage due to penetration of dust or liquids

Dust or moisture inside the N2000 may cause abnormal behavior or destruction of the device.

- ▶ Only operate the N2000 with a closed housing.
- ▶ Do not operate the N2000 outdoors.
- ▶ Do not operate the N2000 outside the specified temperature range.
- ▶ Turn off the N2000 and disconnect it from the power supply before you start cleaning.

CAUTION

Damage due to improper device shutdown

Disconnecting the power supply during operation may cause data loss and destruction of the N2000.

- ▶ Never disconnect the N2000 from the power supply while in operation.
- ▶ Ensure proper connector seating and tighten the screws if possible.
- ▶ Only shut down the N2000 through the XORAYASuite or the power button on the front panel.
- ▶ Pull the black plug connected to ground last when disconnecting the N2000 from the power supply.

CAUTION

Safety defects due to incorrect accessories and spare parts

Accessories and spare parts that have not been recommended by X2E GmbH negatively affect the safety, functionality and precision of the N2000.

X2E GmbH shall assume no responsibility whatsoever or honor any warranty for damages arising from non-recommended accessories and spare parts or incorrect use.

▶ Use only accessories recommended by X2E GmbH and original spare parts.

2.4 Product liability

In the following cases, the intended protection of the N2000 may be adversely affected. The liability is then transferred to the user.

- The N2000 is not used according to the manual.
- The N2000 is used outside the scope described in this manual.
- The user modifies the N2000 without proper authorization.

2.5 Terms of use

If the installation of the N2000 in a vehicle is intended for operation on public roads, the user and the X2E GmbH must jointly perform a risk analysis beforehand. This analysis must consider the specific installation requirements and the valid factory standards at the user's site.

Conditions set forth in framework contracts shall apply.

The N2000 is continuously developed. The development process relies on the cooperation between the user and X2E GmbH.

2.6 Warranty

The warranty period is 12 months. Device batteries, whether internal or external, are excluded from the warranty. The warranty also excludes damages arising from improper handling.

X2E GmbH guarantees that the media on which the software is located are free of material errors under normal operating conditions. Users can return any defective or materially erroneous media to X2E GmbH within a period of 30 days from date of original purchase. Media shall be replaced immediately at no cost.

X2E GmbH guarantees that the software as described herein is basically usable. X2E GmbH, however, shall assume no liability for the correctness and the continued use of the software, given that the current state of the art prevents the production of software suitable for all combinations of hardware and software.

In particular, X2E GmbH cannot guarantee that the software meets any user requirements, or that it is compatible with any programs the latter may have selected. Responsibility for program selection and the consequences of program use lie entirely with the user.

X2E GmbH shall assume no liability for damages arising from faulty recorded data, as well as damage due to incorrect configuration, data entry and data transfer.

After configuring, we recommend to verify the proper operation and plausibility of each sensor using some manual measurement over the entire measuring range.

X2E GmbH shall assume no further liability. This limitation of liability also applies to the personal liability of employees, representatives and organs of X2E GmbH.

2.7 FCC notice

This equipment has been tested and found to comply with the limits for a *Class A* digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at one's own expense.

Changes or modifications made to this equipment not expressly approved for compliance may void the FCC authorization to operate this equipment.

3 Product description

The XORAYA N2000 is a compact datalogger that offers good performance and a wide range of interfaces while coming in a rather small package. Therefore, the device can be used very flexibly, especially in test environments where a variety of different bus systems have to be recorded. The datalogger has interfaces for CAN, RS-232, FlexRay, LIN, analog, 100/1000BASE-T1 and Gbit Ethernet, which can be written at a data rate of up to 2 Gbit/s.

3.1 Identification

The bottom side of the datalogger bears a silver nameplate, which contains the following information:

- Type — Product variant
- Config. — First block: Product ID
  0200 XORAYA Datalogger
  Second block: Product variant
  0A00 XORAYA N2000
  Third block: Hardware revision
- Input — Maximum current consumption at given standard input voltage
- S/N — Unique serial number for this datalogger
- DMF — Date of manufacture
- RAM-Size — Size of RAM

Upon device-specific issues, always provide the serial number and configuration.

3.2 Scope of delivery

The following components are part of the delivery:

- XORAYA N2000
- Power supply cable
- Software
- User manual

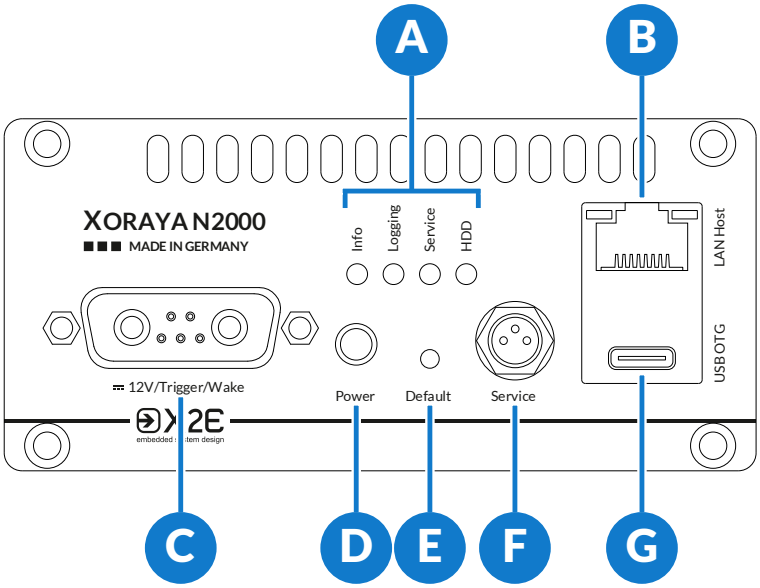
The following accessories are optionally available:

- Power supply cable with AC adapter (recommended)
- Additional cables
- Mounting material
- Device bag

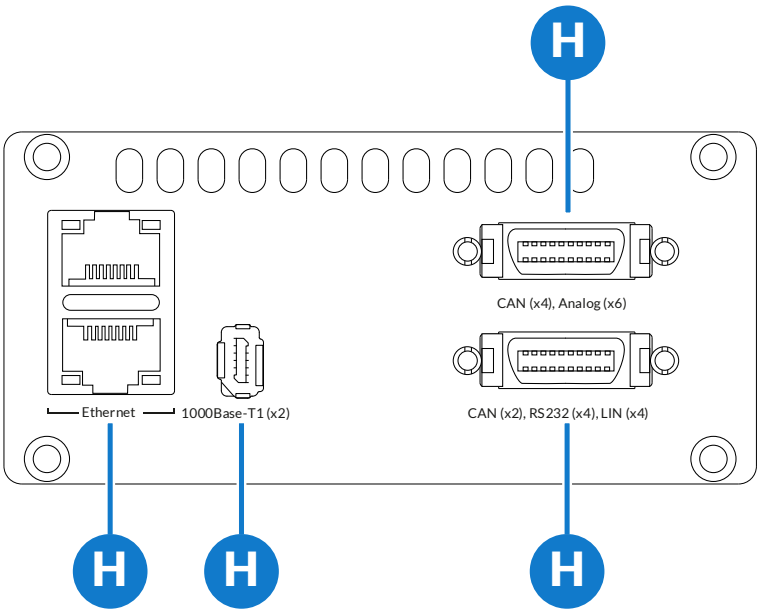
3.3 Connections and controls

The front side of the N2000 contains ports, buttons and LEDs for operation and elementary functions. The back side contains the log interfaces.

Front side



Back side



A	General status LEDs	E	Default button
B	LAN Host interface	F	Service interface
C	12V/Trigger/Wake port	G	USB OTG interface
D	Power button	H	Log interfaces

General status LEDs (A):

These LEDs indicate the operating status of the N2000.

LED	Color	Meaning
Info	Yellow Red	N2000 is DHCP server Flashes when restarting after the power supply was interrupted and the N2000 could not shut down safely
Logging	Green	Recording in progress, flashes when data is received
Service	Red	Lights up constantly when the N2000 is in firmware update or recovery mode Displays different error codes by flashing
HDD	Red	Flashes when accessing the internal storage medium

LAN Host interface (B):

The N2000 features one port to connect to a switch or directly to a PC. This is necessary to control the N2000 via software and exchange data.

12V/Trigger/Wake port (C):

By default, the N2000 must be supplied with 12 V DC voltage. Optionally, it can also operate with power supplies in a certain specified range.
(➔ Technical data)

A +12 V signal level at the trigger input is equivalent to raising a trigger. The wake input allows waking up the N2000 from sleep. To that end, the wake signal must shift from 0 V to +12 V.

You can configure the trigger and wake input via the Digital-IO interface in the XORAYASuite.

The pin assignments of the port can be found in the appendix.
(➔ 12V/Trigger/Wake)

Power button (D):

Turn on the N2000 with this button. If you press the button while the N2000 is on, the device switches to sleep mode.

Default button (E):

Press the default button with a pointed object for at least 3 seconds to reset all N2000 settings to factory defaults.

Service interface (F):

In case of errors, this interface is used as a debugging interface by the X2E support team.

USB OTG interface (G):

By using a USB flash drive, the following functions are available:

- Data recording
  - Label the USB flash drive *XORAYALOG* and create the folder *usb_queue* there.
  - Check *Record on USB stick* in the *Hard Disk* category of the system settings.
  - Start data recording in HDD mode.
- Updating the firmware
  - Create the folder *xoraya_update* on the USB flash drive and copy the firmware archive there.
  - Connect the drive and the firmware is automatically updated.
- Generating the supportfile
  - The supportfile is a set of files that you can send to X2E support to help solve technical issues.
  - Create the folder *xoraya_supportfile* on the USB flash drive.
  - Connect the drive and the supportfile is automatically generated. The *Info* LED flashes during the process.

If required, configure the trigger *logger.eject_usb* in the XORAYASuite to safely disconnect the USB flash drive after use.

Log interfaces (H):

Unlike other XORAYA series dataloggers, the N2000 has a fixed interface configuration.

You can find the pin assignments of the interfaces in the appendix.
(➔ Pin assignments)

4 Commissioning

4.1 Unpacking

Upon unpacking, check whether the delivery is complete and all components appear in perfect condition. (➔ Scope of delivery)

- ▶ Please contact X2E GmbH immediately should the delivery be incomplete or upon damaged components.
- ▶ Do not put any defective component into operation.

X2E GmbH can only accept your complaint and replace the affected component upon prompt notification.

Keep original packaging

Keep the original packaging and packing materials for later storage or further transport.

4.2 Selecting an installation location

The N2000 installation location must meet the following criteria:

- Location of the DC power supply (standard: 12 V)
- Distance of at least 4 cm to other devices
- Solid and stable base
- Adequate airflow
- N2000 front and back sides must not be covered

4.3 Installing the N2000

X2E GmbH provides no special requirements for datalogger installation. Install the datalogger in the vehicle so as to avoid a damage risk at any time.

4.4 Installing the XORAYASuite

Users must install the GUI XORAYASuite on a PC with the following minimum requirements to be able to configure the N2000 and analyze the recorded data.

Supported operating systems:

- Microsoft® Windows® 7 (32 Bit or 64 Bit)
- Microsoft® Windows® 8 (32 Bit or 64 Bit)
- Microsoft® Windows® 10 (32 Bit or 64 Bit)

Hardware requirements:

- Processor speed at least 1 GHz
- RAM at least 2 GB
- Storage space approx. 120 MB available

Software requirements:

- Microsoft® .NET Framework Version 4.5 or higher

Installation:

▶ Close all open programs.

▶ Use the XORAYASuite setup wizard from the supplied data medium.

or

▶ Download the latest version of the XORAYASuite from the X2E-Wiki. (➔ X2E-Wiki)

▶ Start the setup wizard and follow the instructions.

4.5 Connecting the N2000 to the measuring environment

This section describes how to connect the N2000 to the measuring environment.

CAUTION

Device damage due to incorrect connection sequence

The incorrect connection sequence can lead to abnormal behavior or destruction of the N2000.

- ▶ According to the numbering of the subsections, connect the interfaces first and then the power supply.
- ▶ Please note the correct connection sequence from top to bottom within the subsection.

4.5.1 Interfaces

VORSICHT

Device damage due to mixing up the connection cables

Mixing up the two log interfaces with identical connectors, *CAN/Analog* and *CAN/RS232/LIN*, can lead to malfunction or destruction of the N2000.

- ▶ Please pay attention to the labels on the N2000 and on the cables.

Observe pin assignments

Please note the port pin assignments when connecting the N2000 with the measuring environment. Wrong pin assignments lead to measurement errors.

Please note the following sequence:

- ▶ Connect the data cables of all data buses to be monitored in the measuring environment.
- ▶ Connect the data cables to the appropriate N2000 ports.
- ▶ Wherever possible, tighten the connector screws on the N2000 and in the measuring environment.

☑ The N2000 is connected to all data buses to be monitored.

Loss of data due to port disconnections

To avoid data loss, never disconnect the N2000 during the current recording from connected data buses.

Furthermore, make sure that all connectors are firmly attached and the screws are tightened.

4.5.2 Power supply

This chapter describes the default connection to a DC power supply via the supplied power cable. If you use the optionally available power cable with AC adapter, please note the specifications on the adapter label.

DANGER

Electric shock due to improper connection of the power supply

Introducing the 4-mm plugs of the supplied power cable into low-voltage sockets can be fatal.

- ▶ Never introduce the 4-mm plugs into low-voltage sockets.
- ▶ Connect the supplied power cable only to a power source that meets the prescribed technical conditions.

CAUTION

Damage due to incorrect power supply

Using an incorrect power supply can lead to abnormal behavior or destruction of the N2000.

- ▶ Use only the supplied power cable.
- ▶ Please ensure correct polarity upon connection.
- ▶ Make sure that the power supply used meets the prescribed technical conditions.
- ▶ Make sure that the power supply lies within permissible operating voltage of the N2000.
- ▶ Please note the allowable voltage level when feeding external signals.
- ▶ Please note the technical specifications on the label when using the optionally available power cable with AC adapter.

CAUTION

Damage due to faulty connection

When connecting with live contacts, transient fault currents with entrained mass may arise on interface connections which have been already connected.

- ▶ Please ensure contacts are de-energized when connecting the N2000 to the power supply.

Continuous current of the DC power supply

A 12 V DC power supply must deliver a continuous current of 3.1 A. Use a regulated power supply or a car battery and note the required voltage and current levels.

Connection order:

- ▶ Connect the power cable to port **(C)**. (➔ Connections and controls)
- ▶ Tighten the connector screws.
- ▶ Connect the black plug of the cable to 0 V or ground.
- ▶ Connect the red plug to the power supply.

☑ The N2000 is securely connected to the measuring environment.

Once the supply voltage is established, the N2000 turns on and displays its operational status via the power button LED **(D)**.

CAUTION

Damage due to improper device shutdown

Disconnecting the power supply during operation may cause data loss and the destruction of the N2000.

- ▶ Never disconnect the N2000 from the power supply while in operation.
- ▶ Ensure proper connector seating and tighten the screws if possible.
- ▶ Only shut down the N2000 through the XORAYASuite or the power button on the front panel.
- ▶ Pull the black plug connected to ground last when disconnecting the N2000 from the power supply.

The N2000 is equipped with an intelligent energy management system that lowers power consumption to about 1 mA (at 12 V supply voltage) in sleep mode.

Sleep mode is activated by the following actions or under the following conditions:

- Pressing and holding the power button **(D)** for at least 2 seconds. Current recording stops automatically.
- If no data reach the log interfaces and no connection to the XORAYASuite is established for 10 minutes, the N2000 shuts down automatically. This behavior is configured using the main setting *Automatically Switch Off*.

Users can wake up the N2000 from sleep mode as follows:

- Pressing the power button **(D)**
- Switching the power supply off and on
- Signal change from 0 V to +12 V at the wake input **(C)**
- Activity on a wakeable log interface

4.6 Connecting the N2000 to the PC

This section describes how to connect the N2000 to the PC. To do so, you will need a standard network cable.

Proceed as follows to connect:

▶ Connect the network cable to a switch.

or

▶ Connect the network cable directly to your PC.

▶ Connect the network cable to the LAN host interface **(B)**.
(➔ Connections and controls)

☑ The N2000 is fully connected.

5 XORAYASuite

5.1 Starting

- ▶ Perform all commissioning steps. (➔ Commissioning)
- ▶ Start the XORAYASuite by double-clicking the desktop icon.

  or

- ▶ Start the XORAYASuite from the Windows Start menu.

Upon start, XORAYASuite provides access to the various tools.

Tool	Function
Sys-Network	Manage datalogger group
Configuration	Customize the datalogger behavior
Online-Logging	Start and stop logging
Hdd-Download	Download measurements from the datalogger storage medium
Viewer	Evaluate measurements
Statistic	Evaluate bus statistics
Convert	Convert log data to other formats
Firmware-Update	Update firmware
TK Commandline	Command line access to the XORAYAToolkit

☑ The XORAYASuite is started.

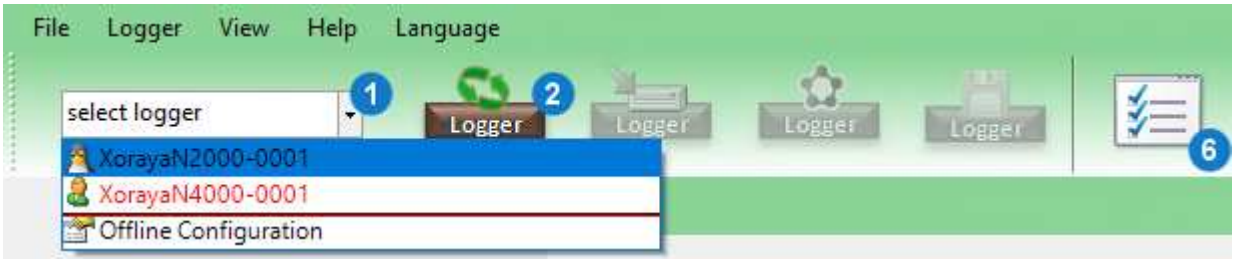
Windows notification area

Even after closing the launcher, the XORAYASuite continues to operate in the background. Click the icon in the Windows notification area to access tools or to close the XORAYASuite.

5.2 Connecting and disconnecting the N2000

The N2000 is connected and disconnected in the same way regardless of the XORAYASuite tool. This section shows the process for the *Configuration* tool as an example.

5.2.1 Connecting the N2000



1	Display available loggers	6	Display settings
2	Establish connection to logger		

- ▶ Connect the N2000 to the PC. (➔ Connecting the N2000 to the PC)
- ▶ Turn on the N2000.
- ▶ Start the desired XORAYASuite tool. (➔ Starting)
- ▶ Click *Display available loggers* **(1)** to start scanning for dataloggers.
- ▶ Select the desired N2000 using the assigned name.
- ▶ Click *Establish connection to logger* **(2)**.

  or

- ▶ In the *Logger* menu, click *Connect*.

☑ The N2000 is connected to the XORAYASuite.

Icons and text colors indicate the status of the N2000:

and name **red**	Network error, the N2000 is located on a different subnet
and name **black**	Disconnected N2000
and name **red**	Another user is connected to the N2000
and name **blue**	You are connected to the N2000
	Measurements are currently transferred from the N2000 storage medium to the PC
	N2000 is in favorites list

Edit the configuration file

You can edit a configuration file (XML) previously created without connecting to the N2000. To do so, select *Offline Configuration* in the drop-down list *Display available Loggers* **(1)** in the *Configuration* tool.

5.2.2 Disconnecting the N2000

2	Release connection to logger	5	Display settings
3	Start Hdd logging		

▶ Click *Release connection to logger* **(2)**.

or

▶ In the *Logger* menu, click *Disconnect*.

☑ N2000 and XORAYASuite are disconnected.

6 Maintenance

6.1 Safety measures

DANGER

Electric shock caused by damage to components

Any damage to the N2000, power source or power supply cable may cause an electric shock.

- ▶ Switch on the N2000 only if all components appear undamaged.
- ▶ Only commission the N2000 after a proper installation or repair.
- ▶ Check the power cable regularly for defects to prevent damage to the power source.
- ▶ Always install the N2000 in de-energized status.

CAUTION

Device damage due to short circuit

Bent connector pins pose a short circuit risk. This can lead to abnormal behavior or destruction of the N2000.

Likewise, devices connected to the measurement setup may be also compromised.

- ▶ Make sure that connector pins are not bent.
- ▶ Check the N2000 regularly for any deficiencies.

CAUTION

Safety defects due to incorrect accessories and spare parts

Accessories and spare parts that have not been recommended by X2E GmbH negatively affect the safety, functionality and precision of the N2000.

X2E GmbH shall assume no responsibility whatsoever or honor any warranty for damages arising from non-recommended accessories and spare parts or incorrect use.

- ▶ Use only accessories recommended by X2E GmbH and original spare parts.

6.2 Cleaning

CAUTION

Device damage due to pollution

Avoid any contamination in plugs and sockets to ensure a reliable contact.

- ▶ Keep the N2000 clean.

CAUTION

Device damage due to penetration of dust or liquids

Dust or moisture inside the N2000 may cause abnormal behavior or destruction of the device.

- ▶ Only operate the N2000 with a closed housing.
- ▶ Do not operate the N2000 outdoors.
- ▶ Do not operate the N2000 outside the specified temperature range.
- ▶ Turn off the N2000 and disconnect it from the power supply before you start cleaning.

Observe the following instructions to prevent damage to the N2000:

- ▶ If necessary, clean the N2000 with a damp, soft, lint-free cloth.
- ▶ Make sure that no moisture penetrates into the housing.
- ▶ Use only clear water and a mild detergent to moisten the cloth. Avoid sprays, solvents, alcohol or abrasive cleaners.
- ▶ Only reconnect the N2000 to the power supply if the housing appears completely dry.

6.3 Repair

CAUTION

Device damage due to device opening

Unauthorized opening of the N2000 can lead to abnormal behavior or destruction of the device.

- ▶ Never open the N2000.
- ▶ Contact X2E GmbH should maintenance and repairs be required.

Upon malfunction or defect, return the N2000 without any accessories to X2E GmbH.

Before submission, please take the following measures:

- ▶ Clean the N2000. (➔ Cleaning)
- ▶ Pack the N2000 safely in its original packaging.
- ▶ Include the completed return form. You can download this form from the X2E Wiki or receive via email upon request to xoraya-return@x2e.de.

7 Storage, transport and disposal

7.1 Storage

If the N2000 will remain unused for an extended time, we recommend storing it in the original packaging.

Adopt the following precautions to avoid damage to the N2000:

- Protect the N2000 from intense sun, heat, as well as from severe shocks.
- Do not place heavy objects on the N2000.
- Store the N2000 in a dry, dust-free and ESD safe area.

7.2 Transport

Transport the N2000 only in the original packaging.

7.3 Disposal

The Electrical and Electronic Equipment Act (ElektroG), which applies in Germany, obliges every manufacturer to create a reasonable option for returning old B2B devices.

X2E cannot take back so-called historical devices that were placed on the market before August 15th, 2018. In this case, the customer is responsible for professional disposal.

Return of old X2E devices

Old devices can be returned at the customer's expense to the following address:

X2E GmbH
Grosse Ahlmuehle 19
76865 Rohrbach
Germany
Phone: +49 6349 99599 211
E-mail: sales@x2e.de

If more than 10 devices are returned at the same time, X2E must be informed in advance by the customer via the above e-mail address.

Old devices to be returned must be clearly marked by the customer with the words "Disposal" or "Entsorgung".

Disposal of batteries

If the products contain batteries or lamps that can be removed from the old device without destroying them, you as the end user are legally obliged to remove them before disposal and dispose of them separately.

Deletion of personal data

X2E expressly points out that the customer is responsible for deleting personal data on the devices to be disposed of.

Meaning of the symbol on the device

The crossed-out wheeled bin symbol on the device means that it must not be disposed of with household waste.

8 Appendix

8.1 Technical data

Property	Value
Timestamp resolution	100 ns for all interfaces
Storage capacity	Max. 1 TB
Operating ambient temperature	-40 to +65 °C
Operating air humidity	10 to 95 % (non-condensing)
Supply voltage	12 V DC (temporarily from 6 to 32 V)
Current consumption	Max. 3.1 A (at 12 V)
Standby current consumption	Max. 1 mA (at 12 V)
Dimensions (H x W x D)	50 x 105 x 215 mm
Weight	1.1 kg
Housing protection type	IP 20, NEMA Type 1
Pollution degree	3
Altitude	Max. 2000 m

8.1.1 Analog

A basic accuracy of +/-0.2 % with a deviation of 2 digits results in the following values for the different measuring ranges.

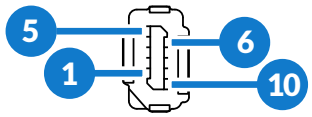
Measuring range	Resulting accuracy
+/-15 V	+/-32 mV
+/-30 V	+/-62 mV
+/-60 V	+/-122 mV

X2E recommends calibrating the interface every two years in order to be able to meet these accuracies in the long term.

8.2 Pin assignments

The following tables show the pin assignments of the log interfaces and the 12V/Trigger/Wake port. Figures show the external view of the N2000 contacts.

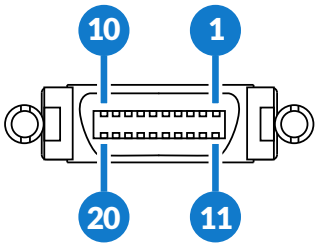
8.2.1 1000Base-T1 (x2)



HARTING ix Industrial type A

Pin	Function
1	CH 2 P
2	CH 2 N
3	GND
4	-
5	-
6	CH 1 P
7	CH 1 N
8	GND
9	-
10	-

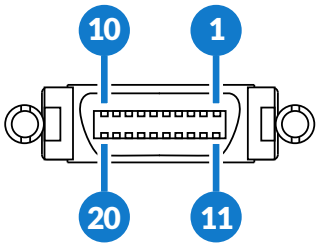
8.2.2 CAN (x4), Analog (x6)



3M, 10220-5212 PL
(+ 2x bolt: 3M, 3341-31)

Pin	Function
1	Analog 1 P
2	Analog 1 N
3	Analog 2 P
4	Analog 2 N
5	Analog 3 P
6	Analog 3 N
7	Analog 4 P
8	Analog 4 N
9	Analog 5 P
10	Analog 5 N
11	CAN 3 High
12	CAN 3 Low
13	CAN 4 High
14	CAN 4 Low
15	CAN 5 High
16	CAN 5 Low
17	CAN 6 High
18	CAN 6 Low
19	Analog 6 P
20	Analog 6 N

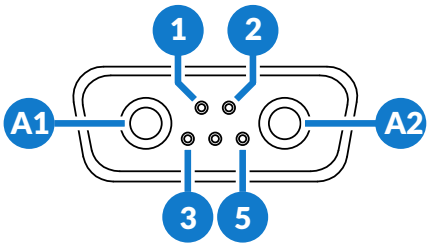
8.2.3 CAN (x2), RS232 (x4), LIN (x4)



3M, 10220-5212 PL
(+ 2x bolt: 3M, 3341-31)

Pin	Function
1	CAN 1 High
2	CAN 1 Low
3	RX 1
4	TX 1
5	RX 2
6	TX 2
7	RS232 GND
8	-
9	LIN 1
10	LIN 2
11	CAN 2 High
12	CAN 2 Low
13	RX 3
14	TX 3
15	RX 4
16	TX 4
17	-
18	LIN GND
19	LIN 3
20	LIN 4

8.2.4 12V/Trigger/Wake



Conec D-SUB Combination, M

Pin	Function
A1	GND
A2	VIN
1	-
2	Wake
3	Trigger/Wake GND
4	Trigger
5	-

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