SCHAEFFLER

Schaeffler ProLink CMS

User manual

Imprint

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The software uses the following third-party provider libraries under their respective licences:
base, binutils, burnin, busybox, clinfo, cmake, crypto, curl, dhcp, dropbear, expat, gcc-host, gdb, gettext, glibc, gmp-host, i2ctools, gsoap, gwt, imx-gpu-viv, kexec-tools, keys, kiss_fft, kmod, libtirpc, libunwind, linux, linuxptp, log4cpp, lzo, mbedtls, memstat, memtester, mtd-utils, ncurses, odhcp6c, open62541, openssl, paho-mqtt-embedded-c, perfmon, popt, protobuf, readline, rescue_tools, rsync, sqlite, strace, tar, u-boot, ua-nodeset, udev, util-linux, zlib
Full licence conditions for the respective libraries can be found in the software's program directory.

Contents

1 General

1.1 Safety information

The Schaeffler ProLink condition monitoring system is manufactured in accordance with the recognised standards and guidelines (see Declaration of Conformity) and is safe to operate. Nevertheless, the device can pose unavoidable residual hazards to users and third parties or to property, therefore it is imperative that all of the safety information provided in this guide is observed. The generally applicable safety and accident prevention regulations must also be taken into account. Failure to do so may result in the health and life of persons being put at risk, or cause damage to property. The safety information in this guide applies in the Federal Republic of Germany. In other countries, the relevant national regulations apply.

> According to its intended use, the Schaeffler ProLink device is not subject to EC Machine Directive 2006/42/EC.

This guide differentiates between

- **General safety information**, which applies to the whole guide and is listed in this chapter

and

- **Specialised safety information**, which you will find in each chapter, either at the start or accompanying individual actions

General safety information

Schaeffler ProLink is integrated in a machine as a system for permanent machine monitoring. The system must be installed in the machine, connected to machine components and operated in the machine in line with the specifications set out in this guide (see Technical data 7). The machine owner is responsible for installing the device properly and for ensuring safe operation in the machine as a whole.

In addition to recording measured values, it is also possible to transfer characteristic values or alarms to superordinate control systems via the Schaeffler ProLink outputs. In doing so, the limitations of use for the connected machine components must also be observed, in addition to the Schaeffler ProLink specification. The machine owner bears sole responsibility for this.

> The ProLink device must not be used for safety-relevant tasks or for critical switching operations! This applies in particular when these tasks or switching operations have health and safety implications.

Operating personnel

Schaeffler ProLink may only be installed, operated and maintained by authorised qualified specialists who have received training in accordance with the applicable, relevant regulations.

1.2 Hazard symbols and signal words

Hazard symbols used in this guide

Safety information and warnings are identified by specific, standardised hazard symbols. If no specific symbol applies, a general hazard symbol is used.

General hazard symbol

DANGER   **Specifies the nature and source of the hazard**

Explains actions to prevent the hazard.

Specific hazard symbols

DANGER ⚠️	**DANGER FROM ELECTRICAL CURRENT!** This symbol indicates a danger from electric shock that can cause personal injury or even death, or damage to property.

Signal words used in this guide

Signal words indicate the severity of the hazard that occurs if the actions to reduce the hazard are not taken.

- **Caution**: Minor damage to property may occur.
- **Warning**: Minor personal injury or severe damage to property may occur.
- **Danger**: Personal injury may occur. There is a risk of fatal injury in particularly severe cases.

1.3 About this guide

This guide describes the installation and use of the ProLink device and contains important information about using the device safely and correctly. Please read

through this guide carefully before commissioning the device, and keep it for future reference.

Make sure that

- This guide is available to all users of the device.
- If the product is passed on to other users, that this guide is also passed on with it.
- Additions and amendments provided by the manufacturer are always attached to this guide.

Further information

In addition to the device described in this guide, the Schaeffler ProLink condition monitoring system also includes the integrated Schaeffler SmartWeb software, which is dealt with in a separate manual.

To operate the Schaeffler ProLink device, you will also need the supplied Schaeffler SmartUtility Light software. This is also dealt with in a separate manual. You also have the option of purchasing the Schaeffler SmartUtility software, which features enhanced functionality.

Definitions

- Product: The Schaeffler ProLink device described in this manual.
- User: person or organisation capable of putting the product into operation and using it.
- Qualified person: a person who, by virtue of their relevant training and experience, is qualified to identify risks and avoid potential hazards that may be caused by the operation or maintenance of a product.

Symbols used

💡	This symbol indicates - Helpful additional information and - device settings or practical tips that will help you to perform activities more efficiently.

Cross-reference symbol ⌐5⌐: This symbol refers to a page in the manual that provides further information. If you are reading the manual in PDF format on a screen, clicking the word to the left of the cross-reference symbol will take you straight to the section in question.

2   Product description

About the Schaeffler ProLink system

ProLink is a condition monitoring system for permanent frequency selective monitoring of plants. It consists of a processor module (CPU) and at least one vibration module (Vibration). The system can be extended to a maximum of 4 vibration modules. Up to 4 analogue and 2 digital signals can be connected per vibration module and measured values can be logged, recorded and analysed. After the analysis, the system can switch up to 4 digital outputs per vibration module depending on user-defined alarm limits and report the state to an external control system, for example.

The ProLink device can be used to cover a wide range of applications; the ProLink device can be configured to meet your own requirements using the integrated Schaeffler SmartWeb software. There, the connected modules with their inputs and outputs are automatically created with default configurations and can then be adapted to your system. The ProLink device is administered using the software Schaeffler SmartUtility Light or optionally Schaeffler SmartUtility.

With ProLink, the Schaeffler offers status monitoring that is optimised to suit your requirements.

2.1 Intended use

The ProLink system is intended exclusively for the following functions:
- Connection of the processor module (CPU) to a maximum of 4 vibration modules (Vibration)
- Connection of input signals according to the technical specification of the respective input
- Connection of output signals according to the technical specification of the respective output
- Connection of the processor module to the PC via Ethernet
- Use of the software that is approved for the Schaeffler ProLink device

> The ProLink device must not be used to switch safety-relevant applications.

The ProLink device with all connected modules may be operated only within the limitations of use as specified under Technical data 7 .

Measured-value analyses and changes to settings may only be made using the supplied Schaeffler SmartUtility Light software, the optional Schaeffler SmartUtility software or the integrated Schaeffler SmartWeb software.

Any other use or use beyond this shall be considered improper and the user shall bear all associated risk. The user is responsible for the intended use of the device. This also includes observing these instructions.

2.2 Modifications by the user

The user must not make any modifications to the ProLink device. The user may only make settings on the device itself or via the Schaeffler SmartWeb or Schaeffler SmartUtility Light/Schaeffler SmartUtility software.

The user bears responsibility for any further modifications! Should you detect a fault with your ProLink device, please contact our Support team.

2.3 Technical data

⚠️ The ProLink device must not be used in measurement voltage categories II, III or IV!

Processor module (CPU)	
General	
Housing	Material: PA (polyamide) Colour: RAL 7035 Flammability class according to UL 94: V0
Fixing	Installation on 35-mm standard mounting rail Mounting rail height: 7.5 mm Installed on a flat mounting surface
Power consumption	800 mA
Power supply	18–30 VDC Typical: 24 VDC
Humidity	80%
Operating altitude	<3000 m
Ambient temperature	Operation: -30 to +60°C Storage: -30 to +55°C
Dimensions	75 mm x 139.5 mm x 120 mm (W x H x D)
Weight	600 g
Protection type	IP 20
Operating system	Embedded Linux
Software	**Schaeffler SmartWeb:** • Device-own web interface • Recommended browser: Google Chrome • Configuration of the device and the measurement jobs, initial data analysis **Schaeffler SmartUtility Light:** • Administration of the device **Schaeffler SmartUtility (optional and chargeable):** • Administration of the device • Detailed analysis of the measurement data **Schaeffler SmartVisual (optional and chargeable):** • Plant visualisation
Memory	8 GB eMMC Flash 2 GB DDR3 RAM
Certifications	CE
Interfaces	
Control elements	1 button to start learning mode 1 Reset button 1 USB button, intended for future functions
Display elements	1 **Status** LED 1 **Link** LED 1 **Alarm** LED 1 **USB Status** LED Details of the functions can be found in the section **Operation and controls** 29.

Communication	Ethernet 1000 Mb/s RJ45
Connections	1 Ethernet 1000 Mb/s 1 USB A, intended for future functions 1 USB B, intended for future functions 1 interface for fieldbus communication, intended for future functions 1 RJ45 (internal Schaeffler module communication) 1 Ethernet 100 Mb/s for communication between the Schaeffler ProLink modules 1 power supply
Communication protocols	• WebServices • SLMP • OPC/UA (only with additional licence) • MQTT (only with additional licence) • Email (only with additional licence)
Measurement jobs and characteristic values	
Measurement jobs	- Base configuration - Roller bearing - Journal bearing - Pump - Fan - Classification (optional and chargeable) - Coupling - Gear stage - Belt drive - Shaft - Condition guard - Tracked frequency bands - User-defined frequency bands The user is guided through the configuration step-by-step with the help of a wizard. Depending on the selected measurement job, all necessary characteristic values for frequency selective monitoring are automatically created.
Characteristic values (time range and frequency range)	**Defined characteristic values:** - DIN/ISO 10816 **Calculated characteristic values:** - RMS - Frequency selective RMS - Direct component - Peak - Peak2peak - Crest factor - Wellhausen counter - Condition guard Other user-defined characteristic values are possible.

Vibration module (Vibration)	
General	
Housing	Material: PA (polyamide) Colour: RAL 7035 Flammability class according to UL 94: V0
Fixing	Installation on 35-mm standard mounting rail Mounting rail height: 7.5 mm Installed on a flat mounting surface
Power consumption	400 mA
Power supply	18–30 VDC Typical: 24 VDC
Humidity	80%
Operating altitude	<3000 m
Ambient temperature	Operation: -30 to +60°C Storage: -30 to +55°C
Dimensions	50 mm x 139.5 mm x 120 mm (W x H x D)
Weight	320 g

Protection type	IP 20
Certifications	CE
Interfaces	
Control elements	1 Reset button
Display elements	1 **Status** LED 2 **Link** LEDs 4 LEDs for analogue inputs 2 LEDs for digital inputs 4 LEDs for digital outputs Details of the functions can be found in the section **Operation and controls** 29.
Connections	2 RJ45 (internal ProLink communication) 1 Ethernet 100 Mb/s for communication between the Schaeffler ProLink modules 1 power supply
Inputs	
4 analogue inputs	Measuring range: +/-10 V Sample rate: 51.2 kHz Resolution: 24 bits DC bandwidth: 0 Hz - 20 kHz AC bandwidth: 0.1 Hz - 20 kHz IEPE bandwidth: 0.1 Hz - 20 kHz Maximum number of FFT lines: 12800
2 digital inputs	Measuring range: 0-24 VDC, 0.1 Hz - 50 kHz A/B coded (speed and direction) Sensor supply: 24 VDC, 100 mA Maximum current consumption per sensor when powered by the device: 25 mA at 24 VDC
Outputs	
4 switching outputs	Open collector, max. 25 mA, reaction time 1 ms

Subject to technical modifications!

2.4 Scope of delivery

Scope of delivery

- ProLink starter kit consisting of a processor module (CPU) with integrated software Schaeffler SmartWeb and a vibration module (Vibration)
- Per vibration module: One jumper for power supply and one jumper for Ethernet
- Quick start guides for processor module and vibration module
- Software Schaeffler SmartUtility Light for download on the Schaeffler homepage
- User documentation ProLink, Schaeffler SmartWeb and Schaeffler SmartUtility Light for download on the Schaeffler homepage

Optional accessories

An extensive range of optional accessories is available for the ProLink system from Schaeffler Monitoring Services GmbH. Please contact your local Schaeffler contact person.

3 Commissioning the base system

⚠️

- The ProLink device may be maintained only by persons who are verifiably qualified to do so in accordance with the relevant rules and regulations.
- Ensure that the ProLink device is de-energised while work is being carried out.

You can start and become familiar with a fully functional basic version of the ProLink system with the components of the scope of delivery⌐9¬ and up to 4 IEPE acceleration sensors. The following steps are required:

- Step 1: Install the device⌐10¬
- Step 2: Connect acceleration sensors to analogue inputs⌐10¬
- Step 3: Connect the computer to the processor module⌐11¬
- Step 4: Configure analogue inputs on IEPE sensors⌐11¬

Details about these steps can be found in the following.

Step 1: Install the device

1. Before installing, turn off the power supply to the ProLink system.
2. Connect the DC power supply to the power supply connection on the processor module.
3. Connect the power supply connection of the processor module⌐27¬ to the power supply connection of the vibration module using the jumper supplied.
4. Connect the processor module to the vibration module using the jumper supplied⌐21¬ to enable communication between the modules.
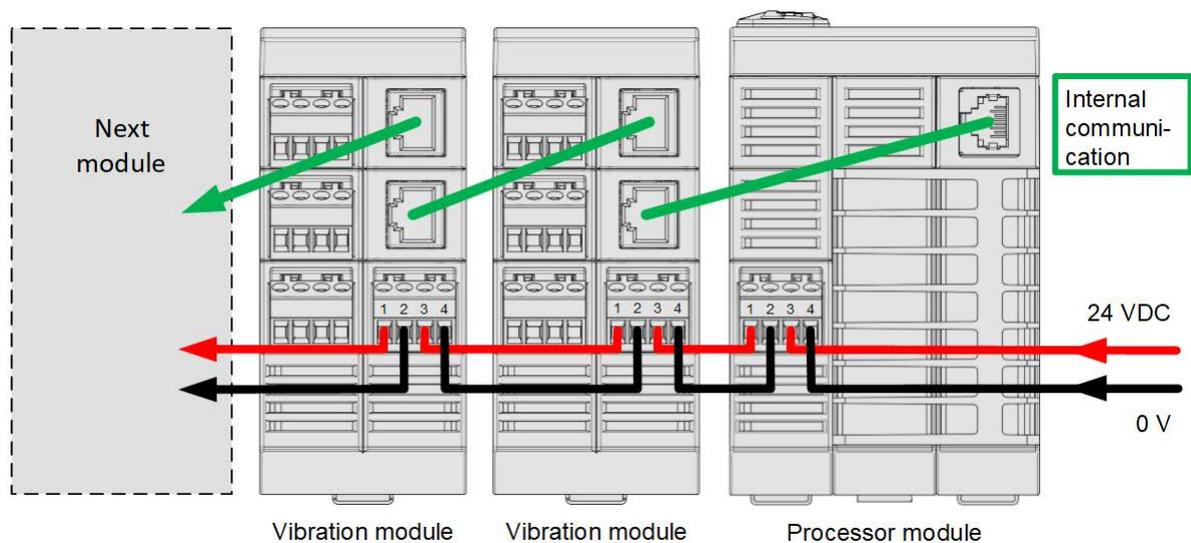
Step 2: Connect IEPE acceleration sensors

Connect up to 4 analogue IEPE acceleration sensors to the analogue inputs of the vibration module⌐22¬:
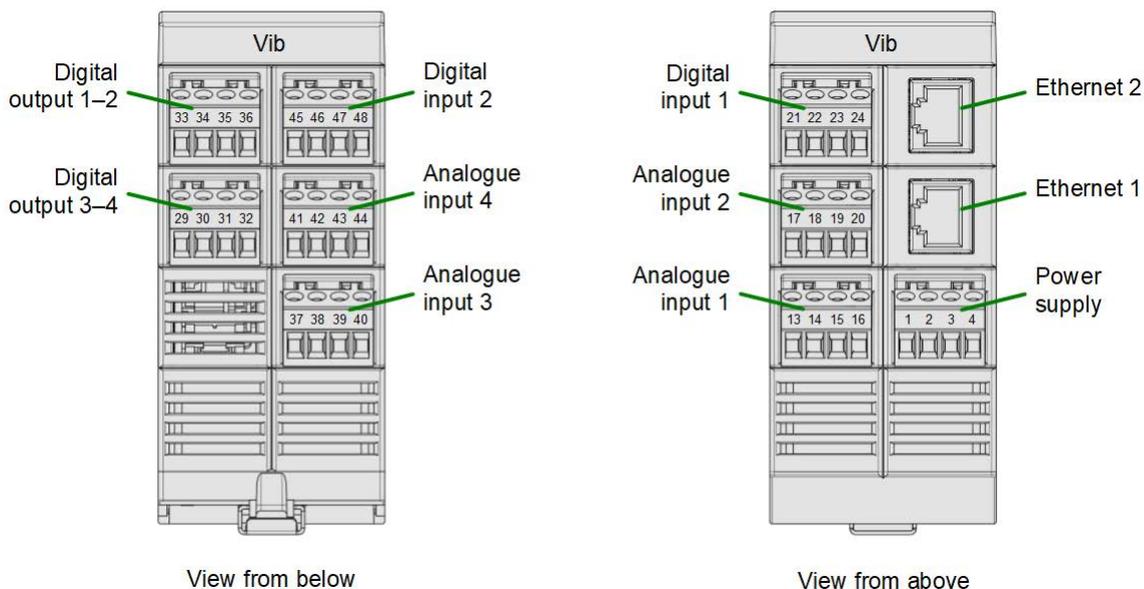
View from below   View from above

The pin assignment appears as follows:

Analogue input	Input 1/2/3/4	GND	GND	Shield FE
Analogue input 1	13	14	15	16
Analogue input 2	17	18	19	20
Analogue input 3	37	38	39	40
Analogue input 4	41	42	43	44

You must enable the **IEPE** sensor type in the Schaeffler SmartWeb software for IEPE acceleration sensors. This is described in step 4.

Step 3: Connect the computer to the processor module

- The default IP address of the ProLink system is **192.168.1.100**.
- You can also run the ProLink system on a network. The IP address can then be provided via a DHCP server and the time via an NTP server. Please contact your system administrator if you experience problems with the network settings. More information can also be found in the SmartWeb manual.

1. Turn on the power to the ProLink system.
2. Set the IP address of your computer to **192.168.1.xxx**.
   For **xxx**, **100** is excluded - this address is reserved for the ProLink system.
3. Connect your computer to the ProLink system using a LAN cable. You can establish a connection directly with a network cable or using a switch.
4. Open your browser. We recommend Google Chrome.
5. Enter the IP address **192.168.1.100** in the address line of the browser. The device's own software SmartWeb opens.

Step 4: Configure analogue inputs on IEPE sensors

The connected analogue inputs of the ProLink device are automatically created and preconfigured in the Schaeffler SmartWeb software.

For IEPE acceleration sensors, you must adapt the automatically created input as follows:

1. Open the **Configuration > Input configurations > ProLink vibration module (Serial number) > Acceleration sensor 1-4** area.

2. Click the **Edit** ✎ button for the corresponding analogue input.
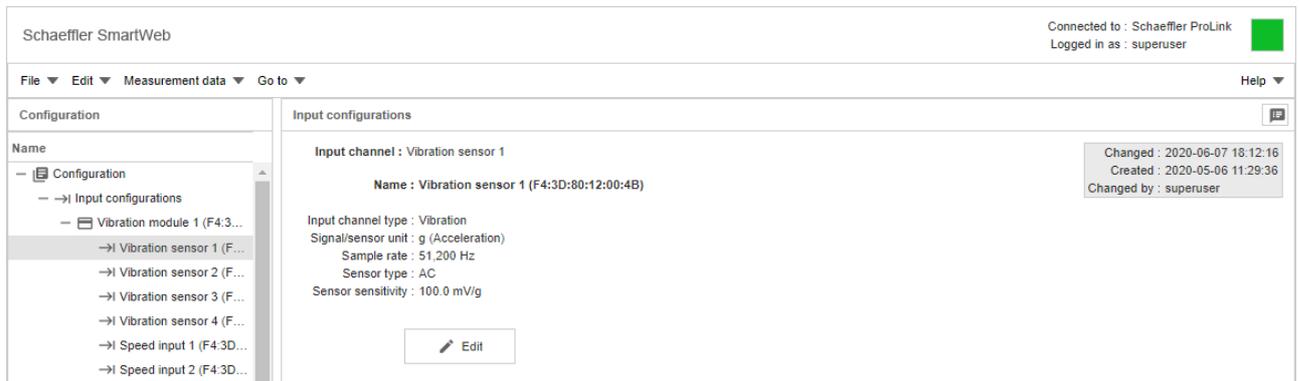
The twelve-digit number (e.g. F4:3D:80:12:00:00) is the serial number of the vibration module. You can also find this number on the outside of the module.

3. In the **Edit input configuration** dialogue, set the **Sensor type** to **IEPE**. Adjust the sensor sensitivity as indicated in the calibration data sheet of the sensor. You may also need to adjust the **Min.** and **Max. bias voltage**. This is used to detect a defective sensor or cable.
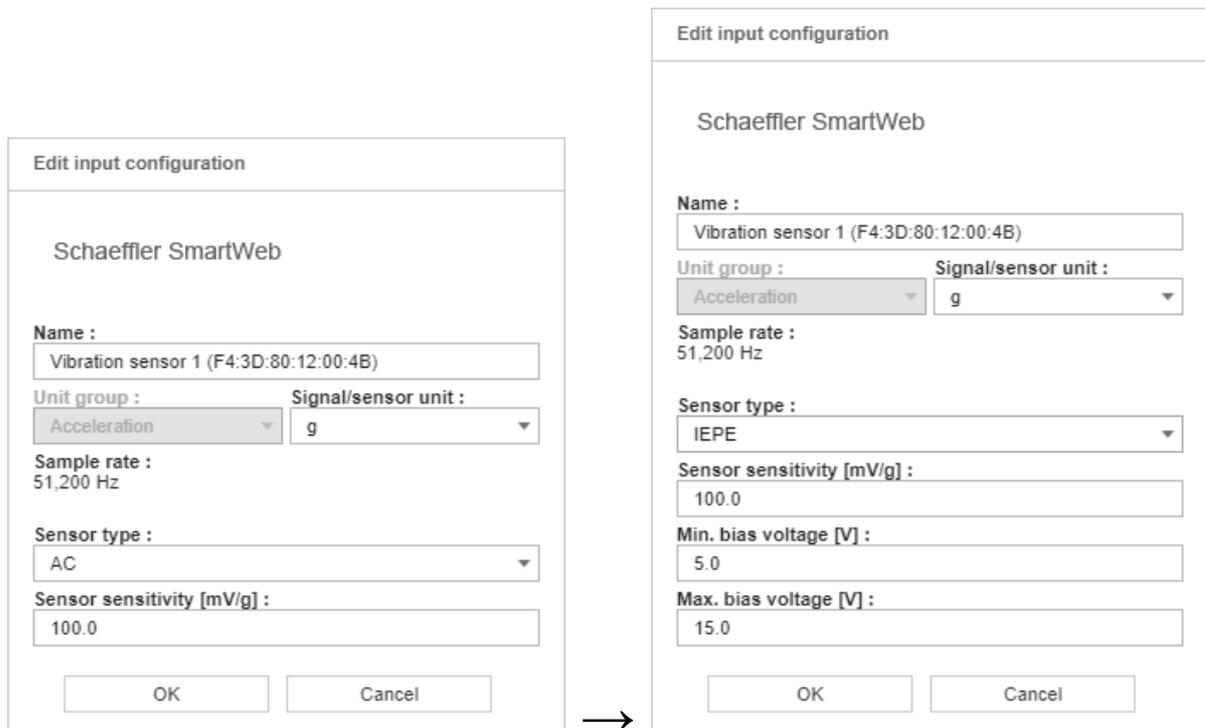
For each analogue input with IEPE acceleration sensor, the sensor type must be adjusted separately in the Schaeffler SmartWeb software.

The ProLink system is now ready for use. Further details of the possible settings can be found in the Schaeffler SmartWeb user documentation.

4   Installing the ProLink modules

Important details about installing the ProLink device can be found in the following sections.

> • The ProLink device may be maintained only by persons who are verifiably qualified to do so in accordance with the relevant rules and regulations.
> • Ensure that the ProLink device is de-energised while work is being carried out.

4.1 Installation details of the ProLink modules

Installation site

Install the ProLink device at the installation site on a grounded mounting rail. When doing so, make sure that all of the environmental conditions for operation are adhered to, good ventilation is ensured for cooling, and all components are easily accessible for maintenance purposes.

Installation material

When installing the ProLink device, note the following:

- **Details about the mounting rail**
  Width: 35 mm
- **Securing clips**
  To secure the ProLink device to the side of the mounting rail, you need two suitable securing clips. The securing clips are not included in the scope of delivery.
- **Cross-head screwdriver or flat-head screwdriver**
  You need cross-head and flat-head screwdrivers in order to join the connections.

> If you are installing the device in a location with constant vibrations, e.g. on a ship, you can also use spring terminals instead of screw terminals. Further information is available from our support team.

Environmental conditions at the installation site

Note the following environmental conditions for the ProLink system:

- Observe the **technical specifications** 7 for ambient temperature and humidity.
- Avoid the following installation sites:
  - Locations where condensation accumulates due to sudden temperature changes
  - Locations with easily flammable gases
  - Locations with a high level of conductive dust (iron filings, oil mist, mist, salt vapours or organic solvents)
  - Locations with direct sunlight
  - Locations with strong magnetic fields or high voltage fields
  - Locations at which powerful sound waves and shock waves can make their way directly into the ProLink system.

Position

To ensure good ventilation and to make it easier to maintain/service the device, the following minimum distances should be adhered to:

- Distance of the modules to the upper, lower and side wall: 50 mm
- Distance of the modules to the front wall or the switch cabinet door: 60 mm

> From an ambient temperature of 50°C, please increase the distance between the individual modules to ensure good air circulation.

4.2 Dimensions of the ProLink modules

The following illustrations show the modules of the ProLink device from different perspectives with dimensions accurate to the millimetre.

Basic dimensions of the processor module

From the front, you can see the processor module buttons, connections and LED indicators, as well as the power supply connection that points upwards. The 35-mm recess for the mounting rail can be seen in the side view.
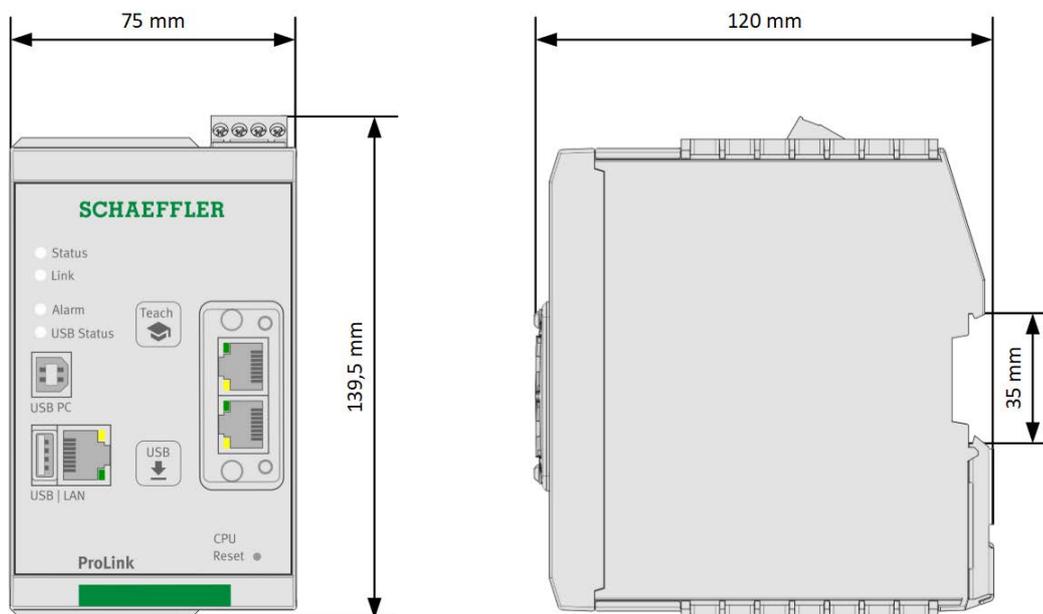
Basic dimensions of the vibration module

From the front, you can see the vibration module LED indicators, as well as the connections for inputs, outputs and power supply that point upwards and downwards. The 35-mm recess for the mounting rail can be seen in the side view.
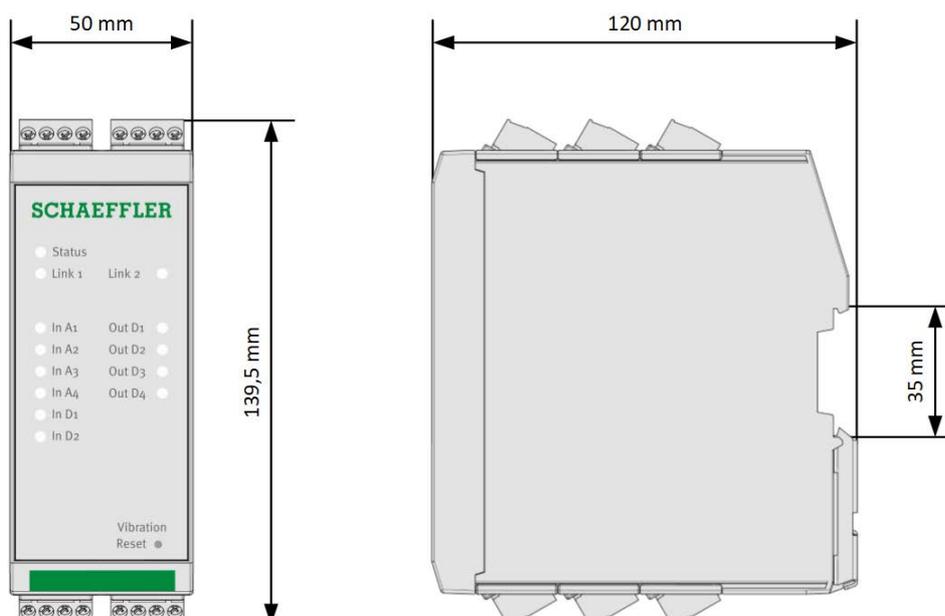
4.3 Mounting modules

DANGER   **Switch off the power supply**

Before performing any installation and connection activities, ensure that the power supply to the ProLink system is switched off, including external power sources.

Earthing

Functional earth is a low impedance current path between circuits and earth that is not intended as a protective measure but, for example, to improve interference immunity.

The modules have a FE spring (metal clamp) at the bottom of their electronic sockets, which provides an electrical connection to the mounting rail. Connect the mounting rail to the protective earth via earth terminals. This means that the modules are also earthed when they are snapped onto the mounting rail.

If failures occur at the sensor signals, please connect the shield of the sensors to the FE terminal of the corresponding sensor connector on the ProLink device.

The functional earth FE is only used to discharge interference. It does not serve as protection against accidental contact for persons.

Installation of the ProLink modules

The ProLink system is set up by connecting the individual modules. You do not need any tools.

Proceed as follows to install the modules of the ProLink device on the mounting rail:

1. Place the module slightly tilted with the top edge of the mounting rail recess on the mounting rail (**A**).
2. Push the module down onto the mounting rail until it clicks into place (**B**):
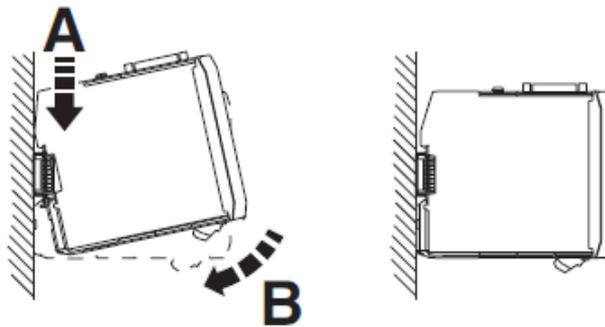

3. Attach end brackets on both sides of the ProLink system to secure the system to the mounting rail.

You can now set up and connect [17] the modules of the ProLink device.

To remove the modules of the ProLink device from the mounting rail, proceed as follows:

1. Insert a screwdriver at the bottom edge of the module and lever upwards (**A** and **B**).
2. Another lever movement (**C**) is used to release the anchoring of the module in the mounting rail.
3. Lift the module upwards from the mounting rail (**D**):
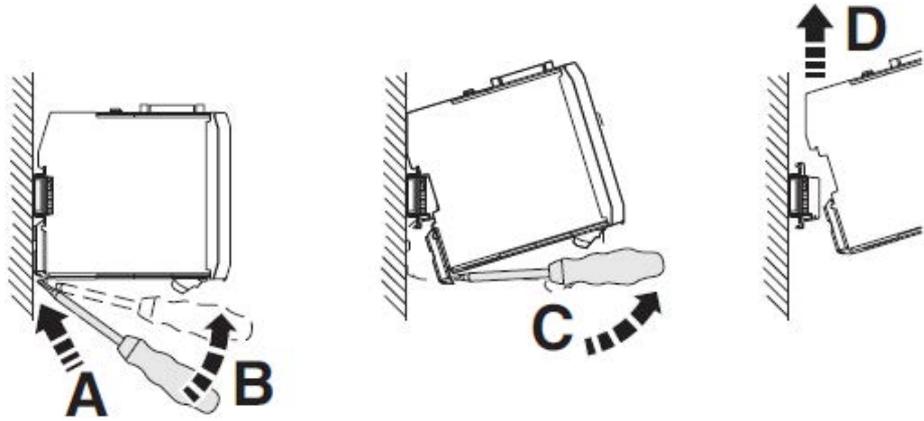
5   Layout, connections and fittings

You can use the connections on the ProLink device to

- Connect the individual modules to each other 21,
- Set up inputs and outputs 18 and various connection configurations
- Set up a PC/Ethernet connection 28 and
- Connect the power supply 19.

To set up and operate the ProLink device, you will need the following connection cables - these are not included in the standard scope of delivery:

- Cable for Ethernet connection between processor module and PC
- Power supply cable
- Cable to connect the inputs and outputs to the vibration module

> - The ProLink device may be maintained only by persons who are verifiably qualified to do so in accordance with the relevant rules and regulations.
> - Ensure that the ProLink device is de-energised while work is being carried out.

General

Please note the following information when connecting cables:

- Ensure that the sockets for the plug connections are clean and free of contamination. Dirt or moisture in plug connections can impair signal quality.
- When securing cables, ensure that they are not subjected to any mechanical strain. If necessary, fit strain relief accessories.
- Observe the minimum permissible bending radii for the cables. These can be found in the data sheets from the cable manufacturer.
- Attach the cables in such a way that they are laid firmly and cannot be knocked.
- Do not lay signal cables parallel to high-power lines.

5.1 Overview of how to connect and set up the device

To use the functions and connections of the ProLink device, proceed as follows:

1. Install the processor module and the vibration module or vibration modules of the ProLink in the desired location. You can operate up to 4 vibration modules with one processor module.
2. Connect the modules to each other 21.
3. Provide the appropriate accessories for the connections you want to use on the vibration module of the ProLink device and connect the signals. You can find details on the various connection options in the following sections:
   - **Connecting analogue inputs** 22
   - **Connecting digital inputs** 23
   - **Connecting digital outputs** 25
4. Connect the power supply 27.
5. Establish the network connection 28 and start the Schaeffler SmartWeb software. The inputs and outputs of the vibration module are preconfigured there by default. You can customise these configurations for your system environment.
6. When you have put the ProLink device into operation, the device goes through a test sequence. The controls of the ProLink device 29 are then available.

> In the event of a power failure, the ProLink device has a buffer that continues to power the internal clock for 14 days. Alternatively, you can use a DHCP server and provide the time using an NTP server. Please contact your system administrator if you experience problems with the network settings. More information can also be found in the SmartWeb manual.

Important notes that must be observed when connecting can be found in the section **Connection notes**.

Details about the pin assignment of the individual connections can be found in the section **Connection details** [18].

Information about getting started with the Schaeffler SmartWeb software can be found in the section **Further information** [32]. For details on working with the Schaeffler SmartWeb software, refer to the SmartWeb manual.
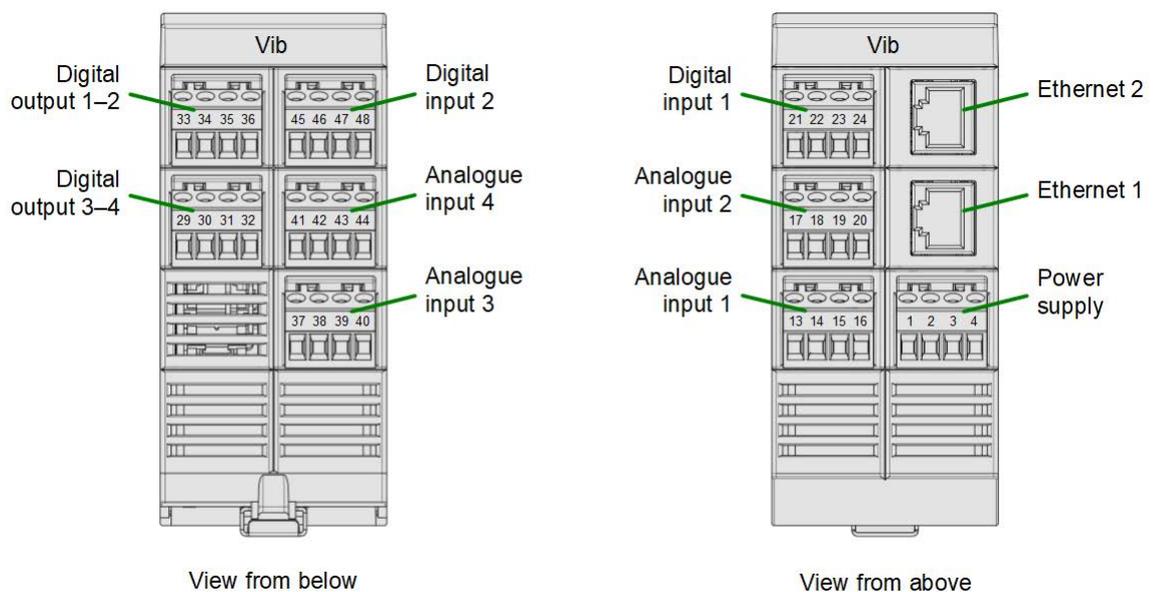
5.2 Connection details

The ProLink processor module has the following connections:

- PC/Ethernet connection LAN [28] (front)
- Power supply [19] (top)
- Connection to vibration module [21] (top)

View from the front

View from above
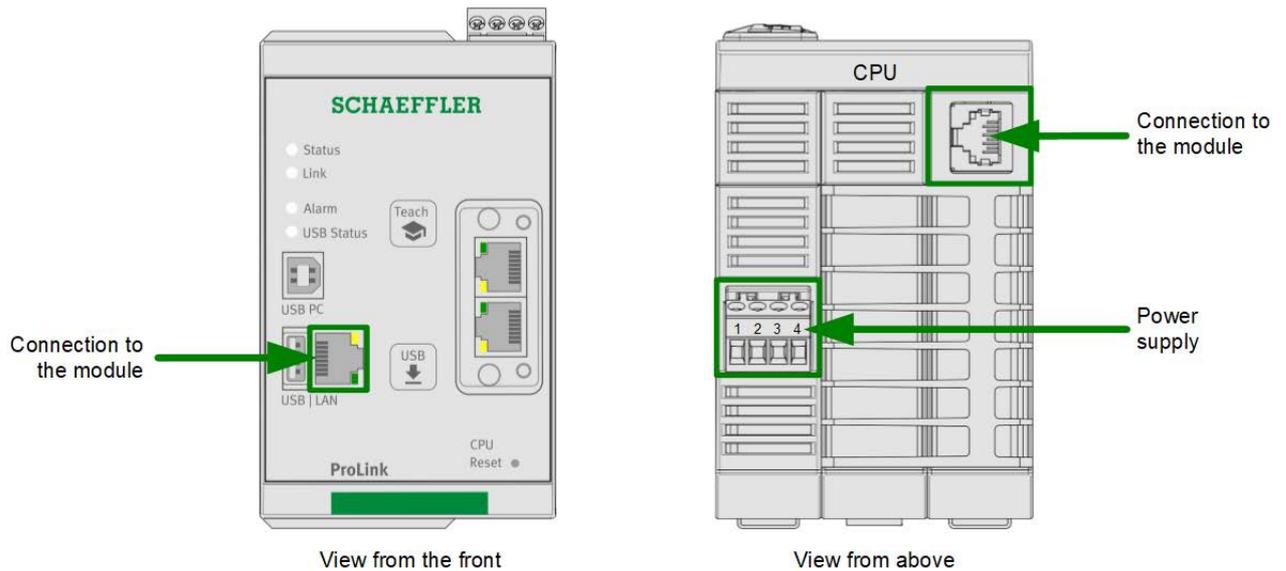
The ProLink vibration module has the following connections:

- Power supply [19] (top)
- Network connection to neighbouring modules [21] (top)
- Analogue inputs [19] (top and bottom)
- Digital inputs [20] (top and bottom)
- Digital switching outputs [20] (bottom)

View from below

View from above

Connection overview

The following graphic shows a detailed wiring diagram for all connection options of the ProLink vibration module:
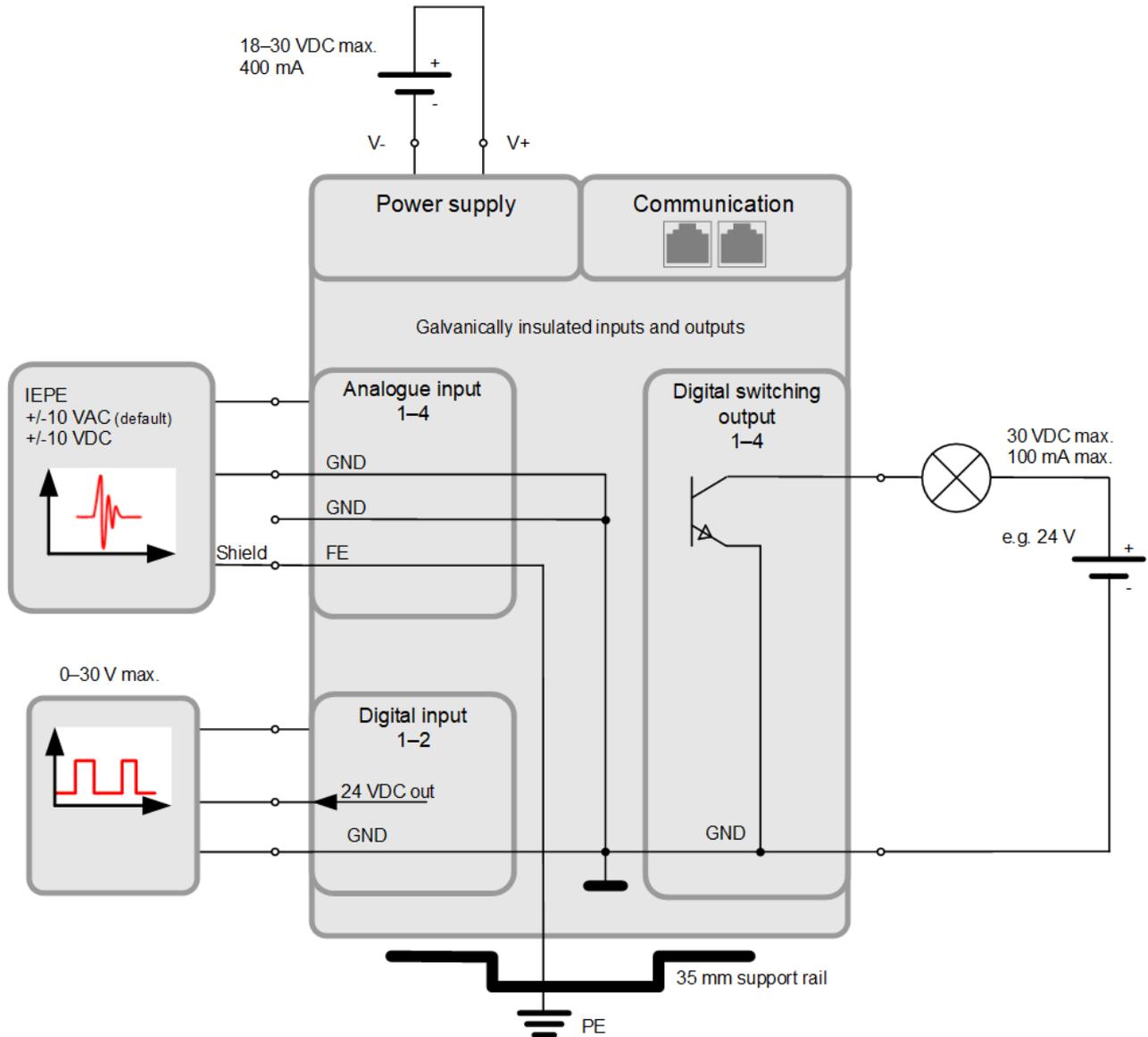
Power supply

The power supply is accessible on each module via the corresponding supply terminal at the top.
The pin assignment appears as follows:

Pin no.	Signal
1	24 VDC
2	0 V
3	24 VDC
4	0 V

Analogue inputs

The 4 analogue inputs are accessible via the corresponding supply terminals at the top and bottom of the vibration module.
The pin assignment appears as follows:

Analogue input	Input 1/2/3/4	GND	GND	Shield FE
Analogue input 1	13	14	15	16
Analogue input 2	17	18	19	20
Analogue input 3	37	38	39	40
Analogue input 4	41	42	43	44

GND has the same potential. Shield FE has a conductive connection to the mounting rail. The mounting rail should have a conductive connection to the switch cabinet; the switch cabinet should be grounded.

We recommend that the shield of the sensor is first clamped to FE (usually connected to PE via the mounting rail).

Digital inputs

The 2 digital inputs are accessible via the corresponding supply terminals at the top and bottom of the vibration module.

The pin assignment appears as follows:

| Digital input	24 V	GND	Signal	GND
Digital input 1	21	22	23	24
Digital input 2	45	46	47	48
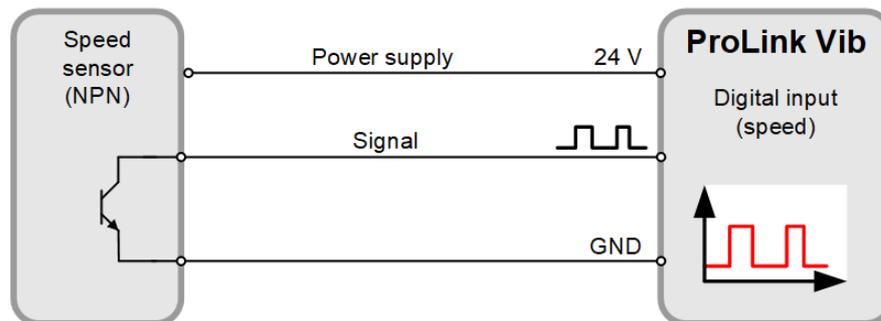
Digital switching outputs

The 4 digital outputs are accessible via the corresponding supply terminals at the bottom of the vibration module.

The pin assignment appears as follows:

| Digital output	Open collector	GND
Digital output 1	33	34
Digital output 2	35	36
Digital output 3	29	30
Digital output 4	31	32
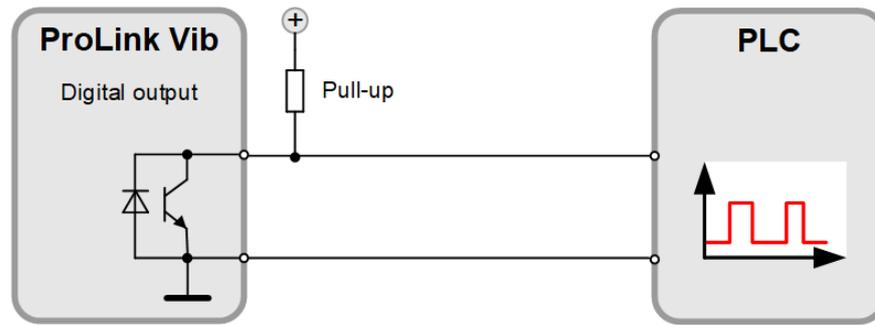
5.3 Connecting modules via internal Ethernet network

The ProLink device consists of a processor module and at least one, and up to a maximum of 4 vibration modules. The modules are connected via an internal Ethernet network. A network cable required for this is included in the scope of delivery of the additional module.

To connect modules, use the RJ45 connection on the processor module as well as one or both RJ45 connections of the vibration module. Proceed as follows:

- **Connect the processor module to the vibration module**: Insert one plug of the network cable into the RJ45 connection of the processor module and the other plug into the RJ45 connection of the vibration module. The connection sockets are located on top of the modules.
- **Connect additional vibration modules**: For the first vibration module, insert a network cable into the available RJ45 connection. Plug the other end of the cable into an RJ45 connection on the second vibration module.
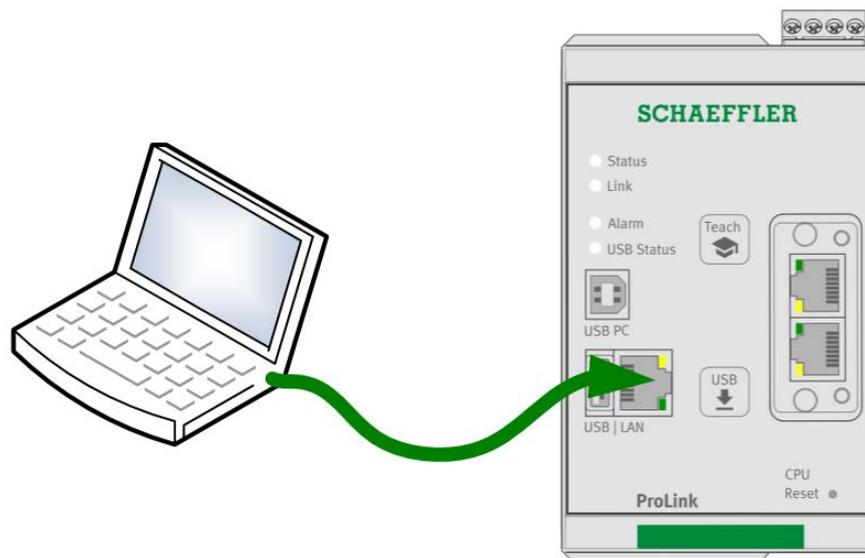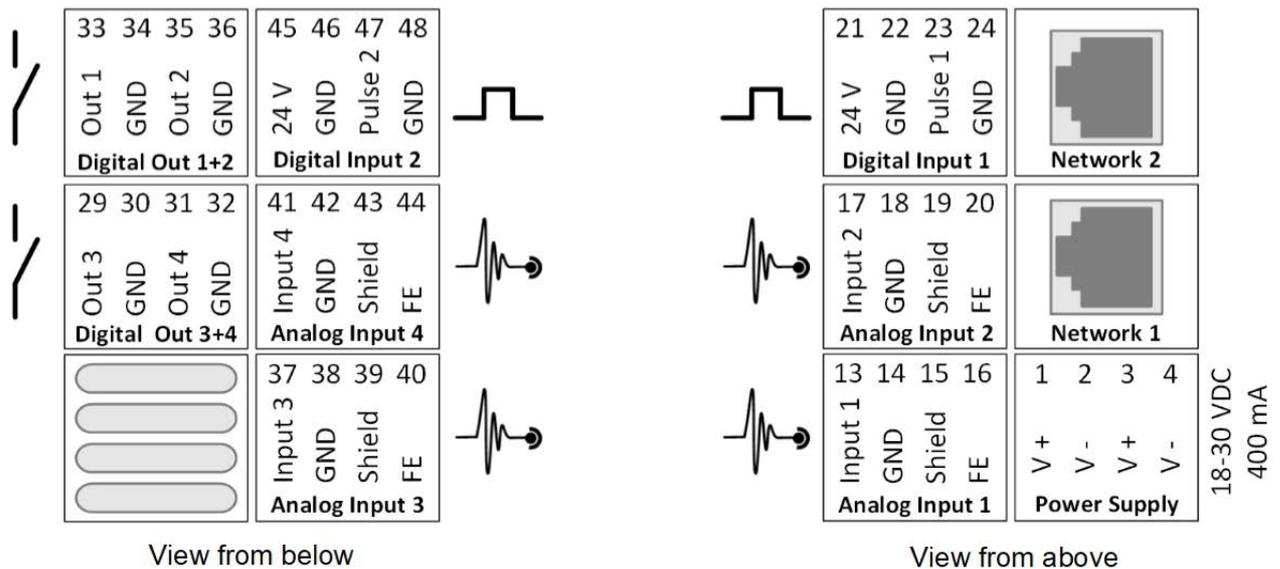

To ensure reliable communication between the modules, the length of the connecting network cable must not exceed 100 m.

This is an internal communications interface. In order to avoid malfunctions with data transmission, it must not be connected to the client network. However, if additional network components are required, these components should support the Precision Time Protocol (PTP).

5.4 Inputs and outputs of the vibration module

You can use 4 analogue inputs (Analog Input), 2 digital inputs (Digital Input) and 4 digital switching outputs (Digital Out) on each vibration module of the ProLink device. The galvanic isolation of the vibration module is implemented as follows:

33 34 35 36	45 46 47 48		21 22 23 24	
Out 1 / GND / Out 2 / GND	24 V / GND / Pulse 2 / GND		24 V / GND / Pulse 1 / GND	Network 2
Digital Out 1+2	Digital Input 2		Digital Input 1	

View from below

View from above

- **Power supply 24 VDC:** Electrically isolated
- **Communication (Ethernet):** Electrically isolated
- **Inputs and outputs:** Electrically isolated from supply and communication
- **Analogue and digital inputs:** Common earth
- **Switching outputs:** Common earth

The following sections provide some information about input and output connections and their configuration in the Schaeffler SmartWeb software.

An illustration of all the connection options for the ProLink device can be found in the **Connection overview** [18] section.

Information on configuration options can be found in the section **Further information** [32] and in particular in the user documentation Schaeffler SmartWeb.

Here, you can:

- Connect the analogue inputs of the vibration module [22]
- Connect the digital inputs of the vibration module [23]
- Connect the digital switching outputs of the vibration module [25]

5.4.1 Connecting the analogue inputs of the vibration module

You can connect up to 4 analogue sensors, such as vibration sensors, to the analogue inputs of the vibration module. The following wiring diagram shows the connection of an IEPE acceleration sensor:
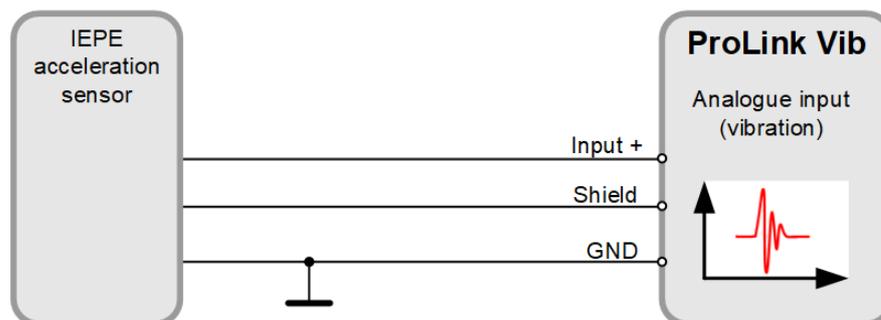
> You must enable the **IEPE** sensor type in the Schaeffler SmartWeb software for IEPE acceleration sensors:
>
> In the **Edit input configuration** dialogue, set the **Sensor type** to **IEPE**. Adjust the sensitivity of the sensor as indicated in the calibration data sheet of the sensor.

Details on the connection for analogue inputs can be found in **Connection details** 19 .

Analogue input in the Schaeffler SmartWeb software

The Schaeffler SmartWeb software automatically detects the connected modules. For each module, the corresponding inputs, which are pre-assigned with a default configuration are displayed in the **Configuration** area.

For IEPE acceleration sensors, you must adapt the automatically created input as follows:

1. Connect your computer to the processor module 28 .

2. Open the device's own SmartWeb software 32 .

3. Open the **Configuration > Input configurations > ProLink vibration module (Serial number) > Vibration sensor 1-4** area.

4. Click the **Edit** ✏ button for the corresponding analogue input.

5. In the **Edit input configuration** dialogue, set the **Sensor type** to **IEPE**. Adjust the **sensor sensitivity** as indicated in the calibration data sheet of the sensor. You may also need to adjust the **Min.** and **Max. bias voltage**. This is used to detect a defective sensor or cable.
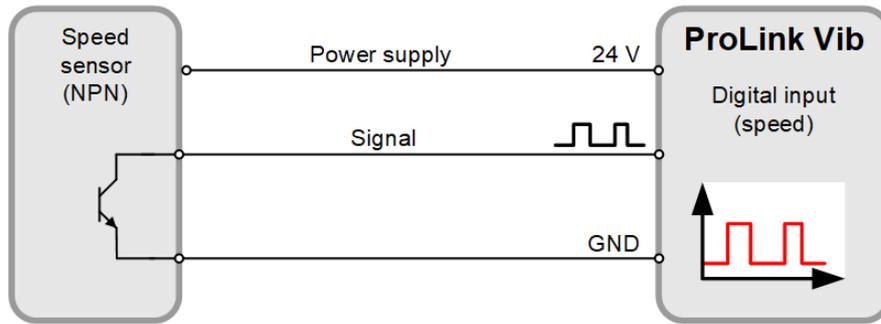

Further details of the possible settings can be found in the Schaeffler SmartWeb user documentation.

5.4.2 Connecting the digital inputs of the vibration module

You can connect up to 2 digital sensors, such as speed sensors, to the digital inputs of the vibration module. The following wiring diagram shows the connection of an NPN speed sensor:

Details on the connection for digital inputs can be found in **Connection details** [20].

Digital input in the Schaeffler SmartWeb software

The connected digital inputs of the ProLink device are automatically created and preconfigured in the Schaeffler SmartWeb software. You can view the configuration as follows:

1. Connect your computer to the processor module [28].
2. Open the device's own SmartWeb software [32].
3. Open the **Configuration > Input configurations > ProLink vibration module (Serial number) > Speed input 1-2** area.
4. Click the **Edit** ✏ button for the corresponding digital input.
5. In the **Edit input configuration** dialogue, you can see the automatically created configuration:

- Please use a shielded cable.
- If you supply the sensor via the 24 V output for speed sensors, it must not require more than 25 mA. If this value If this value is exceeded, the power supply is switched off and the corresponding input LED is switched to red. The state is only reset when the module is rebooted.
- If you select A/B encoder as the signal type, both inputs are interconnected to form an input with direction information. To do this, connect a speed sensor that supplies two output signals, one of which is phase-shifted by 90°. Both inputs then receive the same settings in the SmartWeb software. If you use speed inputs, for example in measuring tasks, both inputs can still be selected but both provide the same data.

Further details of the possible settings can be found in the Schaeffler SmartWeb user documentation.

5.4.3 Connecting the digital switching outputs of the vibration module

You can connect the digital switching outputs of the vibration module to an external control system, for example. Refer to the following wiring diagram:
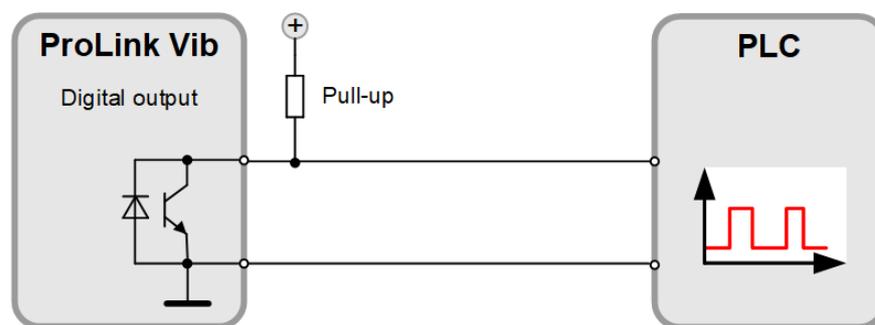
- Please note the external pull-up resistor. This is often part of the client's control system.
- Please use a shielded cable.
- If you use the switching output to control loads, such as a lamp or a relay, you must observe the maximum permissible current. If this value is exceeded, the output is automatically switched off.

Details on the connection for digital outputs can be found in **Connection details** [20].

Digital output in the Schaeffler SmartWeb software

The connected digital outputs of the ProLink device are automatically created and preconfigured in the Schaeffler SmartWeb software. You can view the configuration as follows:

1. Connect your computer to the processor module [28].
2. Open the device's own SmartWeb software [32].
3. Open the **Configuration > Output configurations > ProLink vibration module > Output 1-4** area.
4. Click the **Edit** ✏ button for the corresponding digital output.
5. In the **Edit output configuration** dialogue, you can see the automatically created configuration:

Edit output configuration

Schaeffler SmartWeb

Name :

Output 1 (F4:3D:80:12:00:53): Base configuration (F4:3D

Output channel :

● Digital output 1

Characteristic value configuration :

Base configuration (F4:3D:80:12:00:53) (Vibration se... ▼

Output type :

○ Alarm output

○ Characteristic value output

☐ Inverted

Alarm limit :

Main alarm ▼

Alarm	Output
No alarm	Off (open/pull-up)
Pre-alarm	Off (open/pull-up)
Main alarm	On (closed/ground)

OK   Cancel

Further details of the possible settings can be found in the Schaeffler SmartWeb user documentation.

5.5 Connecting the power supply

The ProLink device can consist of one processor module and up to 4 additional modules. Each module has a separate 4-pin plug for power supply. Pins 1 and 3 as well as pins 1 and 4 are jumpered in the module for easy wiring. Connect the modules as follows and also observe the illustration:

1. Connect the DC power supply to the power supply connection on the processor module.
2. Connect the power supply connection of the processor module to the power supply connection of the vibration module.
3. Connect all other vibration modules that are located in the same switch cabinet to each other accordingly via their power supply connections.
4. When the power supply connections of all modules are connected, you can switch on the power supply.
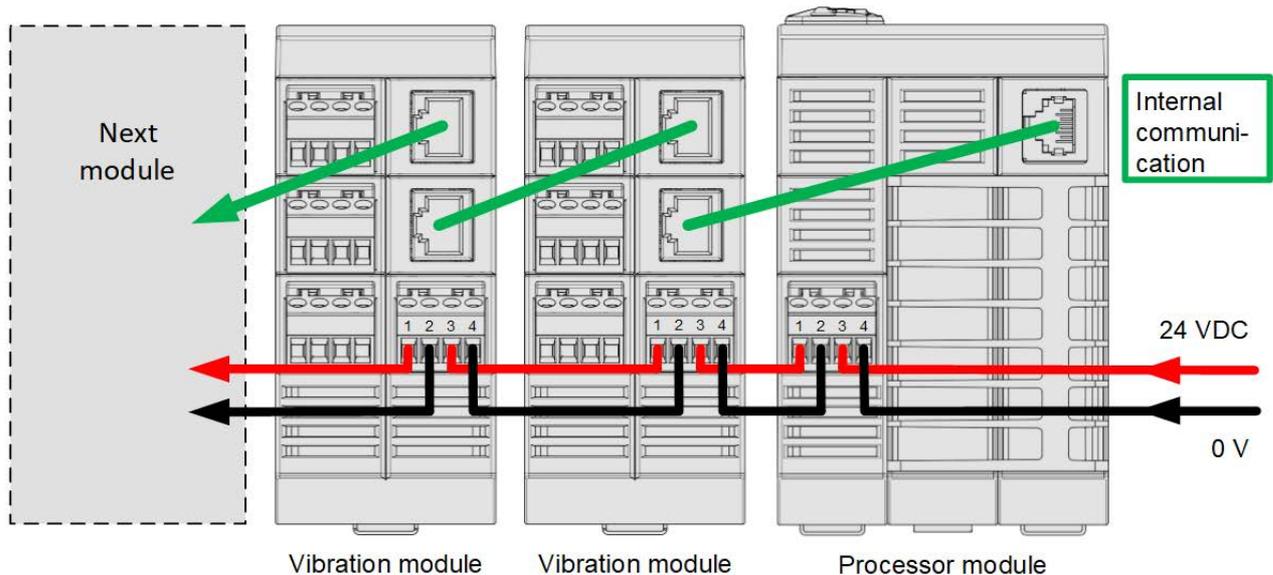
- If the modules are distributed over several switch cabinets, you must install a separate DC power supply in each switch cabinet.
- Please note the maximum cable length of three metres.

For details on the power supply connection, see **Connection details** 19 .

DANGER	**Damage to the ProLink device from unsuitable power supply!**

- Only use a power supply that meets the specifications set out in the Technical data 7 section as well as the relevant and applicable statutory requirements governing such components.
- When connecting the device, you must ensure the polarity is correct. Although all inputs and outputs are protected against reverse polarity and overvoltage of up to 30 V, damage to the system cannot be ruled out in principle.
- A secondary fuse of 4 A for each ProLink device is strongly recommended. If several ProLink devices are used, a separate fuse must be provided for each device.
- Ensure that the connecting wires are installed with no voltage.

5.6 Connecting the computer via Ethernet

In order to view measurement data from the ProLink device, download data or manage settings, you must connect the device to your computer (PC) via Ethernet. You can then call up and manage the ProLink in a browser using the dedicated SmartWeb software.

The following basic prerequisites apply for connecting to the computer:

- The UDP communication protocol must be enabled on ports 19000 and 19001 in existing firewalls in your network (this only applies when calling up the device using the SmartUtility software).
- If the ProLink device has not been assigned an address via DHCP, it will have the IP address 192.168.1.100 by default. In this case, the IP address of your computer must be within the 192.168.1.x range.

Please contact your system administrator if you experience problems with the network settings.

Please use only the LAN connection on the front of the processor module to connect your computer or your company network. The network interface on the top of the ProLink modules may only be used for communication between the modules.

To establish the connection, proceed as follows:

1. Select an IP address in the range 192.168.1.xx for your computer.
2. Insert the Ethernet cable into the Ethernet port on the front of the processor module:
3. Connect the cable to your computer:
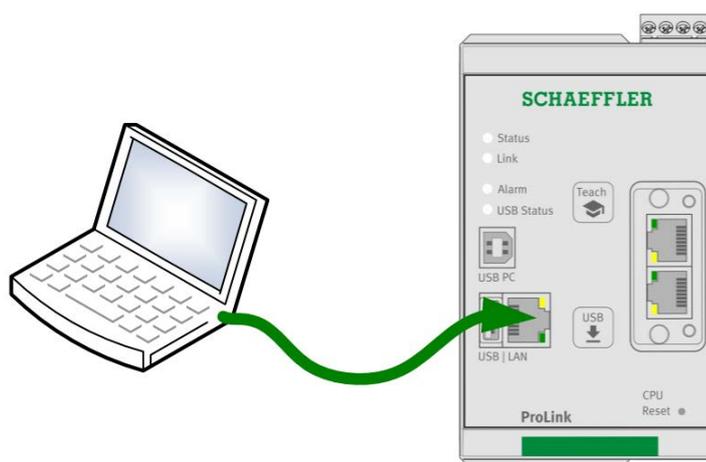
4. You can now access the device's own software Schaeffler SmartWeb⌐32⌐ via the browser on your computer. In the software, basic measuring tasks, inputs and outputs are automatically created for the ProLink device and its modules and assigned to the modules.

When the ProLink device is first commissioned, it may take a few minutes after the power supply is switched on before all automatic configurations are created and visible in the software.

Depending on your corporate and network restrictions, ports and protocols may be blocked. You will then not be able to reach the ProLink system. In this case, contact your system administrator.

Information about getting started with the Schaeffler SmartWeb software can be found in the section **Further information**⌐32⌐. For details on working with the Schaeffler SmartWeb software, refer to the SmartWeb manual.

An illustration of all the connection options for the ProLink device can be found in the Connection overview⌐17⌐ section.

6 Operation and controls of the ProLink system

You can find the controls of the ProLink modules on the front of the respective module. Relevant details can be found in the following sections.

You can make other settings for the ProLink device via the integrated software SmartWeb. Relevant details can be found in your SmartWeb user documentation.

Operation

After the ProLink modules are mounted and connected, the desired connections are set up, the PC is connected via Ethernet and everything is powered, you can access the device via the Schaeffler SmartWeb software on your PC.

The connected sensors supply signals that are converted into the following characteristic values by the base measurement jobs that have already been created in the delivery state:

- ISO 10816
- RMS broad band acceleration
- RMS broad band demodulation
- Peak2peak

All other connected inputs and outputs are also automatically created in the SmartWeb software and are available there.

Processor module controls

The processor module controls are located on the front of the device. Here you will find two pushbuttons, a knob and a total of four LEDs – the functions of these LEDs are described in more detail in the following sections.
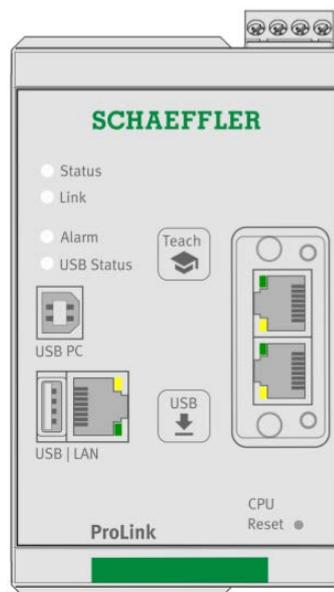
Behaviour of the LEDs during system start

As soon as power is supplied to the processor module of the ProLink device, the LEDs behave as follows:

- All LEDs light up briefly once.
- **Status** LED:
  - Flashes yellow while the device is booting up.
  - Flashes briefly in the rhythm of a heartbeat while the maintenance system is starting and is reachable.
  - Lights up green when the system start is complete.
- **Link** LED:
  - Flickers green when there is network activity.
- **Alarm** LED:
  - Flashes while the device is booting up.
  - Lights up in the colour of the current alarm state when the system start is complete and the connected module is reachable.

Behaviour of the LEDs in the operating state

Description	LED colour and activity	Meaning
Status LED	**Continuous green**	State OK
	Continuous red	Module defective
	Flashing yellow-red	Updating module
	Flashing green-yellow	Resetting data partition
	Flashing green-red	Module being reset to factory settings
	Flashing yellow	Maintenance system running with the default network settings
Link LED	**Flickering green**	Connection to the module and internal network activity
Alarm LED	**Continuous green**	No alarm
	Continuous yellow	Pre-alarm
	Continuous red	Alarm
	Flashing green	Learning mode active
USB Status LED		No current function
Teach button 31		Press this button to start learning mode.
USB button		No current function
Reset button 31		Press this button with a paper clip: < 1 sec: Restart module > 5 sec: Reset module to factory setting

- Before pressing any buttons on the device, please ensure that the device has started up correctly.
- You can also go to **Device settings > Key settings** in the Schaeffler SmartWeb software to specify the actions permitted using these keys. In this way, you protect the ProLink device against inadvertent operation. For more information, please see the manual for the Schaeffler SmartWeb software.

Vibration module controls

The vibration module controls are located on the front of the device. Here you will find the reset button and a total of 13 LEDs – the functions of these LEDs are described in more detail in the following sections.
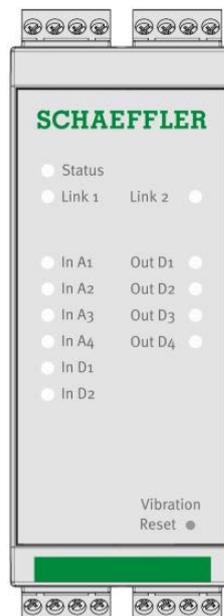
Behaviour of the LEDs during system start

As soon as power is supplied to the vibration module of the ProLink device, the LEDs behave as follows:

- An LED test is performed in which all LEDs light up briefly in the colours red and green.
- **Status** LED:
  - Flashes yellow while the device is booting up.
  - Lights up green when the system start is complete.
- **Link** LED:
  - Flickers green when there is network activity.

Behaviour of the LEDs in the operating state

Description	LED colour	Meaning
Status LED	**Continuous green**	State OK
	Continuous red	Module defective
	Flashing yellow-red	Updating module
Link 1/2 LED	**Flickering green**	Connection to the module and internal network activity
In A1 - **In A4** LEDs	**Continuous green**	Depending on the configuration: • AC input OK • DC input OK • IEPE input OK
	Continuous red	IEPE input: Invalid bias voltage, sensor may be defective
In D1 + **In D2** LEDs	**Continuous green**	High level detected
	LED off	No signal created or low level
	Continuous red	Overload of the power supply
Out D1 - **Out D4** LEDs	**Continuous green**	Switching output activated
	LED off	Switching output not activated
	Continuous red	Switching output activated and overloaded
Reset button		Press this button with a paper clip: < 1 sec: Restart module

6.1 Reset button

Press this button with a paper clip. Which function the Reset button executes will depend on how long you press and hold it:

- If you press and hold the Reset button for **less than 1 second**, you will restart the module.
- Processor module only: If you press and hold the Reset button **for more than 5 seconds**, you reset the Schaeffler SmartWeb firmware to the factory default.
  Resetting to factory settings is indicated by the status LED flashing yellow.

Restoring factory settings

CAUTION	**Measurement data and configurations will be irretrievably deleted!**
⚠	If you restore the ProLink device to its factory settings, you will lose all measurement data and configurations stored on the device! Please save the measurement data stored on the device and the configuration of the device.
	To do this, download the measurement data with the Schaeffler SmartUtility Light software. The full version of Schaeffler SmartUtility also allows you to download the configuration of the ProLink device.

6.2 Teach button

If you press and hold the Teach button for **longer than 5 seconds**, the learning mode will be restarted for all measurement jobs that use learning mode. Starting of learning mode is indicated by the **Alarm** LED.

Further information on learning mode can be found in the user documentation for the SmartWeb software.

7 Further information

Once you have connected and started the ProLink condition monitoring system, you can view the measurement data of the connected inputs via the Schaeffler SmartWeb software on your computer. In addition, you can adapt the base measurement jobs, inputs and outputs automatically created and assigned to the modules and sensors for your system.

> The following basic prerequisites apply for connecting to the computer:
> - The ProLink device must be on the network or directly connected to your computer via Ethernet cable.
> - If no address was assigned to the ProLink device via DHCP, it has the default IP address 192.168.1.100. In this case, the IP address of your computer must be within the 192.168.1.x range.
>
> For more information, please see the section entitled **First start-up** in the handbook for the SmartWeb software. Please contact your system administrator if you experience problems with the network settings.
>
> When the ProLink device is first commissioned, it may take a while after the power supply is switched on before all automatic configurations are created and visible in the software.

Proceed as follows:

1. Connect your computer to the processor module 28 of the ProLink device via the LAN connection.
2. Call up the ProLink with the address 192.168.1.100 via the device's own SmartWeb software in a browser:
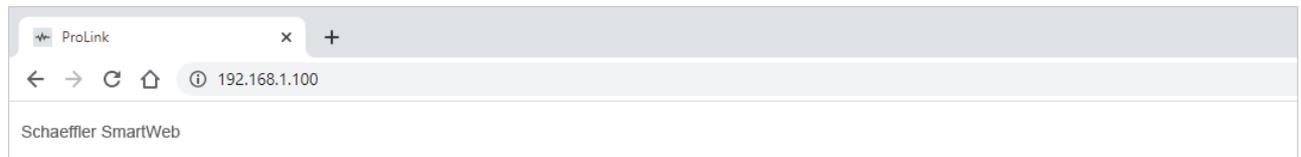
3. The **Status** page of the Schaeffler SmartWeb software opens. Basic measurement jobs, inputs and outputs are automatically created for the ProLink device and its modules and assigned to the modules. The modules are displayed in ascending alphanumeric order from left to right. During initial commissioning, this means that the module with the smallest serial number is displayed on the left. You can check your connection to the respective physical modules via the module identification 33 and then influence the sequence shown by renaming the modules:
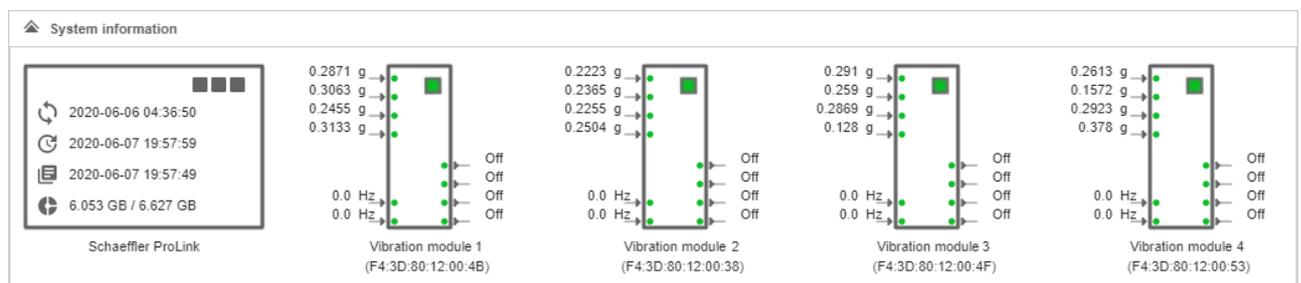
4. In the left-hand pane, click the **Live view** button.
   If you have connected the ProLink device correctly, you can see the signals of the inputs connected to the vibration module here:

Detailed instructions for configuring the ProLink device and for analysing the measurement data can be found in the user documentation for Schaeffler SmartWeb and Schaeffler SmartUtility Light or Schaeffler SmartUtility.

Identification and positioning of the modules

The Schaeffler SmartWeb software has a function for visual module identification. Use this function to determine which physical module belongs to a module displayed in the software. To do this, proceed as follows:

- Select the module in the Schaeffler SmartWeb software and click the alarm status symbol ▮ to enable visual module identification.
  The LEDs on the associated physical module flash alternately. When you turn off the module identification, the LEDs on the physical module exit flashing mode.
- The module display in the software is sorted alphabetically. You can therefore change the position of the module in the software by changing its name.

Information and services for the ProLink condition monitoring system

We offer a unique range of services for the ProLink system – from training courses, technical mentoring during the induction phase and expert support with diagnostic issues, right through to customised service agreements including remote monitoring and reporting.

A look at the extensive range of products and services relating to the ProLink system can be found online at www.schaeffler.de/en/condition-monitoring/prolink.

8 Maintenance and repair

Should you detect a fault with the ProLink device, please contact our Support team.

- The ProLink device may be maintained only by persons who are verifiably qualified to do so in accordance with the relevant rules and regulations.
- Ensure that the ProLink device is de-energised while work is being carried out.

Cleaning the ProLink device

You can clean the outside of the ProLink device's modules if necessary.

- Disconnect the device from the mains.
- Clean the modules using a soft, lint-free cloth.

CAUTION   **Damage to the device from improper handling!**

Do not use chemical solvents such as acetone, nitro thinners or similar products as these solvents may damage the device housing.

Do not use solvent sprays. These solvents can cause the modules to fail.

9 Decommissioning and disposal

Decommissioning

If the ProLink device can no longer be operated safely, the device must be decommissioned and secured against inadvertent operation. The device can no longer be operated safely if it:

- Exhibits visible signs of damage
- Ceases to function
- Has been stored under damaging conditions
- Has been exposed to severe stresses in transit

Disposal

Neither the ProLink device nor its associated components may be disposed of as household waste since they contain electronic components that must be disposed of in an appropriate manner. Please return the device and/or components to us so that we can ensure they are disposed of in an environmentally friendly manner and in accordance with the relevant regulations. By returning old devices, you will be making an important contribution to protecting our environment.

10 Manufacturer/support

Manufacturer

Schaeffler Monitoring Services GmbH

Kaiserstraße 100
52134 Herzogenrath
Germany

Tel.: +49 (0) 2407 9149-66
Fax: +49 (0) 2407 9149-59
Support: +49 (0) 2407 9149-99

Internet: www.schaeffler.de/en/services
Further details: www.schaeffler.de/en/condition-monitoring/prolink
Contact: industrial-services@schaeffler.com

Please send all correspondence directly to Schaeffler Monitoring Services GmbH!

A subsidiary of
Schaeffler Technologies AG & Co. KG

PO Box 1260
97419 Schweinfurt
Germany

Georg-Schäfer-Straße 30
97421 Schweinfurt
Germany

Support

Tel.: +49 (0) 2407 9149 99
Email: support.is@schaeffler.com

We provide support services for the ProLink device and related software products. For a detailed description of the nature and scope of our support services, see www.schaeffler.de/en/condition-monitoring/prolink.

11 Appendix

EG Declaration of Conformity

EU Declaration of Conformity

The manufacturer

Schaeffler Monitoring Services GmbH, Kaiserstrasse 100, 52134 Herzogenrath

Herby declares that the products

ProLink.CPU und

ProLink.VIB-IEPE-4CH

meets the protection requirements specified in the guidelines on Electromagnetic Compatibility Directive (2014/30/EU) and the guideline on the restriction of the use of certain hazardous substances in electrical and electronic equipment (2011/65/EU) provided that the product has been professionally and correctly installed in accordance with commissioning instructions of the manual.
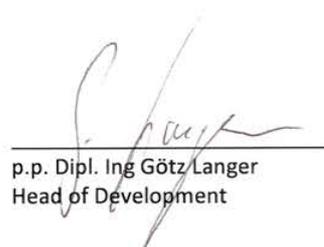
The following standards, among other, were referred to when assessing the product.

EN 61326-1:2013
EN 55011:2016 Group 1 Class A

Measuring device mark: **CE**

Herzogenrath, 09.06.2020

Dr.-Ing. Hans-Willi Keßler
Managing Director

p.p. Dipl. Ing Götz Langer
Head of Development

This declaration certifies the compliance with the guidelines mentioned, but does not include any assurance of properties. The safety instructions in the operating instructions must be observed.