CANlink mobile 3000 Device Manual

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1. Preamble

1.1. Version

CANlink mobile 3000 series Device Manual

Table 1. Version history

Version	Date	Remark
1.0 EN	10.10.2018	* First official version
1.3 EN	02.12.2019	* Update
1.4 EN	05.03.2020	* Switching the device on/off revised * Power management revised * Adapter cable for retrofit added * Various editorial corrections
1.5 EN	01.02.2021	* New device variants of CANlink mobile 3600 added * Various editorial corrections * Fundamental revision of various contents in the complete manual * Addition of various warning notices
1.6 EN	01.12.2021	* New device types of CANlink mobile 3600 added

1.2. Legal Notice

All brands and trademarks named in this document and possibly protected by third-party rights are subject without limitation to the terms of the valid trademark law and intellectual property rights of their respective registered owner.
You can find a list of the free-source and open-source software as well as copyright notes, license texts and, if applicable, the relevant source code on our website under the link: Free & Open Source Software
Observe all local and regional laws and provisions as well as the safety instructions contained in this document.

1.3. Contact

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1.4. About This Manual

This document is part of the product and provides important information on the intended use, safety, installation, and operation of the devices described below. The document is intended for qualified technicians and electricians with advanced knowledge in electrical engineering and field bus systems, allowing them to estimate the risks and hazards of operating the device and to integrate it into systems with components of other manufacturers.

1.4.1. Safety Levels

The safety levels have the following meanings:

	Severe injury or death. Probability: **very high**
	Slight or medium injury. Probability: **possible**
	Severe injury or death. Probability: **possible**
	Property damage.
	Valuable information

1.4.2. Symbols and formatting

The following symbols and formatting help you recognize the purpose of the paragraphs:

DANGER

Nature and source of the danger
Consequences of non-observance
- Measures to avoid the danger

WARNING

Nature and source of the danger
Consequences of non-observance
- Measures to avoid the danger

CAUTION

Nature and source of the danger
Consequences of non-observance
- Measures to avoid the danger

NOTICE

Nature and source of the danger
Consequences of non-observance
- Measures to avoid the danger

INFORMATION

Indicates notes and information

TIP

Indicates supplementary information

Symbol	Description
	Application options for the devices described.
	Indicates references to other documents, websites, etc.

Symbol	Description
	Description of different types. Data and descriptions that only apply to certain types are either covered in separate chapters or marked with the symbol shown here.

1.4.3. Tasks

Tasks are structured as follows:

- Aim of the task
- Prerequisites for the described task.

Step 1.
Step 2.

Result of correct performance of the task.

Step 3.

1.4.4. Lists

Lists are indicated as follows.

- List item

1.4.5. Notations

The following notations are used in this document:

Table 2. Representations

Designation	Representation
Keys, commands, messages	Keys, commands, messages
Navigation in menus, functions of the user interfaces, file paths	FILE ¬ SAVE ¬ … **OK** button
Accessories	Cable, adapter

2. About the Device

This chapter provides an overview of the device's operating elements and functions as well as the intended use of the device. Additionally, it provides an overview of the available types and certificates.

For more detailed information, see Chapter Annex.

2.1. Important Device Information

2.1.1. Device Elements

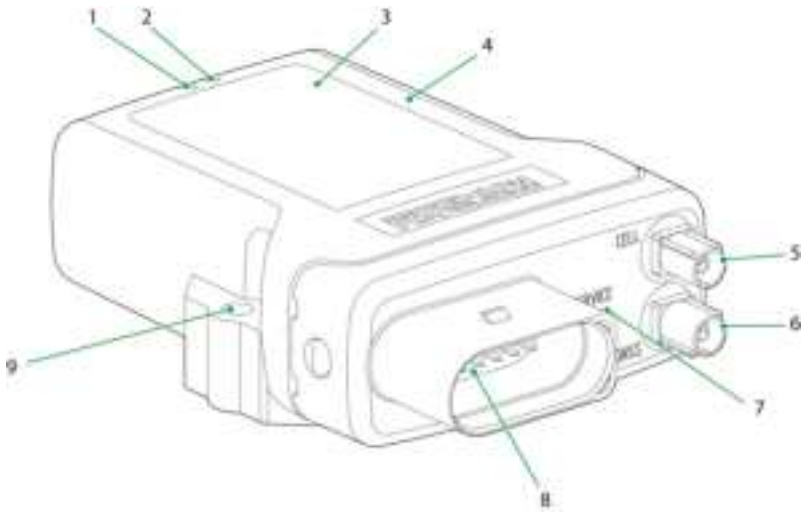


Figure 1. Device overview CANlink mobile 3000

Table 3. Device Overview labels

#	Item
1	ON LED
2	STATUS LED
3	Type label
4	Housing
5	Mobile radio antenna connector
6	GNSS antenna connector
7	Micro-USB port with protective plug / sticker
8	Main plug connector
9	Fixing holes

INFORMATION

Not all types feature the antenna ports. For more information, see Chapter Available types.

2.1.2. Type Label

The device type label is located on the front of the housing and provides the following information:

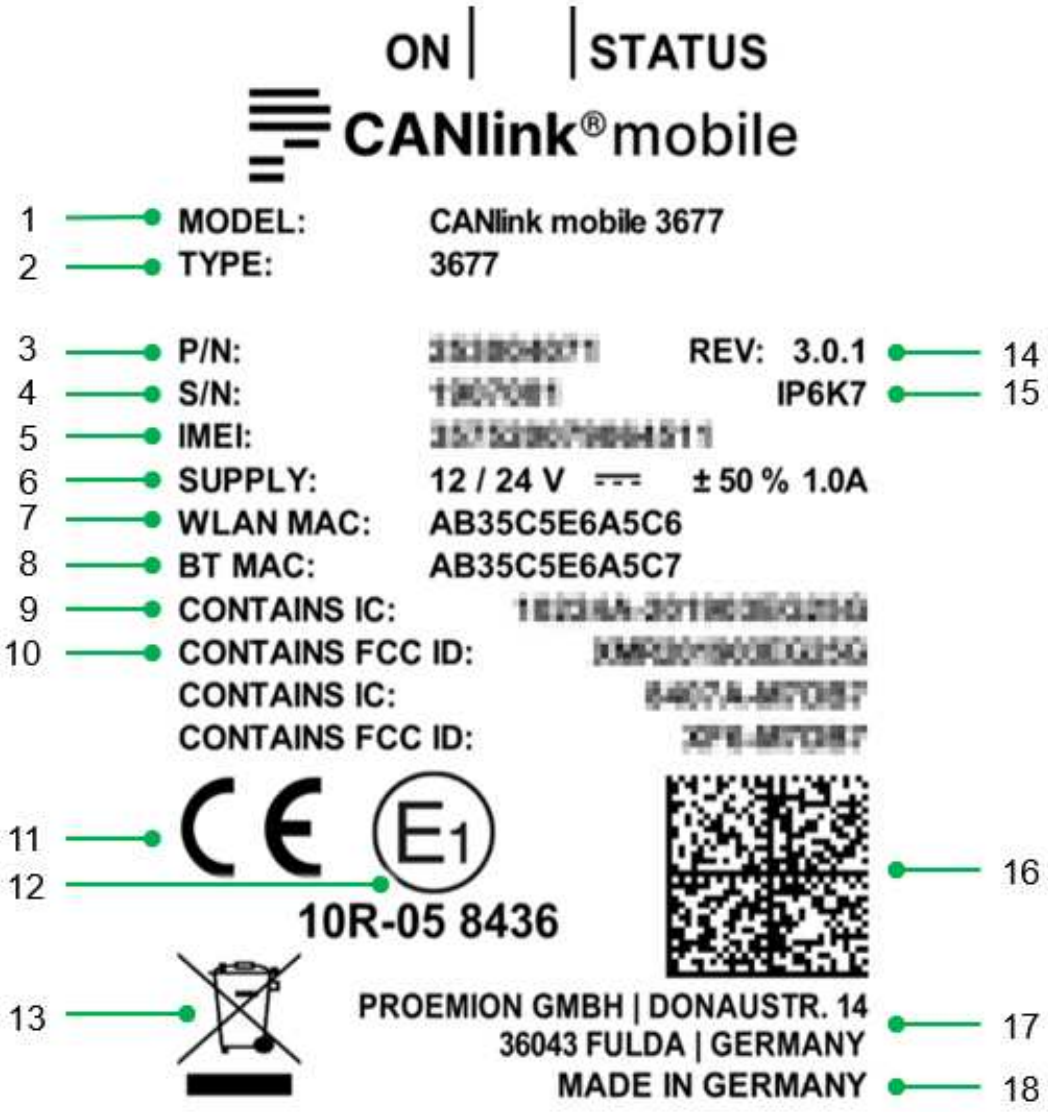


Figure 2. CANlink mobile 3000 type label

Table 4. Device Type labels

#	Item
1	Model designation
2	Type
3	Part number
4	Serial Number
5	IMEI number
6	Power supply
7	WLAN MAC address
8	Bluetooth MAC address
9	IC-ID
10	FCC-ID
11	CE mark
12	ECE certification mark

#	Item
13	Disposal symbol
14	Hardware version
15	Protection class
16	Traceability code
17	Manufacturer address
18	Country of origin

NOTICE

Use of solvents on the product label can remove or destroy product information.
* Keep solvent-containing substances away from the label!

Traceability code

The traceability code contains the following information.
Example:

```
25300405900000000000001815014(I)357520074597168(W)D4CA6E7D0CAA(B)D4CA6E7D0CA9
```

Table 5. Extracted information

Item	Description
9-digit part number:	`253004059`
Serial number 0-padded:	`1815014`
`(I)` followed by the IMEI Number:	`357520074597168`
`(W)` followed by the WLAN MAC Address:	`D4CA6E7D0CAA` - only certain types
`(B)` followed by the Bluetooth MAC Address:	`D4CA6E7D0CA9` - only certain types

INFORMATION

The device's type label contains important information.
* Do not remove the type label!

2.1.3. Intended Use

The device is used for the wireless transmission of CAN data from a vehicle or machine according to the 2G, 3G and 4G standards. Depending on the type, GPRS, EDGE, HSPA and LTE can be supported.

Depending on the type, you can also receive and transmit GNSS positioning data and CAN data via the additional Bluetooth, WLAN or LTE interfaces.
The device enables access to CAN data in various modes:

- CAN-CAN Bluetooth bridge: wireless transmission of CAN data between two CANlink mobile devices, e.g. as a substitute for CAN cables in cable carriers or with remote-control devices.
- CAN-Bluetooth interface: wireless transmission of CAN data to a Bluetooth terminal device.
- CAN-WLAN interface: wireless transmission of CAN data to a WLAN.

In interface mode, CAN data can be transmitted to other devices, such as PCs, smartphones or tablets, for display or evaluation.

Depending on the type, the device is equipped with an integrated battery and external antenna ports. The integrated battery provides temporary backup in the event of power failure. It is not intended as a permanent power source for the device. You can connect a GNSS antenna and a mobile communications antenna to the external antenna ports.

The device is suitable for use in mobile and stationary systems for industry, small businesses, and in agricultural and forestry machinery.

The device can be used in environments that require protection class IP6K7.

INFORMATION

Protection class IP6K7 is only ensured when all the device connectors except the micro-USB port are provided with plug connectors or corresponding protection caps / protection plugs.
Please refer to chapters Connectors, Cables and Cleaning.

Only use the device within the permitted temperature range and the other parameters specified in the technical data.
Any use other than that described under “Intended use” is considered unintended use.

MISUSE

The device does not comply with Directive 2014/34/EU and may not be used in potentially explosive areas.
The device must not be cleaned with a pressure washer.

QUALIFIED PERSONNEL

The device must only be put into operation by qualified technicians and electricians with advanced knowledge of electrical engineering and fieldbus systems.
The specialist personnel must know the contents of this manual and always have access to it.

NOTICE

Risk of Property damage.
A defective device must be inspected and repaired by a trained Proemion service technician.
* Do not open the device housing by yourself.

NOTICE

Risk of Property damage.
Device is not installed in accordance with the setup requirements and permitted environmental conditions.
* The system integrator is responsible to install the device according to the specification and take corrective action in regards mechanical protection against soiling, water penetration and vibration.
* If necessary, install external protection shields. For example, an additional housing to protect the device from jet water.
* Install the device according to the recommended mounting position.
* Ensure that the cable management fulfills the required mechanical protection, insulation from vibration and strain.

2.1.4. Conformity

For details of the corresponding approval tests, see Certification and Qualification.
The device meets the requirements of the following standards and legal requirements:

CE	**CE Compliant** This device complies with the directives, standards and normative documents listed in Certification and Qualification.
UK CA	**UKCA Compliant** This device complies with the directives, standards and normative documents listed in Certification and Qualification.
Innovation, Science and Economic Development Canada	**ISED Compliant** This device complies with the directives, standards and normative documents listed in Certification and Qualification.
FC	**FCC Compliant** This device complies with Part 15 of the FCC rules. Operation is subject to the following conditions: * The device may not cause harmful interference. * The device must accept any interference received, including interference that may cause undesired operation. See Certification and Qualification.
E1	**E1 Compliant** This device has been approved by the KBA (Kraftfahrtbundesamt, Federal Office for Motor Traffic) as compliant with Regulation No. 10. See Certification and Qualification.

INFORMATION

For more information about compliance, see Certification and Qualification.
Should you have any questions, simply contact the support team. See Chapter Service and Support.

2.2. Device Functions

The available types differ according to the provided interfaces.
With the device, you can log position data and transmit and receive CAN data via a mobile phone network. The CAN data can be transmitted directly (RealTime mode) or it can be logged and transmitted at a later time. In logging mode, the CAN data is saved to the device and can subsequently be transmitted.

The device can optionally be ordered with the following equipment features:

- wireless module for WLAN and Bluetooth
- an integrated battery
- external antenna ports for mobile radio and position tracking (GNSS)
- 4G mobile module for LTE mobile radio (Europe)
- 4G mobile module for LTE mobile radio (North America)
- 4G mobile module for LTE mobile radio worldwide
- CAN2 and CAN3 interface
- Internal SIM card slot for customized Nano SIM card instead of eSIM card (Only on request as specific inhouse project)

For detailed information on the supported mobile radio and WLAN standards as well as the Bluetooth profiles, see Chapter Interfaces.

For detailed information regarding the available device variants, please refer to table Available types.

NOTICE

Loss of connectivity
Due to the upcoming discontinuation of the support for 2G and 3G frequency bands, the device variants which are equipped with a 3G mobile module are not recommended for new designs. An updated list with the 3G sunset dates can be found on our website using this link CANlink mobile 3000 - Cellular Data Plans - Countries

2.2.1. Available Types

Table 6. Available Types

Type	Part number	Battery	CAN	Ext. antenna	WLAN/ BT	Mobile radio	SIM card
3311*	253004062	No	1	No	No	3G	eSIM
3317*	253004075	Yes	2	No	No	3G	eSIM
3333*	253004067	No	2	No	Yes	3G	eSIM
3337*	253004060	Yes	2	No	Yes	3G	eSIM
3351*	253004063	No	1	Yes	No	3G	eSIM
3355*	253004310	Yes	1	Yes	No	3G	eSIM
3357*	253004076	Yes	2	Yes	No	3G	eSIM
3373*	253004065	No	2	Yes	Yes	3G	eSIM
3377*	253004059	Yes	2	Yes	Yes	3G	eSIM
3477	253004061	Yes	2	Yes	Yes	4G (EU)	eSIM
3577	253004064	Yes	2	Yes	Yes	4G (NA)	eSIM

* not recommended for new designs due to upcoming discontinuation of 3G mobile radio support

Table 7. Available Types for Model 3617

Type	Part number	Battery	CAN	Ext. antenna	WLAN/BT	Mobile radio	SIM card
3617	253004334	Yes	3	No	No	4G	eSIM
3610	**	No	2	No	No	4G	eSIM
3611	253004083	No	1	No	No	4G	eSIM
3613	253004095	No	3	No	No	4G	eSIM
3651	253004084	No	1	Yes	No	4G	eSIM
3653	253004096	No	3	Yes	No	4G	eSIM
3657	253004097	Yes	3	Yes	No	4G	eSIM

The lead type is **3617**.

Table 8. Available Types for Model 3677

Type	Part number	Battery	CAN	Ext. antenna	WLAN/BT	Mobile radio	SIM card
3677	253004071	Yes	3	Yes	Yes	4G	eSIM
3677	253004092	Yes	3	Yes	Yes	4G	Nano (internal)
3633	253004081	No	3	No	Yes	4G	eSIM
3630	**	No	2	No	Yes	4G	eSIM
3637	253004070	Yes	3	No	Yes	4G	eSIM
3673	253004082	No	3	Yes	Yes	4G	eSIM

The lead type is **3677**.

** The device types 3610 and 3630 are customized types for certain OEMs only.

2.2.2. Scope of Delivery

- CANlink mobile 3xxx
- Product information sheet with brief CE declaration

2.2.3. Launch Kit

The launch kit contains all hardware components required for putting the CANlink mobile into operation.
Before you can use the DataPlatform, you must obtain the corresponding access. This access must be a component of the quotation and finally of the sales order.

Table 9. Launch Kits

Material	33xx, 34xx, 35xx	36xx
Launch Kit (without Proemion Account Setup)	253000177	253000176
CLM 3000 Starter cable	X	-
CLM 3600 Starter cable	-	X
CANview USB	X	X
USB cable (CANview USB)	X	X
CAN bus terminator D-Sub/D-Sub, 120¬	X	X
Power supply unit with set of connectors (US, EU, UK, AU)	X	X
USB cable (bootloader, firmware update)	X	X
USB cable (debugging, diagnosis)	X	X
Assembly set M5 Housing GH1208	X	X
Antenna LTE GNSS DA 3M0 FAKRA-D FAKRA-C FAR	X	X
CANlink mobile 3000 Plug-Kit	X	X
Cable MTII 14pin code1 14open 2m	X	X

2.2.4. Software and Accessories

The software can be downloaded from our Document Library

Table 10. Software

Software	Part Number
Proemion Configurator	Download-Center
Proemion PDC Builder	Download-Center
CANlink mobile 3000 DeviceAnalyzer	Download-Center
Proemion Dashboard	Download-Center
Proemion Firmware Programmer	Download-Center
RM CAN-Device Monitor	Download-Center
Dashboard App	Google Play
Proemion Machine Companion App	Google Play
Proemion Web Portal Setup	259003021

Table 11. Accessories

Material	33xx, 34xx, 35xx
CANview USB CAN-PC communication gateway for configuration and test purpose	253001014
CANlink Connector Kit MT II 14-pin socket housing, 14x MT II contact type A*, 14x MT II gray single-wire sealing, 14x dummy plugs *only for machine processing, refer to Connector-Kit for further information	132600031
ERGOCRIMP HAND TOOL 539635-1 without die set Hand Tool	Direct order at supplier
ERGOCRIMP DIE SET for MICRO Timer and Micro Timer (SWS) 539663-2 Micro Timer	Direct order at supplier
MT2 A REC 1.6 Contact SWS Sn (LP) for crimping with hand tool Crimping Hand Tool	Direct order at supplier
CAN bus termination, D-Sub/D-Sub CAN 120 Ohm	157000033
USB connection cable, USB A - USB B, 2 m connection cable for CANview USB	136000119
USB cable, USB-A- Micro USB-A, 1.8 - 2 m USB cable for bootloader / firmware update	136000199
USB cable, USB-A to Micro-USB-B, 1.6 m USB cable for debugging / diagnosis	136000138
MT II socket, 14-pin, cod.1, open, 30 cm Connection cable for main plug connector, 14-pin with open cable, 0.3m	136000188
MT II socket, 14-pin, cod.1, open, 2 m Connection cable for main plug connector, 14-pin with open cable ends, 2 m	136000198
Adapter Cable CANlink 14p-M12 5p 0,3m Adapter cable MT II 14-Pin - M12, 5-Pin, 0.3 m long	136200001
Adapter Cable CANlink 14p-M12 12p 0,3m Adapter cable MT II 14-Pin - M12, 12-Pin, 0.3 m long	136200002
CLM3 start cable, 6open 2dsub 1pw 2m (start cable for main plug connector) Cable for initial startup with complete connector assignment for main plug connector, 14-pin, ready-to-use, 2 m long	136000197

Material	33xx, 34xx, 35xx
CLM3600 Starter Cable 6open 3dsub 1pw 2m (start cable for main plug connector) Cable for initial startup with complete connector assignment for main plug connector, 14-pin, ready-to-use, 2 m long	136000202
ANT LTE GNSS DA 3M0 FAKRA-D FAKRA-C FA (Shark fin) GNSS / mobile radio antenna	157000109
ANT LTE GNSS DA 3M0 FAKRA-D FAKRA-C FAR (Flat Rectangle) GNSS / mobile radio antenna	157000121
ASSEMBLY SET M5 HOUSING GH1208 fixing set	141000017
Power supply unit, US EU UK AU 24V/0.83A/20W Power supply unit without AC plug 24 V 0,83 A 20 W, plug adapter set (US, EU, UK, AU), adapter DC 5.5x2 mm BU / 3.5x1.35 mm ST	257004007

2.3. Service and Support

For more information visit our website: Proemion - or contact our support using our Support form.
The latest versions of the drivers, software, firmware, and documentation are available on our Document Library

3. Safety Information

This chapter contains important information on how to avoid life-threatening situations and injuries and how to prevent product damage.

3.1. Safety Instructions

DANGER

Failure of safety-related functions due to deficient data transmission.
Risk of severe or fatal injury.
The device operates using radio signals and is not authorized for use in safety-related applications. Insufficient mobile and WLAN network availability, interference or malfunctions of the device can cause faulty data transmission. Because of this, data transmission cannot be guaranteed at all times and under all conditions.

* Never operate this device in machines or applications where life depends on the fault-free operation of this device.
* Never rely solely on wireless devices for essential communications.
* The device is designed to be used in systems which must be checked for conformity with the respective valid legal requirements prior to putting into operation. The system integrator of the device is responsible for ensuring that all local regulations and provisions are observed.

DANGER

Failure of communications systems in aircraft due to radio-frequency energy.
Risk of severe or fatal injury.

* Disconnect the power supply to the device before entering the aircraft.
* Make sure the device cannot be switched on inside the aircraft.
* Note the information in Power management.

DANGER

Danger of explosion due to the operation of electrical equipment in potentially explosive atmospheres.
Risk of severe or fatal injury.

* Observe the applicable regulations and precautions for potentially explosive areas.
* Do not mount the antenna in the close proximity of easily ignited substances (e.g. fuel tanks) and insufficiently shielded electronic devices.

WARNING

Danger of interference with medical equipment caused by radio frequency (RF) energy.
Risk of severe or fatal injury. Medical equipment may be sensitive to RF energy. The functioning of cardiac pacemakers, other implanted medical devices and hearing aids can be affected if the CANlink mobile 3000 is located too close to the medical devices.

* Observe the local regulations for use of mobile radio devices in hospitals or other medical facilities. Disconnect the power supply to the device when local regulations in sensitive areas require that you do so.
* If you use a cardiac pacemaker or other medical device, do not come within the close vicinity of the switched-on CANlink mobile 3000 and its antenna.
* If in doubt about potential danger, contact a physician or the manufacturer of the medical equipment to verify that it is properly shielded.

WARNING

Danger to life due to electric shock!
Risk of severe or fatal injury.

* Never use the device if you suspect damage to the power supply unit or the device, or if there is visible damage to the power supply unit or the device.

WARNING

Danger to life due to electric shock!
Risk of severe or fatal injury.

* Never carry out repairs to the device yourself. Contact the Proemion support. The device does not contain any parts that can be repaired or maintained by the user.

WARNING

Overload damage due to malfunction.
Risk of severe or fatal injury.

* To limit power in the event of malfunction, secure the DC power supply circuit during installation with an external 2 A fuse.

CAUTION

Health hazards of radio-frequency energy.
Risk of minor injury.

* During operation, observe a distance of at least 20 cm between the antennas and personnel.

NOTICE

Interference with electronic equipment caused by radio-frequency energy.

* Do not use the device with damaged cables or plugs. Cables and plugs must always be shielded.
* Observe all special regulations and disconnect the power supply to the CANlink mobile 3000 if its use is prohibited or if you have doubts as to whether operation can cause interference or dangers.

NOTICE

Risk of property damage.

* The device must be installed, connected, and commissioned by a qualified technician.
* Disconnect all the connections to the device before starting to use it.
* Also disconnect any independently supplied output load circuits.
* Provide all the device connectors with plugs and any protection caps required to ensure protection class IP6K7.
* Only mount the device in the installation position shown in Mounting the Device.
* Never immerse the device in water or other liquids.
* The device must only be opened by the manufacturer.
* The device must only be repaired by the manufacturer.
* Keep substances that contain solvents away from the type label.
* Pay attention that all the plug and cable connections can be made according to the correct assignment and without the need for any excessive force.
* To switch the device off, observe the procedure described in Switching the Device On/Off.

NOTICE

Risk of property damage.
Damage to the device due to water penetration

* The device was tested against water jets according to IPxK5 of ISO 20653 standard. Different loads, e.g. with a pressure washer or a higher flow rate, do not correspond to the intended use.
* Never clean the CANlink mobile device with a pressure washer or similar.

INFORMATION

The horizontal distance between antennas can be calculated for every radio signal. The distance between two antennas should always be greater than 1/4 of the wavelength, but not a multiple of the wavelength. If you use several antennas with different radio signals from each other, the distance of the antenna with the lowest frequency range must be observed.

GNSS: Frequency range 1.559 GHz, wavelength 19.23 cm (1/4 = 4.8 cm)

Bluetooth: Frequency range 2.400 - 2.4835 GHz, wavelength 12.49 cm (1/4 = 3.12 cm)

WLAN:
* Frequency range 2.400 - 2.4835 GHz, wavelength 12.49 cm (1/4 = 3.12 cm)
* Frequency range 5.150 - 5.725 GHz, wavelength 5.17 cm (1/4 = 1.29 cm)

Example: If you use one GNSS and one WLAN antenna, the distance between the two antennas should be at least 4.8 cm. Avoid the distances 19.23 cm, 12.49 cm and multiples of these values.

3.2. CE Notes European Union

The devices described in this device manual may only be used in mobile or stationary systems in which the distance between antennas and persons is at least 20 cm. Furthermore, antennas may only be operated in conjunction with other antennas or transmitters when the correct horizontal distance between them is observed.

NOTICE

Loss of CE conformity is possible.
Only use antennas with a maximum antenna gain (incl. cable and connector loss) of:

CANlink mobile 3651, 3653, 3657, 3673, 3677:
2.98dBi (GSM)
2dBi (DCS)
1.53dBi (WCDMA B1)
2.98dBi (WCDMA B8)
2.29dBi (WCDMA B5)
1.53dBi (LTE B1)
2dBi (LTE B3)
2.29dBi (LTE B5)
3dBi (LTE B7)
2.98dBi (LTE B8)
2.64dBi (LTE B20)
3.95dBi (LTE B28)
2.06dBi (LTE B38)
1.88dBi (LTE B40)

CANlink mobile 3351, 3373, 3377:
2.9 dBi (900 MHz, GSM 900 band / UMTS FDD-8 band)
7.8 dBi (1800 MHz, GSM 1800 band)
11.8 dBi (2100 MHz, UMTS FDD-1 band)

CANlink mobile 3477:
9.3 dBi (800 MHz, LTE FDD-20 band)
2.9 dBi (900 MHz, GSM 900 band)
8.8 dBi (1800 MHz, GSM 1800 band / LTE FDD-3 band)
13.0 dBi (2600 MHz, LTE FDD-7 band)

NOTICE

Loss of CE conformity is possible.
The allowed maximum equivalent isotropically radiated power (EIRP) according to ETSI for Bluetooth is:

Types 3333, 3337, 3373, 3377, 3477, 3577
- Bluetooth Classic: max.11.4 dBm at 2.402 - 2.480 GHz
- Bluetooth LE: max. 7 dBm at 2.402 - 2.480 GHz

Types 3630, 3633, 3673, 3637, 3677
- Bluetooth Classic: max. 9.76dBm at 2.402 - 2.480 GHz
- Bluetooth LE: max. 9.98dBm at 2.402 - 2.480 GHz

NOTICE

Loss of CE conformity is possible.
The allowed maximum equivalent isotropically radiated power (EIRP) according to ETSI for WLAN is:

Types 3333, 3337, 3373, 3377, 3477, 3577
- max. 13 dBm at 2.400 - 2.4835 GHz
- max. 13 dBm at 5.150 - 5.350 GHz
- max. 13 dBm at 5.470 - 5.725 GHz

Types 3630, 3633, 3673, 3637, 3677
- max. 18.58dBm at 2.412 - 2.472 GHz
- max. 19.62dBm at 5.150 - 5.350 GHz
- max. 17.64dBm at 5.470 - 5.725 GHz
- max. 13.88dBm at 5.725 - 5.785 GHz

Changes or modifications to this device not expressly approved by the manufacturer can void the user's authority to operate the device under CE rules.

NOTICE

Loss of CE conformity is possible.

Applicable for CANlink mobile variants with WLAN interface (3333, 3337, 3373, 3377, 3473, 3477, 3630, 3633, 3637, 3673, 3677)

This device is restricted to indoor use only when operating WLAN channels in the frequency range 5150 to 5350 MHz for the following countries:

	AT	BE	BG	CH	CZ	DK	EE	FI	FR	DE	HR
	IS	IE	IT	EL	ES	CY	LV	LI	LT	LU	HU
	MT	NL	NO	PL	PT	RO	SI	SE	SK	TR	UK (NI)

3.3. UKCA Notes United Kingdom

The devices described in this device manual may only be used in mobile or stationary systems in which the distance between antennas and persons is at least 20 cm. Furthermore, antennas may only be operated in conjunction with other antennas or transmitters when the correct horizontal distance between them is observed.

NOTICE

Loss of UKCA conformity is possible.
Only use antennas with a maximum antenna gain (incl. cable and connector loss) of:

CANlink mobile 3651, 3653, 3657, 3673, 3677:
2.98dBi (GSM)
2dBi (DCS)
1.53dBi (WCDMA B1)
2.98dBi (WCDMA B8)
2.29dBi (WCDMA B5)
1.53dBi (LTE B1)
2dBi (LTE B3)
2.29dBi (LTE B5)
3dBi (LTE B7)
2.98dBi (LTE B8)
2.64dBi (LTE B20)
3.95dBi (LTE B28)
2.06dBi (LTE B38)
1.88dBi (LTE B40)

CANlink mobile 3351, 3373, 3377:
2.9 dBi (900 MHz, GSM 900 band / UMTS FDD-8 band)
7.8 dBi (1800 MHz, GSM 1800 band)
11.8 dBi (2100 MHz, UMTS FDD-1 band)

CANlink mobile 3477:
9.3 dBi (800 MHz, LTE FDD-20 band)
2.9 dBi (900 MHz, GSM 900 band)
8.8 dBi (1800 MHz, GSM 1800 band / LTE FDD-3 band)
13.0 dBi (2600 MHz, LTE FDD-7 band)

NOTICE

Loss of UKCA conformity is possible.
The allowed maximum equivalent isotropically radiated power (EIRP) according to ETSI for Bluetooth is:

Types 3333, 3337, 3373, 3377, 3477, 3577
- Bluetooth Classic: max.11.4 dBm at 2.402 - 2.480 GHz
- Bluetooth LE: max. 7 dBm at 2.402 - 2.480 GHz

Types 3630, 3633, 3673, 3637, 3677
- Bluetooth Classic: max. 9.76dBm at 2.402 - 2.480 GHz
- Bluetooth LE: max. 9.98dBm at 2.402 - 2.480 GHz

NOTICE

Loss of UKCA conformity is possible.
The allowed maximum equivalent isotropically radiated power (EIRP) according to ETSI for WLAN is:

Types 3333, 3337, 3373, 3377, 3477, 3577
- max. 13 dBm at 2.400 - 2.4835 GHz
- max. 13 dBm at 5.150 - 5.350 GHz
- max. 13 dBm at 5.470 - 5.725 GHz

Types 3630, 3633, 3673, 3637, 3677
- max. 18.58dBm at 2.412 - 2.472 GHz
- max. 19.62dBm at 5.150 - 5.350 GHz
- max. 17.64dBm at 5.470 - 5.725 GHz
- max. 13.88dBm at 5.725 - 5.785 GHz

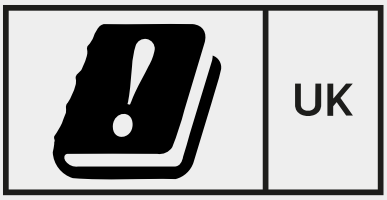
Changes or modifications to this device not expressly approved by the manufacturer can void the user's authority to operate the device under UKCA rules.

NOTICE

Loss of UKCA conformity is possible.

Applicable for CANlink mobile variants with WLAN interface (3333, 3337, 3373, 3377, 3473, 3477, 3630, 3633, 3637, 3673, 3677)

This device is restricted to indoor use only when operating WLAN channels in the frequency range 5150 to 5350 MHz for the following countries:



3.4. FCC Notes USA

The devices described in this device manual may only be used in mobile or stationary systems in which the distance between antennas and persons is at least 20 cm. The antennas must further not be co-located or operated in conjunction with any other antennas or transmitters.

NOTICE

This device has been tested and found to comply with the limits for a Class B digital device pursuant to part 15 of the FCC rules. These limits are designed to provide adequate protection against harmful interference in a residential installation. This device generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause interference to radio communications. There is no guarantee that interference will not occur in a particular installation. If this device does cause interference to radio or television reception, which can be determined by switching the device on and off, the user is advised to try to correct the interference by one or more of the following measures:

* Realign the receiving antenna or put it in a different place.
* Increase the distance between the device and the receiver.
* Connect the device and the receiver to different supply circuits.
* Consult the dealer or an experienced radio/TV technician for help.

NOTICE

Loss of FCC certification possible.
Only use antennas with a maximum antenna gain of:

CANlink mobile 3651, 3653, 3657, 3673, 3677, 3677:
* 8dBi in WCDMA Band 2/LTE Band 2/7/25/38/41
* 5dBi in WCDMA /LTE Band 4
* 8.6dBi in GSM850
* 10.19dBi in PCS1900
* 9.42dBi in WCDMA Band 5
* 9.41dBi in LTE Band 5
* 8.7dBi in LTE Band 12
* 9.16dBi in LTE Band 13
* 9.36dBi in LTE Band 26(814-824)
* 9.41dBi in LTE Band 26(824-849)

CANlink mobile 3351, 3377:
* 3.4 dBi (850 MHz)
* 1.5 dBi (1900 MHz).

CANlink mobile 3577:
* 9.8 dBi (700 MHz, LTE FDD-12 band)
* 10.0 dBi (850 MHz, LTE FDD-5 band / UMTS FDD-5 band)
* 6.5 dBi (1700 MHz, LTE FDD-4 band)
* 8.7 dBi (1900 MHz, LTE FDD-2 band / UMTS FDD-2 band)

Changes or modifications to the device not expressly approved by the manufacturer can void the user’s authority to operate the device under FCC rules.

3.5. ISED Notes Canada

English

This product meets the applicable Innovation, Science and Economic Development Canada technical specifications.

This Class B equipment complies with the applicable ISED RSSs Standards and CAN ICES-003 Issue 6. Operation is subject to the following two conditions:
(1) This device may not cause interference, and
(2) This device must accept any interference, including interference that may cause undesired operation of the device.

Radiation Exposure Statement

This device complies with radiation exposure limits prescribed for an uncontrolled environment for fixed and mobile use condition. This equipment should be installed and operated with minimum distance of 20cm between the radiator and the body of the user or nearby persons.

Maximum Cellular Antenna Gain

CANlink mobile 3651, 3653, 3657, 3673, 3677:
The maximum antenna gain including cable and connector loss in a fixed or mobile exposure condition must not exceed +5dBi for all applicable GSM (850, 1900), WCDMA (2, 4, 5) and LTE (2, 4, 5, 7, 12, 13, 25, 26, 38, 41) Bands.

CANlink mobile 3573, 3577:
The maximum antenna gain including cable and connector loss in a fixed or mobile exposure condition must not exceed +6,5dBi for all applicable WCDMA (2, 5) and LTE (2, 4, 5, 12) Bands.

CANlink mobile 3351, 3353, 3357, 3373, 3377:
The maximum antenna gain including cable and connector loss in a fixed or mobile exposure condition must not exceed +0,6dBi for GSM850/WCDMA2 Bands and +1,5dBi for GSM1900/WCDMA5 Bands.

Changes or modifications to this device not expressly approved by the manufacturer can void the user's authority to operate the device under ISED rules.

WARNING

Harmful interference.
Applies to **CANlink mobile 3333, 3337, 3373, 3377, 3573, 3577, 3630, 3633, 3637, 3673, 3677**

This device is restricted to indoor operation only in the band 5150-5250 MHz. to reduce the potential for harmful interference to co-channel mobile satellite systems. However, original equipment manufacturer (OEM) devices, which are installed in vehicles by vehicles manufacturers, are permitted.

The high-power radars are allocated as primary users (i.e., priority users) of the bands 5250-5350 MHz and 5650-5850 MHz and that these radars could cause interference and/or damage to this device.

This device is not capable of transmitting in the band 5600-5650 MHz in Canada.

Français

Ce produit est conforme aux spécifications techniques applicables d'Innovation, Sciences et Développement Économique Canada.

Cet équipement de classe B est conforme aux normes ISDE RSS applicables et à la norme CAN ICES-003, Numéro 6. Son fonctionnement est soumis aux deux conditions suivantes:
(1) Cet appareil ne doit pas provoquer d'interférences et
(2) Cet appareil doit accepter toute interférence, y compris les interférences qui peuvent provoquer un fonctionnement indésirable de l'appareil.

Déclaration d’exposition aux rayonnements

Cet appareil est conforme aux limites d’exposition aux rayonnements prescrites pour un environnement non contrôlé dans des conditions d’utilisation fixe et mobile. Cet équipement doit être installé et utilisé à une distance minimale de 20 cm entre le radiateur et le corps de l’utilisateur ou des personnes à proximité.

Gain d’antenne cellulaire maximal

CANlink mobile 3651, 3653, 3657, 3673, 3677:
Le gain d’antenne maximal, y compris les pertes du câble et du connecteur dans des conditions d’exposition fixe ou mobile, ne doit pas dépasser +5 dBi pour toutes les bandes GSM (850, 1900), WCDMA (2, 4, 5) et LTE (2, 4, 5, 7, 12, 13, 25, 26, 38, 41).

CANlink mobile 3573, 3577:
Le gain d’antenne maximal, y compris les pertes du câble et du connecteur dans des conditions d’exposition fixe ou mobile, ne doit pas dépasser +6,5 dBi pour toutes les bandes WCDMA (2, 5) et LTE (2, 4, 5, 12).

CANlink mobile 3351, 3353, 3357, 3373, 3377:
Le gain d’antenne maximal, y compris les pertes du câble et du connecteur dans des conditions d’exposition fixe ou mobile, ne doit pas dépasser +0,6 dBi pour les bandes GSM850/WCDMA2 and +1,5 dBi pour les bandes GSM1900/WCDMA5.

Les changements ou modifications de cet appareil non expressément approuvés par le fabricant peuvent annuler le droit de l’utilisateur à utiliser l’appareil selon la réglementation ISDE.

AVERTISSEMENT

Interférences nuisibles

S’applique au **CANlink mobile 3333, 3337, 3373, 3377, 3573, 3577, 3630, 3633, 3637, 3673, 3677**

Cet appareil est limité à un fonctionnement en intérieur uniquement dans la bande 5150-5250 MHz pour réduire le potentiel d’interférences nuisibles aux systèmes mobiles par satellite sur le même canal. Toutefois, les dispositifs de fabricant d’équipement d’origine (OEM), qui sont installés dans les véhicules par leurs constructeurs, sont autorisés.

Les radars haute puissance sont considérés comme utilisateurs principaux (c’est-à-dire utilisateurs prioritaires) des bandes 5250-5350 MHz et 5650-5850 MHz et ces radars pourraient causer des interférences et/ou endommager cet appareil.

Cet appareil n’est pas capable d’émettre dans la bande 5600-5650 MHz au Canada.

3.6. Warranty and Liability

Proemion assumes no liability for defects caused by normal wear, external influences and incorrect installation, operation or maintenance. This also applies if the customer or a third party modifies the devices, any accessories, or the software without permission from Proemion.

4. Functionality and Features

This chapter contains information on device functionality and features. It provides details of the operating modes, connectors, cables, pin assignments, interfaces and indicator elements.

4.1. Functions

Table 12. Functions 36xx

Function	*3610	3611	3613	3617	*3630	3633	3637	3651	3653	3657	3673	**3677
CAN-CAN Bluetooth/WLAN bridge	No	No	No	No	Yes	Yes	Yes	No	No	No	Yes	Yes
CAN-Bluetooth/WLAN interface	No	No	No	No	Yes	Yes	Yes	No	No	No	Yes	Yes
Battery	No	No	No	Yes	No	No	Yes	No	No	Yes	No	Yes
Antenna (internal/external)	int.	int.	int.	int.	int.	int.	int.	ext.	ext.	ext.	ext.	ext.
Mobile radio (3G/4G)	4G	4G	4G	4G	4G	4G	4G	4G	4G	4G	4G	4G
RealTime mode	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Logging mode	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Input/output functions	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Acceleration sensor	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Gyro sensor	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
CAN interfaces	2	1	3	3	2	3	3	1	3	3	3	3
GNSS	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
eSIM card	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

*The device types 3610 and 3630 are customized types for certain OEMs only.

**The CANlink mobile 3677 is optionally available as a customer-specific type with a push-pull Nano SIM card slot instead of an integrated eSIM card.

Table 13. Functions 33xx, 34xx, 35xx

Function	3311	3317	3333	3337	3351	3355	3357	3373	3377	3477	3577
CAN-CAN Bluetooth / WLAN bridge	No	No	Yes	Yes	No	No	No	Yes	Yes	Yes	Yes
CAN-Bluetooth/WLAN interface	No	No	Yes	Yes	No	No	No	Yes	Yes	Yes	Yes
Battery	No	Yes	No	Yes	No	Yes	Yes	No	Yes	Yes	Yes

Function	3311	3317	3333	3337	3351	3355	3357	3373	3377	3477	3577
Antenna (internal / external)	int.	int.	int.	int.	ext.	ext.	ext.	ext.	ext.	ext.	ext.
Mobile radio (3G/4G)	3G	3G	3G	3G	3G	3G	3G	3G	3G	4G EU	4G US
RealTime mode	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Logging mode	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Input/output functions	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Acceleration sensor	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Gyro sensor	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
CAN interfaces	1	2	2	2	1	1	2	2	2	2	2
GNSS	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
eSIM card	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

4.1.1. CAN-CAN Bluetooth/WLAN Bridge

In operation as a CAN-CAN Bluetooth/WLAN bridge (types 3333, 3337, 3373, 3377, 3477, 3577,3630 3633, 3673, 3637, 3677), CAN data is transmitted wirelessly between two CANlink mobile or CANlink wireless devices via a Bluetooth or WLAN connection. The CAN-CAN Bluetooth/WLAN bridge acts as a substitute for CAN cables, e.g. in cable carriers or with remote-control units.

4.1.2. CAN-Bluetooth/WLAN Interface

The device is designed for wireless operation via Bluetooth or WLAN interface.

CAN-Bluetooth interface

In operation as a CAN Bluetooth interface (types 3333, 3337, 3373, 3377, 3477, 3577, 3630, 3633, 3673, 3637, 3677), CAN data is transmitted wirelessly and bidirectionally to other Bluetooth-capable devices supported by the Proemion byte command protocol, e.g. CANlink wireless, CANlink Bluetooth, PCs, smartphones or tablet PCs.

The device supports Bluetooth Classic and Bluetooth Low Energy (BLE).

CAN-WLAN interface

In operation via the CAN-WLAN interface (types 3333, 3337, 3373, 3377, 3477, 3577, 3630, 3633, 3673, 3637, 3677), CAN data is transmitted wirelessly and bidirectionally to other WLAN-capable devices supported by the Proemion byte command protocol, e.g. CANlink wireless, PCs, smartphones or tablet PCs.

The CAN-WLAN interface features two operating modes: infrastructure mode and mini access point mode. In infrastructure mode, data transmission takes place via one or more access points. In mini access point mode, the CANlink mobile 3000 additionally provides a WLAN access point function.

WLAN Encryption

Table 14. WLAN encryption

Name	Authentication	Data Protection
None	No	No
WEP64	Yes	according to WEP64
WEP128	Yes	according to WEP128
WPA/WPA2 Mixed Mode	Yes	according to WPA or WPA2
PEAP	Yes	via RADIUS server

WLAN Frequencies and Channels

The device's WLAN interface features automatic domain recognition and supports the following regulatory domains: WORLD, ETSI, FCC. If neither ETSI nor FCC are recognized, the radio module uses WORLD as a standard.

Table 15. Regulatory domains

Name	Band	TX Channel
World	2.4 Ghz	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11
	U-NII-1	36, 40, 44, 48
	U-NII-2	52, 56, 60, 64
	U-NII-2e	100, 104, 108, 112, 116, 132, 136, 140
	U-NII-3	-
ETSI	2.4 GHz	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13
	U-NII-1	36, 40, 44, 48
	U-NII-2	52, 56, 60, 64
	U-NII-2e	100, 104, 108, 112, 116, 120, 124, 128, 132, 136, 140
	U-NII-3	149, 153, 157, 161, 165
FCC	2.4 GHz	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11
	U-NII-1	36, 40, 44, 48
	U-NII-2	52, 56, 60, 64
	U-NII-2e	100, 104, 108, 112, 116, 132, 136, 140
	U-NII-3	149, 153, 157, 161, 165

INFORMATION

When the WLAN is using a channel that is not available in the recognized domain, it is possible that the communication may not work.

4.1.3. Battery

Some device types feature an integrated battery (lithium-polymer).

The integrated battery allows it to send logged CAN and position data via the cellular radio interface even if the power supply from the main plug connector is interrupted. The device is not designed for permanent battery operation.

On delivery, the integrated battery is charged by approx. 30%. Before you use the device, charge the battery fully. See Charging the battery.

A fully charged battery can back up a power failure of approx. 1.5 hours (@ 20°C battery temperature), ensuring active operation of the device.

The following examples provide an overview of the battery runtimes in various application cases.

Example 1:

The rechargeable battery integrated is charged to 100% and the device is permanently switched on and online. The device transmits one file per minute. The battery runtime is approx. 2 hours.

Example 2:

The integrated battery is charged by 100% and the device is permanently in Sleep mode. The device switches on cyclically every 24 hours and is online for 5 minutes to transmit the current position and certain internal device parameters. Then the device automatically switches back to sleep mode. The battery runtime is approx. 14 days.

Example 3:

The integrated battery is charged by 100% and the device is permanently in Sleep mode. The device goes online only once, triggered by the acceleration sensor, and transmits the current position (theft monitoring without external power supply). The battery runtime (operational readiness) is 70 days.

The values stated in the examples can deviate depending on the use purpose and setup conditions (@ 20°C battery temperature).

INFORMATION

Note on the integrated battery:

* The integrated battery is charged using the power supply via terminal 30 and charging is only possible in a limited temperature range of:
0 °C … +45 °C / +32 °F … +113 °F.

* Battery operation of the device is only possible in a limited temperature range of:
-20 °C … +60 °C / -4 °F … +140 °F.

INFORMATION

Note the following information about use of the integrated battery:

* The integrated battery has a limited service life. After 500 charging cycles. Contact the Proemion service to replace the integrated battery. See Chapter Service and support. The number of charging cycles can be read out via the BATTERY - CYCLE COUNT device variable. See Battery.
* Perform three complete charging and discharging cycles to achieve the full performance capability of the integrated battery.
* During battery operation, it is not possible to use the digital output.

4.1.4. Mobile Radio Interface

The device is equipped with a mobile radio interface for mobile data transmission.

Depending on the type, the device supports the 3G or 4G mobile network. To achieve greater network coverage, all types feature a fallback function to a different mobile network. Types 3333, 3337, 3351, 3373 and 3477 switch to the 2G mobile network, and type 3577 switches to the 3G mobile network.
The types 3610, 3611, 3613, 3617, 3651, 3653, 3657, 3630, 3633, 3673, 3637, and 3677 support 2G, 3G and 4G. The device detects the mobile network with the best transmission speed and automatically changes to the corresponding mobile network.

You can use the mobile interface to transmit data bidirectionally via the mobile network.

INFORMATION

Note on the integrated antenna for types 3610, 3611, 3613, 3630, 3633 and 3637:

* Due to the physical limited size of the enclosure, the integrated main and diversity antennas will have limited efficiency in the LTE-Low-Bands below 800MHz. For applications mainly operating in these LTE-Low-Bands, it is recommended to use a CANlink mobile 3600 type with an external antenna, such as type 3651, 3653, 3657, 3673 or 3677.

4.1.5. RealTime Mode

In RealTime mode, CAN messages are transmitted bidirectionally.

You can use the CAN interfaces on the device to transmit process data, such as machine parameters, during ongoing operations via Bluetooth/WLAN, the mobile network and DataPlatform. Depending on the device features, you can transmit data from the GNSS receiver and the input/output functions and pass them on via the CAN bus.

Alternatively, the device can use a WLAN or Bluetooth connection to receive data from an external receiver, e.g., the CANlink wireless, and transmit it to the local CAN interfaces.

Data is transmitted constantly and can be evaluated in close to RealTime. This function requires a permanent link between the device and the user software or DataPlatform.

4.1.6. Logging Mode

When Logging mode is activated, the device records CAN messages, GNSS data and internal variables, such as the values of the acceleration or gyro sensors. All the recorded data is saved in an internal, nonvolatile memory and sent to the DataPlatform.

The device can be used to record process data, such as machine parameters, during ongoing operation via CAN interfaces. Depending on the device features, you can process data from the GNSS receiver and the input/output functions, send and log them via the CAN bus.

4.1.7. Input/Output Functions

The device is equipped with an additional input/output functions (3 analog inputs, 1 digital output). You can use the input function for instance to log status information from devices or machines as well as to directly determine and monitor switch and key states. The data determined from the input/output functions can be visualized or forwarded via the CAN bus.

4.1.8. Acceleration Sensor

The acceleration sensor registers and evaluates accelerations in the directions of the X, Y, and Z axes, and sends them via the CAN bus.

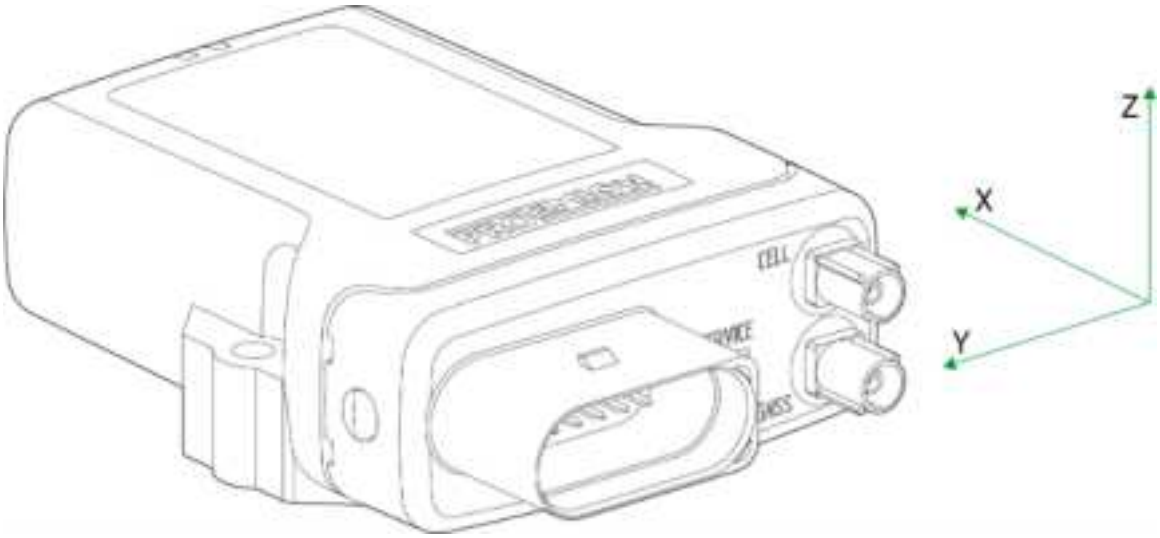


Figure 3. Accelerator Sensor CANlink mobile 3000/3600

Sensor is not calibrated.

4.1.9. Gyro Sensor

The 3-axis gyro sensor registers and evaluates the angle speeds in the X, Y, and Z axes and sends them to the CAN bus.

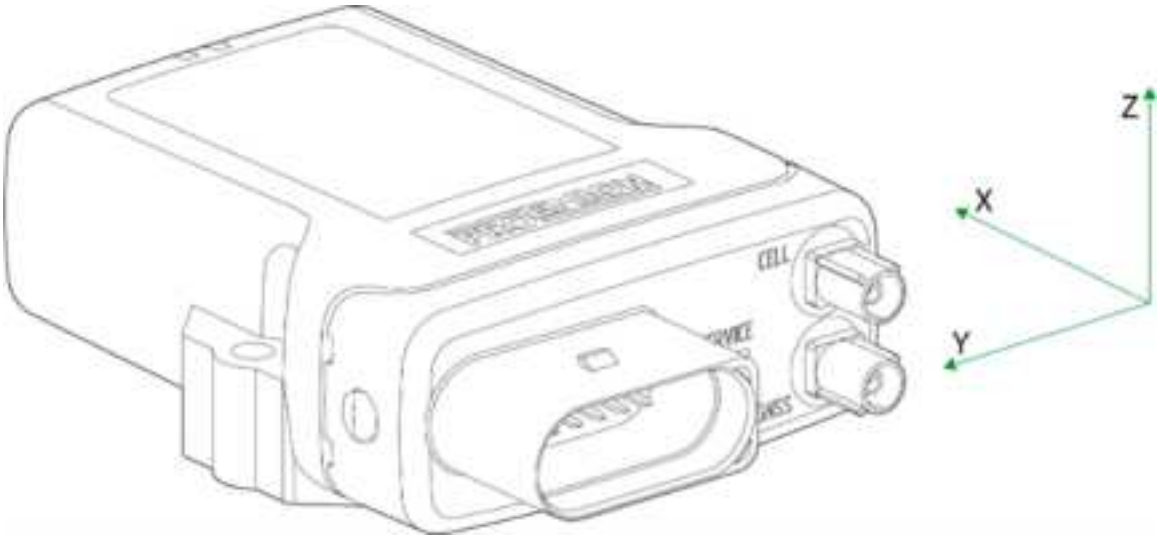


Figure 4. Gyro Sensor CANlink mobile 3000/3600

Sensor is not calibrated.

4.1.10. GNSS-Global Navigation Satellite System

The device is equipped with a GNSS receiver. You can send the position data determined by the GNSS receiver via the CAN bus or the mobile radio network. The receiver can process signals from GPS, GLONASS and BeiDou satellites. It can process data from two navigation systems simultaneously. This increases the accuracy.

4.1.11. eSIM card

All device variants, except a customizable version of the type 3677 are equipped with an integrated eSIM card. On delivery, the eSIM card already has an eSIM profile with all the necessary communication settings.

NOTICE

Potential connectivity loss with custom SIM card

The device cannot establish an online connection to the Proemion DataPlatform when using a customer specific eSIM card and wrong firewall settings at the SIM provider. IP addresses of the DataPlatform may change without prior notice.

* Make sure that the SIM card provider is not using IP address based white-listing for any DataPlatform communication.
* Make sure that - if white-listing is required - the corresponding DNS names are white-listed at the SIM provider's firewall.

INFORMATION

On delivery, the device's eSIM card is not yet activated. After registration of the CANlink mobile 3000, activation of the eSIM card is triggered automatically. Usually this process takes about 15 minutes. In exceptional cases it can take up to 1 working day.

4.1.12. Nano SIM card

The customizable version of the 3677 is equipped with a push-pull nano SIM card slot instead of an integrated eSIM card. This type is only available as a customer-specific variant, in which the nano SIM card provided by the customer is already installed and tested at the Proemion factory. Replacing the nano SIM card in the field will void the warranty and is not recommended.

NOTICE

Potential connectivity loss with custom SIM card

The device cannot establish an online connection to the Proemion DataPlatform when using a customer specific Nano SIM card and wrong firewall settings at the SIM provider. IP addresses of the DataPlatform may change without prior notice.

* Make sure that the SIM card provider is not using IP address based white-listing for any DataPlatform communication.
* Make sure that - if white-listing is required - the corresponding DNS names are white-listed at the SIM provider's firewall.

NOTICE

Potential connectivity loss with custom SIM card

Malfunction due to defective nano SIM may occur.

* Make sure that the specification of the selected nano SIM card meets the environmental requirements of the CANlink mobile. Refer to Mechanical.
* Ensure that the dimension of the selected nano SIM is according to form factor 4FF.

INFORMATION

If a larger quantity of the device type 3677 with a specific nano SIM card is required, please get in touch with your responsible sales contact person. A separate order number will then be created.

4.2. Connectors

The device is equipped with the following connectors:

- 1 main plug connector (14-pin): CAN1 / CAN2 / VCC / GND / AIN1-3 / DOUT / CAN3
- 1 GNSS antenna port, FAKRA, C-coded in blue (types 3351, 3373, 3377, 3477, 3577, 3651, 3673, 3677)
- 1 mobile radio antenna port, FAKRA, D-coded violet (types 3351, 3373, 3377, 3477, 3577, 3651, 3673, 3677)
- 1 micro-USB port, type AB

NOTICE

According to the manufacturer's information, the connectors are equipped for the following minimum number of mating cycles:

Main plug connector: 10 cycles
Fakra plug: 100 cycles
Micro USB: 1000 cycles

If the minimum number of mating cycles is exceeded, individual parameters could lie outside those in the specification.

4.2.1. Main Plug Connector

Use the main plug connector to connect the device to the CAN bus and supply it with power. The I/O signals are integrated in the plug connector.

NOTICE

The main plug connector contains a reset button. The Reset button is required to complete local firmware updates or to switch the device off in the case of types with an integrated, rechargeable battery.

NOTICE

The main plug connector is designed for a minimum number of 10 mating cycles.
If the minimum number of mating cycles is exceeded, individual parameters could be out of the specification. The basic function of the main plug connector remains intact. Please be aware that the process of the CANlink mobile system integration is not designed for a high number of mating cycles. Ideally the device is configured with an adapter cable from the Launch Kit in the first instance and in the second step installed and cabled within the machine.

INFORMATION

The pin assignment shown here can vary depending on the type. The types 3311, 3351 and 3355 do not have a CAN2 interface. The types 3611 and 3651 have no CAN2 and CAN3 interface.

INFORMATION

The analog inputs operate in a range of 0 VDC to 15 VDC. Optionally, you can use the input as a digital input with a maximum voltage of 36 VDC. The digital output switches to supply voltage on terminal 30 and can only take a maximum load of 500 mA. Provide an external safeguard if this limit is not ensured by the external terminal 30 power supply. Input terminal 15 detects "high" from a voltage of 5.5 V and "low" below a voltage of 2.3 V.

Pin layout of CANlink mobile 36xx types

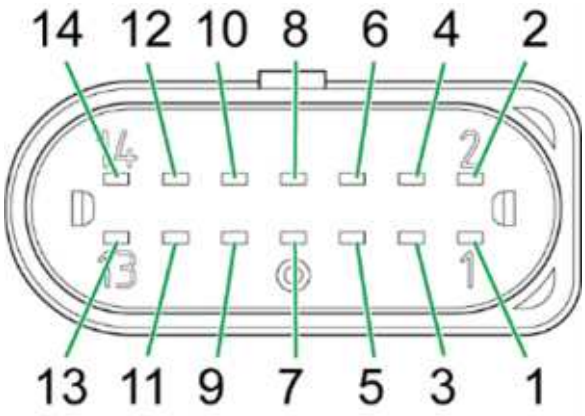


Figure 5. Micro timer II series, plug connector (14-pin, male), A-coded

Table 16. Pin layout of CANlink mobile 36xx types

Pin	Designation	Description
1	Terminal 30 / VCC	Power supply
2	CAN3-Low	CAN, bidirectional
3	Terminal 31 / ground	Power supply
4	Analog input 1	I/O input
5	Analog input 2	I/O input
6	Analog input 3	I/O input
7	Digital output	I/O output
8	Terminal 15	Input (ignition signal)
9	CAN3-High	CAN, bidirectional
10	CAN2-GND	-
11	CAN2-High	CAN, bidirectional
12	CAN2-Low	CAN, bidirectional
13	CAN1-High	CAN, bidirectional
14	CAN1-Low	CAN, bidirectional

Pin layout of all CANlink mobile 3000 types except 36xx types

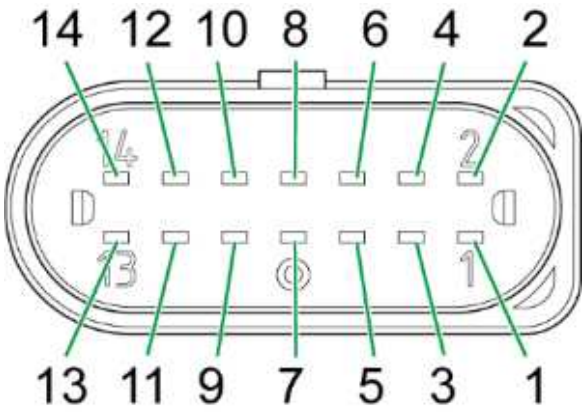


Figure 6. Micro timer II series, plug connector (14-pin, male), A-coded

Table 17. Pin layout of all CANlink mobile 3000 types except 36xx types

Pin	Designation	Description
1	Terminal 30 / VCC	Power supply
2	Factory setting 1	Input
3	Terminal 31 / ground	Power supply
4	Analog input 1	I/O input
5	Analog input 2	I/O input
6	Analog input 3	I/O input
7	Digital output	I/O output
8	Terminal 15	Input (ignition signal)
9	Factory setting 2	Input
10	CAN2-GND	-
11	CAN2-High	CAN, bidirectional
12	CAN2-Low	CAN, bidirectional
13	CAN1-High	CAN, bidirectional
14	CAN1-Low	CAN, bidirectional

Connect main plug connector

Carefully connect the cable with the main plug connector. When connecting the plug, there must be a clear audible click. Then the lock is correctly engaged.

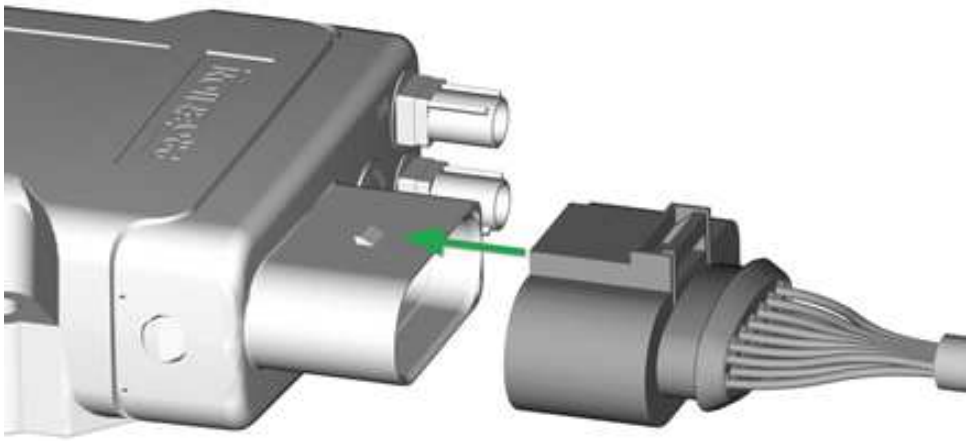


Figure 7. Main Plug Connector

Disconnect main plug connector

Use an appropriate flat-blade screwdriver to release the lock. To do this, insert the screwdriver into the tab from above, then gently lever it down and back. At the same time, pull the plug slightly backwards by hand. If you can hear a click, the lock has been released and the connector can be removed.

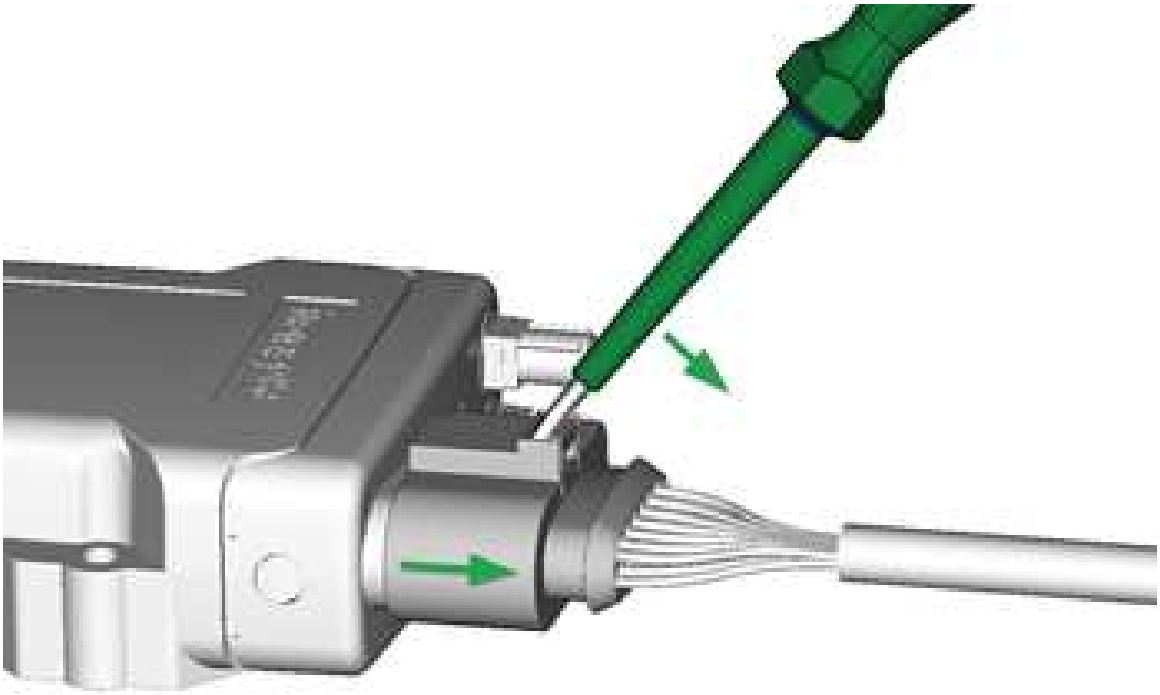


Figure 8. Main Plug Connector

NOTICE

Risk of property damage
Leakage and contamination due to an increased number of mating cycles and improper disconnecting of the main plug connector.

* Make sure the device is switched off during installation.
* Do not forcibly lever the main plug connector off the device connector.
* Refer to the handling manual from the manufacturer at Automotive Connector Manufacturer

4.2.2. GNSS Antenna Connector

The GNSS antenna connector is used to connect the device with an active antenna to receive signals from GNSS satellites. Refer to the following overview for the pin assignment:

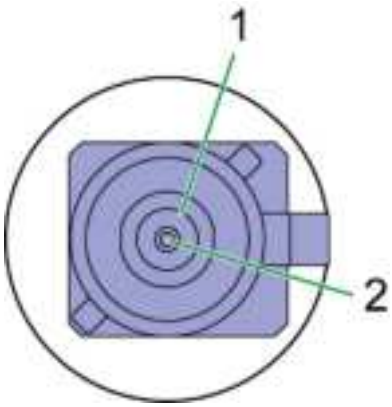


Figure 9. GNSS antenna connector (FAKRA, C-coded, blue, male)

Table 18. Connector assignment of GNSS antenna port

Pin	Designation	Description
1	Ground	Signal ground /shielding
2	Signal	GNSS signal / supply voltage 3.3 V

The GNSS antenna port is supplied with a voltage of approx. 3.3 V and can supply active antennas with a maximum of 40 mA of power. The port is short-circuit-proof against Ground and detects an antenna is present from a current drawn greater than approx. 2 mA.

CAUTION

Health hazards of radio-frequency energy
Risk of minor injury.

* Make sure the device is switched off during installation.

NOTICE

The GNSS antenna port is designed for a minimum number of 100 mating cycles.
If the minimum number of mating cycles is exceeded, individual parameters could be out of the specification. The basic function of the GNSS antenna port remains intact.

INFORMATION

The correct description for the corresponding mating connector is:

FAKRA, C-coded, Signal Blue, Jack (Female)
Manufacturer: Amphenol
Part number: 3FA1-NCSJ-C01E0

For connecting and disconnecting the antenna, please refer to Connect antenna cable and Disconnect antenna cable.

4.2.3. Mobile radio antenna connector

Use the mobile radio antenna connector to connect the device with an antenna to receive mobile radio signals. See the following overview for the pin assignment:

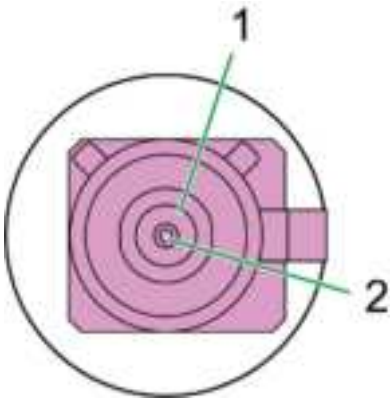


Figure 10. Mobile radio antenna port (FAKRA, D-coded, violet, male)

Table 19. Connector assignment of mobile radio antenna port

Pin	Designation	Description
1	Ground	Signal ground /shielding
2	Signal	Mobile Radio

The port is short-circuit-proof against Ground and detects the connection of an antenna in case that it has an integrated diagnosis resistance (10 kOhm).

CAUTION

Health hazards of radio-frequency energy
Risk of minor injury.

* Make sure the device is switched off during installation.

NOTICE

The mobile radio antenna port designed for a minimum number of 100 mating cycles.
If the minimum number of mating cycles is exceeded, individual parameters could be out of the specification. The basic function of the mobile radio antenna port remains intact.

INFORMATION

The correct description for the corresponding mating connector is:

FAKRA, D-coded, Claret Violet, Jack (Female)
Manufacturer: Amphenol
Part number: 3FA1-NDSJ-C01E0

Connect antenna cable

Carefully connect the antenna cable with the coded antenna connector. Make sure that the coding within the socket is matching the coding of the connector. When connecting the plug, there must be a clear audible click. Then the lock is correctly engaged.

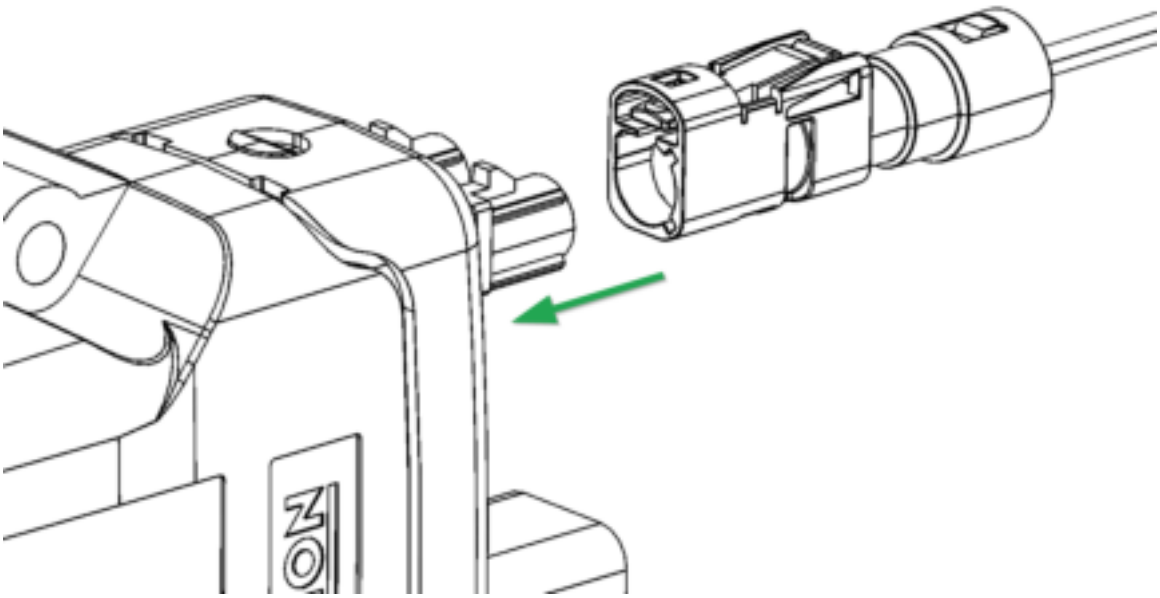


Figure 11. Connect Antenna Cable

Disconnect antenna cable

Use your finger to release the lock by gently levering it down. At the same time, pull the plug slightly backwards by hand.

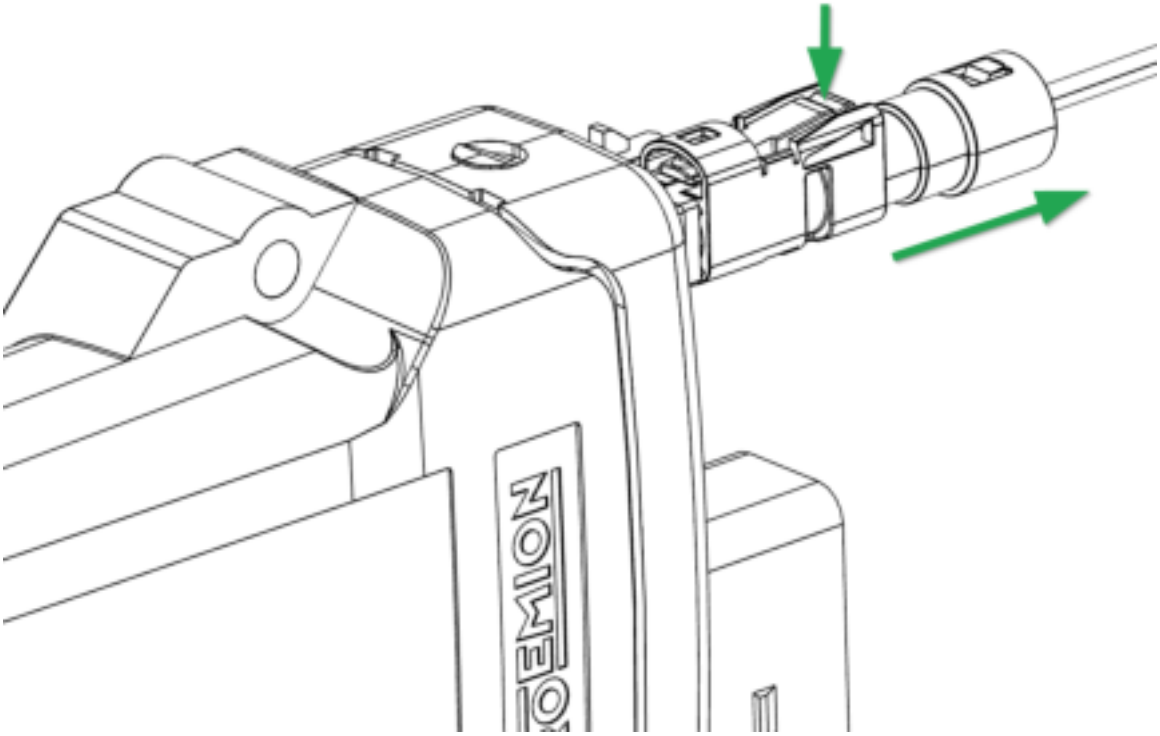


Figure 12. Disconnect Antenna Cable

4.2.4. Micro-USB Port

Use the micro-USB port to connect the device to a PC. The micro-USB port is used for diagnoses as well as for bootloader and firmware updates.
For instructions on how to perform diagnoses, see Diagnosis via micro-USB port.
For instructions on how to update the bootloader and firmware, see Firmware update.
See the following overview for the pin assignment:

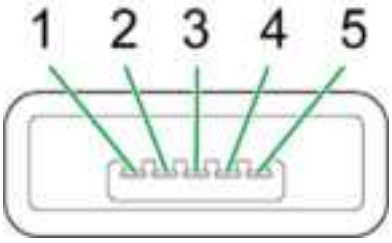


Figure 13. Micro-USB port (type AB)

Table 20. Pin assignment for micro-USB connector

Pin	Designation	Description
1	VBUS	Input
2	D-	Bidirectional
3	D+	Bidirectional
4	ID	Input (0=boot mode, 1/open=USB device)
5	Ground	USB power supply / reference ground

NOTICE

Protection class IP6K7 is also ensured when no USB cable is connected.
However, to protect the micro-USB port from soiling, always insert the corresponding protective plug. With the latest hardware revision of the CANlink mobile 3000, please make sure that the special service sticker is covering the USB port.

NOTICE

The micro USB connector is designed for a minimum number of 1000 mating cycles.
If the minimum number of mating cycles is exceeded, individual parameters could lie outside those in the specification. The basic function of the micro USB connector remains intact.

NOTICE

The device is self-powered. The micro-USB port corresponds with the USB 2.0 full speed device mode. The device is not supplied with power via the VBUS. Use of the ID pin does not comply with the USB standard because the micro USB port does not support USB-OTG. If a type-A USB cable is connected, the device remains in Bootloader mode.

NOTICE

Risk of property damage
Pay attention that the USB plug is connected according to the correct assignment and without the need for any excessive force. Improper connection or excessive force can damage the USB port and render the device seal ineffective.

INFORMATION

To perform debugging or diagnosis, you need the cable USB cable, USB-A on micro-USB-B, 1.6 m (part number 136000138).
To update the bootloader or the firmware, you need the cable USB cable, USB-A / micro-USB-A, 1.8 - 2 m (part number 136000137).
See Software and Accessories

4.3. Indicator Elements

Two LEDs are installed on the front of the device to indicate functions and status.

INFORMATION

The LEDs have the colors red, green, and blue. When several colors are active simultaneously, the LEDs also light up in magenta, orange, or turquoise.

The following tables show possible LED statuses:

4.3.1. ON LED

The ON LED indicates the power supply status.

Table 21. ON LED

Color	Status	Meaning
-	Off	Device switched off or in sleep mode
Green	On	Device switched on, terminal 30 voltage in permitted range
Red	On	Device switched on, terminal 30 voltage outside permitted range
Green	Flashing	Device in diagnosis or update mode
Orange	On	Device is in factory reset mode. See also LEDs during certain operating modes

4.3.2. STATUS LED

The STATUS LED indicates the operating status of the active connections. The various colors reflect the respective priority, from 6 (low) to 1 (high).
If several modes are active simultaneously, the STATUS LED always indicates the status with the highest priority (smallest number).

Table 22. STATUS LED

Color	Status	Connection	Priority	Meaning
-	Off	-	-	LED On is also off, the device is switched off.
Green	On	Various	-	No Error. Device is connected to the DataPlatform
Blue	On	Mobile radio internet	1	Not connected to the DataPlatform.
Orange	On	CAN 1	2	Error on CAN 1 interface.
Red	On	CAN 2	3	Error on CAN 2 interface.
White	On	CAN 3	4	Error on CAN 3 interface.
Magenta	On	GNSS	5	No position / antenna recognized.
-	Off	WLAN Bluetooth	6	Not connected to any network / device.

INFORMATION

If there are no errors with the current connection (mobile radio, CAN1/2/3, GNSS, Bluetooth, WLAN), the STATUS LED lights up green.

When the connection is active, e.g. communication with the DataPlatform, the STATUS LED flashes from time to time. ("Activity flash").

In the event of a fault, the STATUS LED only displays the status with the highest priority.
Example: The device does not recognize any GNSS position (priority 5 = magenta) and has no mobile radio connection (priority 1 = blue). The STATUS LED lights up blue.

4.3.3. LEDs during certain operating modes

The LEDs indicate certain active operating modes and processes.

INFORMATION

The LED statuses shown in the table are examples.
The lighting behavior of the LEDs can deviate from this depending on the use and conditions.

Table 23. LED Behavior

LED	Status	Meaning
On Status		Configuration update in progress via the CAN interface.
On Status		Active file transfer in Logging mode. A configured CAN message is received (flashes orange) and sent to the DataPlatform (flashes blue).
On Status		Active data transmission in RealTime mode.
On Status		Device initializing after switching on.
On Status		Configuration update in progress via the DataPlatform.
On Status		Remote firmware update in progress via the DataPlatform.

On Status		Device reset via slide switch on the D-sub connector CAN1 (Only CLM 3000).
On Status		Reset (`0x1011sub0x64`) the device via the CAN.
On Status		Transmission of the GNSS position and the keep-alive message. Display varies depending on configured polling interval.

4.4. Cables

NOTICE

Malfunction of the device

Problems with the mobile network connectivity can be caused by an insufficient antenna setup and bending radius of the cables.
Cables can be damaged.
Water penetration due to incorrect assembly of the cable and missing sealing.

* Assemble the cables in accordance with the recommendation of the manufacturer
* When mounting the device, please make sure that there is an adequate bending radius of the cables
* Install strain reliefs for the cables
* Protect and fix the cables within the machine
* In case of using the antenna supplied in the Launch Kit: Ensure that the minimum bending radius of the antenna cables is 8 times the outer diameter.

4.4.1. Start Cable / Main Plug Connector CANlink mobile 3600

The cable *CLM3600 Starter Cable 6open 3dsub 1pw 2m* (part number 136000202) must be used for the CANlink mobile 3600 variants and is equipped with the following connectors and open individual wires:

- 1 micro timer II socket,14-pin, female
- 3 D-sub, 9-pin, female (CAN1 and CAN2)
- 1 power connector
- 6 open wires

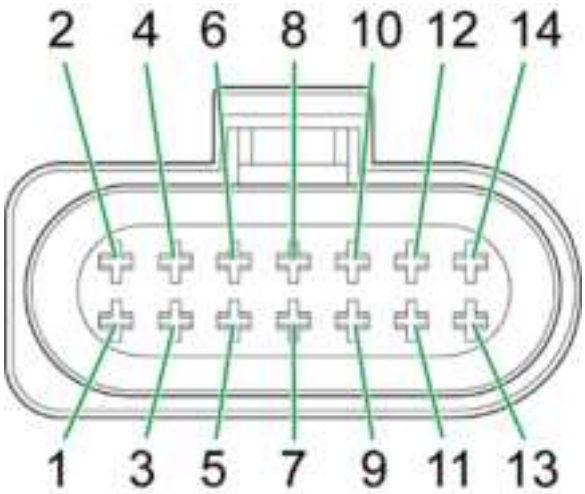


Figure 14. Micro timer II socket (14-pin, female)

Table 24. Start cable for main plug connector

Pin	Designation	Color	Description
1	Terminal 30 / V_{CC}	White	Power supply (steady plus vehicle battery)
2	CAN3-Low	Brown	CAN, bidirectional
3	Terminal 31 / ground	Green	Power supply
4	Analog input 1	Yellow	I/O input
5	Analog input 2	Gray	I/O input
6	Analog input 3	Pink	I/O input
7	Digital output	Blue	I/O output

Pin	Designation	Color	Description
8	Terminal 15	Red	Input (ignition signal)
9	CAN3-High	Black	CAN, bidirectional
10	CAN2-GND	Violet	-
11	CAN2-High	Gray-pink	CAN, bidirectional
12	CAN2-Low	Red-blue	CAN, bidirectional
13	CAN1-High	White-green	CAN, bidirectional
14	CAN1-Low	Brown-green	CAN, bidirectional

INFORMATION

The open-end connectors are numbered on the strand ends.
The polarity also applies for the following cable:
* CLM3 start cable 6 open, 2 D-Sub, 1 pw, 2 m (part number 136000197)

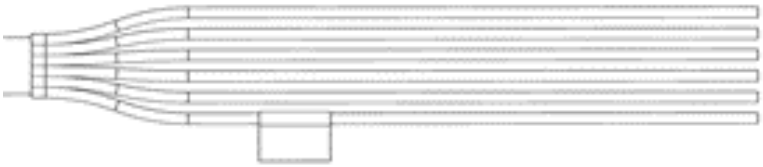


Figure 15. Individual wires open

Table 25. Start cable for main plug connector, individual wires open

Designation	Color	Description
Terminal 31 / ground	Green	Power supply
Analog input 1	Yellow	I/O input
Analog input 2	Gray	I/O input
Analog input 3	Pink	I/O input
Digital output	Blue	I/O output
Terminal 15	Red	Input (ignition signal)

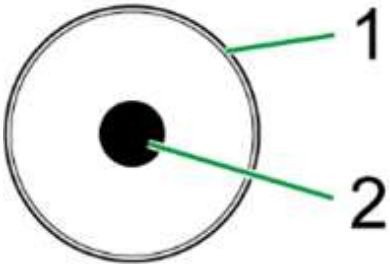


Figure 16. Power connector, low voltage coupling

Table 26. Start cable for main plug connector, power supply cable

Pin	Designation	Color	Description
1	Terminal 31 / ground	Green	Power supply
2	Terminal 30 / VCC	White	Power supply

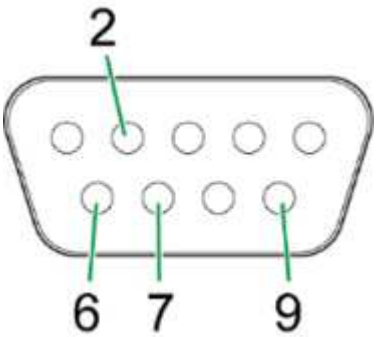


Figure 17. D-sub connector, female, 9-pin (CAN1)

Table 27. Start cable for main plug connector, D-Sub connector (CAN1)

Pin	Designation	Color	Description
1	not assigned	-	-
2	CAN1-Low	Brown-green	CAN, bidirectional
4	not assigned	-	-
5	not assigned	-	-
6	Terminal 31 / ground	Green	-
7	CAN1-High	White-green	CAN, bidirectional
8	not assigned	-	-
9	Terminal 30 / VCC	White	Power supply

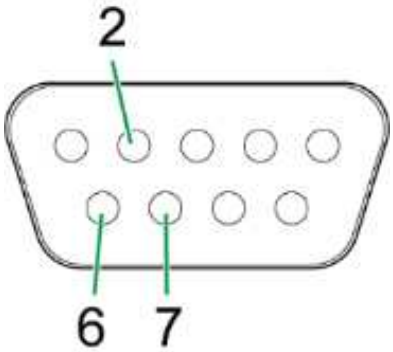


Figure 18. D-Sub connector, female, 9-pin (CAN2)

Table 28. Start cable for main plug connector, D-sub connector (CAN2)

Pin	Designation	Color	Description
1	not assigned	-	-
2	CAN2-Low	Red-blue	CAN, bidirectional
3	not assigned	-	-
4	not assigned	-	-
5	not assigned	-	-
6	CAN2-GND	Violet	-
7	CAN2-High	Gray-pink	CAN, bidirectional
8	not assigned	-	-
9	not assigned	-	-

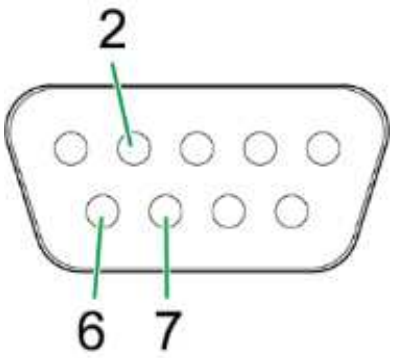


Figure 19. D-Sub connector, female, 9-pin (CAN3)

Table 29. Start cable for main plug connector, D-sub connector (CAN3)

Pin	Designation	Color	Description
1	not assigned	-	-
2	CAN3-Low	Brown	CAN, bidirectional
3	not assigned	-	-
4	not assigned	-	-
5	not assigned	-	-
6	CAN3-GND	Green	-
7	CAN3-High	Black	CAN, bidirectional
8	not assigned	-	-
9	not assigned	-	-

4.4.2. Start Cable / Main Plug Connector CANlink mobile 3000

The cable *CLM3 start cable 6 open, 2 D-Sub, 1 pw, 2 m* (part number 136000197) must be used for the CANlink mobile 3000 variants andis equipped with the following connectors and open individual wires:

- 1 micro timer II socket,14-pin, female
- 2 D-sub, 9-pin, female (CAN1 and CAN2)
- 1 power connector

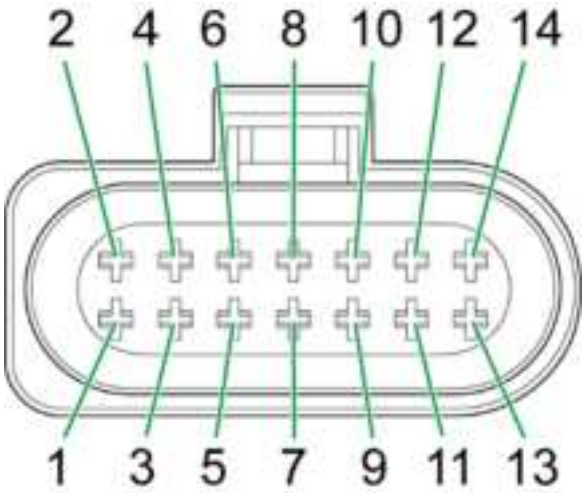


Figure 20. Micro timer II socket (14-pin, female)

Table 30. Start cable for main plug connector

Pin	Designation	Color	Description
1	Terminal 30 / V_{CC}	White	Power supply (steady plus vehicle battery)
2	Factory setting 1	Brown	Input
3	Terminal 31 / ground	Green	Power supply
4	Analog input 1	Yellow	I/O input
5	Analog input 2	Gray	I/O input
6	Analog input 3	Pink	I/O input
7	Digital output	Blue	I/O output
8	Terminal 15	Red	Input (ignition signal)
9	Factory setting 2	Black	Input
10	CAN2-GND	Violet	-
11	CAN2-High	Gray-pink	CAN, bidirectional
12	CAN2-Low	Red-blue	CAN, bidirectional
13	CAN1-High	White-green	CAN, bidirectional
14	CAN1-Low	Brown-green	CAN, bidirectional

INFORMATION

The open-end connectors are numbered on the strand ends.
The polarity also applies for the following cable:
* CLM3 start cable 6 open, 2 D-Sub, 1 pw, 2 m (part number 136000197)

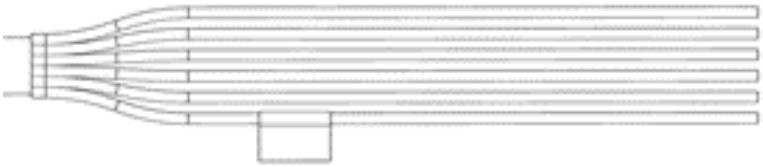


Figure 21. Individual wires open

Table 31. Start cable for main plug connector, individual wires open

Designation	Color	Description
Terminal 31 / ground	Green	Power supply
Analog input 1	Yellow	I/O input
Analog input 2	Gray	I/O input
Analog input 3	Pink	I/O input
Digital output	Blue	I/O output
Terminal 15	Red	Input (ignition signal)

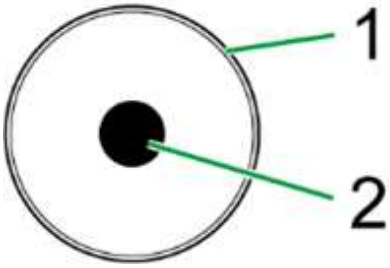


Figure 22. Power connector, low voltage coupling

Table 32. Start cable for main plug connector, power supply cable

Pin	Designation	Color	Description
1	Terminal 31 / ground	Green	Power supply
2	Terminal 30 / VCC	White	Power supply

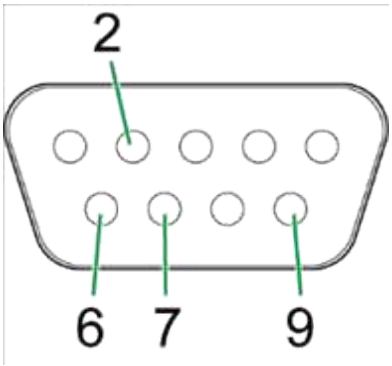


Figure 23. D-sub connector, female, 9-pin (CAN1)

Table 33. Start cable for main plug connector, D-Sub connector (CAN1)

Pin	Designation	Color	Description
1	not assigned	-	-
2	CAN1-Low	Brown-green	CAN, bidirectional
4	not assigned	-	-
5	not assigned	-	-

Pin	Designation	Color	Description
6	Terminal 31 / ground	Green	-
7	CAN1-High	White-green	CAN, bidirectional
8	not assigned	-	-
9	Terminal 30 / VCC	White	Power supply

The *D-Sub connector (CAN1)* connection is also equipped with a slide switch to complete a reset to the factory settings.

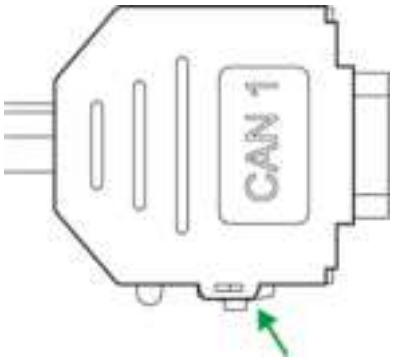


Figure 24. D-Sub connector (CAN1)

INFORMATION

For more information on how to perform a factory reset, see Factory Reset.

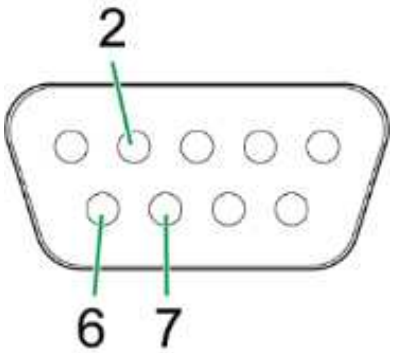


Figure 25. D-Sub connector, female, 9-pin (CAN2)

Table 34. Start cable for main plug connector, D-sub connector (CAN2)

Pin	Designation	Color	Description
1	not assigned	-	-
2	CAN2-Low	Red-blue	CAN, bidirectional
3	not assigned	-	-
4	not assigned	-	-
5	not assigned	-	-
6	CAN2-GND	Violet	-
7	CAN2-High	Gray-pink	CAN, bidirectional
8	not assigned	-	-
9	not assigned	-	-

4.4.3. USB Connector Cable - Firmware Update

The *USB cable, USB A-micro USB A, 1.8-2 m* (part number 136000199) is intended for firmware or bootloader updates and has the following connectors:

- 1 micro-USB-A, male
- 1 USB-A, male

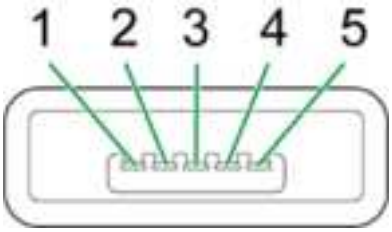


Figure 26. Micro-USB-A connector, male

Table 35. USB cable, USB A-micro USB A, 1.8-2 m, micro-USB-A, male

Pin	Designation	Description
1	VBUS	USB power supply
2	D-	Bidirectional
3	D+	Bidirectional
4	ID	Ground, output
5	Ground	USB power supply

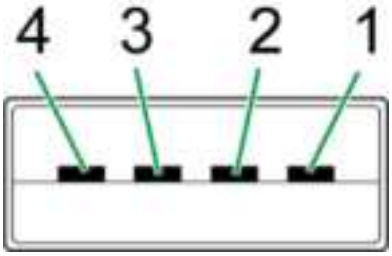


Figure 27. Micro-USB-A connector, male

Table 36. USB cable, USB A-micro USB A, 1.8-2 m, USB-A, male

Pin	Designation	Description
1	VBUS	USB power supply
2	D-	Bidirectional
3	D+	Bidirectional
4	Ground	USB power supply

NOTICE

If you start the device with a *USB cable, USB A micro USB A, 1.8 - 2 m* cable connected, neither of the two LEDs on the device lights up.

INFORMATION

As a result of the *USB cable, USB A micro USB A, 1.8 - 2 m* cable, Pin ID is drawn to GND (ground) when the device is switched on and the internal MCU Bootloader is activated.

4.4.4. USB Connector Cable - Diagnostic

The *USB cable, USB-A on micro-USB-B, 1.6 m* (part number 136000138) is intended for debugging and for diagnosis of the device. It has the following connectors:

- 1 micro-USB-B, male
- 1 USB-A, male

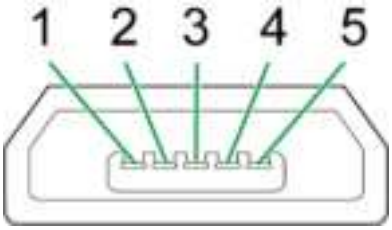


Figure 28. Micro-USB-B connector, male

Table 37. USB cable, USB-A on micro-USB-B, 1.6 m, micro-USB-B, male

Pin	Designation	Description
1	VBUS	USB power supply
2	D-	Bidirectional
3	D+	Bidirectional
4	ID	Output (ID is undefined)
5	Ground	USB power supply

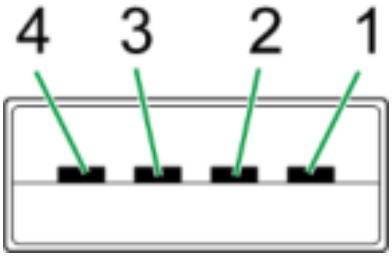


Figure 29. USB-A connector, male

Table 38. USB cable, USB-A on micro-USB-B, 1.6 m, micro-USB-A, male

Pin	Designation	Description
1	VBUS	USB power supply
2	D-	Bidirectional
3	D+	Bidirectional
4	Ground	USB power supply

4.4.5. Custom Cable for Main Plug

When creating a customized cable harness for the system integration of the CANlink mobile 3000, some important recommendation for the setup of the main plug connector and cable must be considered. It is recommended to use the connector components from the Software and accessories list to create a custom cable harness.

NOTICE

Risk of property damage.

* This chapter contains some important advices. Please follow the instructions from the connector manufacturer and general rules for creating and protecting cable harnesses.

NOTICE

Risk of property damage.
Water penetration due to capillary action of the cable strands.

* Ensure that both ends of the cable strands are sealed and assembled in the correct manner and in accordance to the manufacturer's specifications.

Figure 30. MT II 14-pin socket housingMT II 14-pin socket housing

- For the cable assembly it is essential that the instructions from the handling manual of the connector supplier are followed. Especially the main sealing, wire sealing and dummy plugs must be installed in the right manner. Refer to Automotive Connector Manufacturer.

Figure 31. MT II contact type A

- Use only the recommended tooling for machine processing. Refer to Connector-Kit.
- It is recommended to use tinned contacts. This corresponds the material of the pins

Figure 32. MT II gray single-wire sealing

- Use the wire sealing which fits to the outer diameter of the used wires

Figure 33. Dummy Plugs

- Cover the unused contact sockets with dummy plugs to protect the connection from dust and humidity

4.4.6. Cable Management

NOTICE

Risk of property damage.
* Fasten the cable harness with a suitable strain relief near the main plug connector in order to avoid the transmission of any tension, strains or vibrations.
* Ensure that there is minimum bending radius of 8 time the outer diameter of the cable harness.

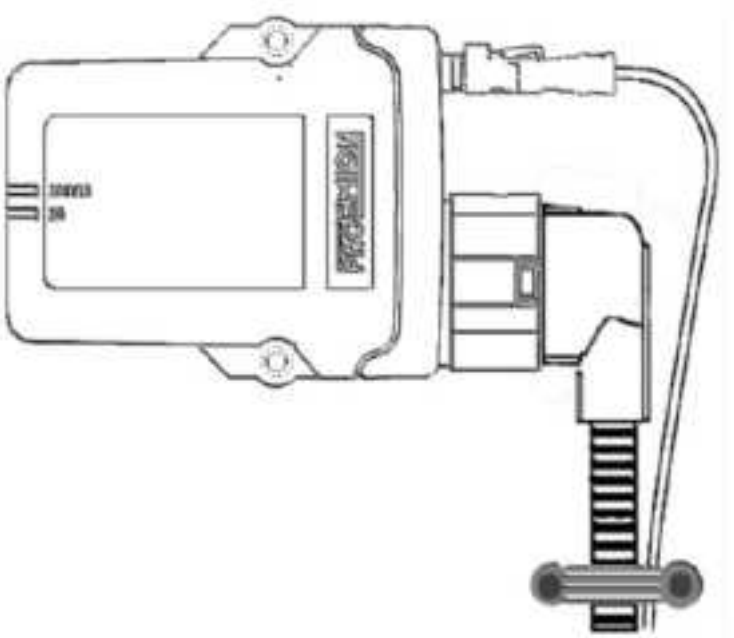
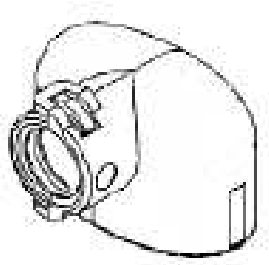
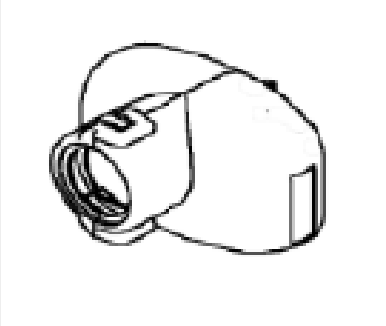
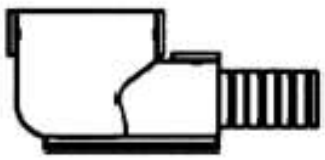


Figure 34. Cable Management

- Protect the connector and the cable with sufficient covers and cable tubing. Please refer to the Cover Supplier for more information.

The following part numbers are recommended for the protective cover:

Symbol	Part Numbers
	7807174
	7807207

Symbol	Part Numbers
	7807624

4.4.7. Adapter Cable for Retrofit

The *Adapter Cable CANlink 14p-M12 5p 0,3m* (part number 136200001) and *Adapter Cable CANlink 14p-M12 12p 0,3m* (part number 136200002) is intended for CANlink mobile 3000 retrofits at machines which are already equipped with a CANlink mobile 5000. With this adapter cable there is no need to modify the existing cable harness of the machine when the existing CANlink mobile 5000 is to be replaced by the CANlink mobile 3000 device.

Table 39. Adapter cables for machines with CANlink mobile 5000

Variant installed at Machine	Part number of required cable for retrofit
CANlink mobile 5201	136200001
CANlink mobile 5301	136200001
CANlink mobile 5303	136200002
CANlink mobile 5320	136200002

For detailed drawings of the adapter cables, please refer to Adapter Cable CANlink 14p-M12 5p 0,3m (136200001) and Adapter Cable CANlink 14p-M12 12p 0,3m (136200002) in Technical Drawings.

5. Getting Started

This chapter describes the first steps required for deploying the device. Furthermore, it contains useful information on how to connect, configure, and mount the device.

5.1. Installing Software

Use the Proemion Configurator software to configure the device.
You can evaluate the data with the DataPlatform or Proemion Dashboard. The Dashboard app enables you to display data on a smartphone (Android).
Use the Proemion Firmware Programmer software for firmware updates.

	The software can be downloaded from our Download Center at the Document Library

Table 40. Software

Software	Path on Download Center
Proemion Configurator	03_Proemion Tools Software\01_Software\01_Proemion Configurator
Proemion PDC Builder	03_Proemion Tools Software\01_Software\03_Proemion PDC Builder
CANlink mobile 3000 DeviceAnalyzer	03_Proemion Tools Software\01_Software\08_CANlink mobile 3000 DeviceAnalyzer
Proemion Dashboard	03_Proemion Tools Software\ 01_Software\04_Proemion Dashboard
Proemion Firmware Programmer	03_Proemion Tools Software\01_Software\02_Proemion Firmware Programmer
Drivers	05_Utilities\06_USB Drivers
Dashboard App	Dashboard App
Proemion Machine Companion App	Machine Companion App

Execute the relevant application file (`setup.exe`, `install.bat` or similar) and follow the instructions on the screen to install the software on your PC.

5.2. Connecting the Device

WARNING

Overload damage due to malfunction.
Risk of severe or fatal injury.

* To limit power in the event of malfunction, secure the DC power supply circuit during installation with an external 2 A fuse.

NOTICE

Risk of property damage.

* The device must be installed, connected, and commissioned by a qualified technician.
* Ensure the power supply is disconnected before connecting the device.
* Only use components from the launch kit or the accessories supplied. Refer to chapters Launch Kit and Software and Accessories.

NOTICE

Device defect due to power failure.
Destroyed hardware component on the device. Repair not possible.
Destroyed file system on the device. Repair by Proemion necessary.

* Permanently connect terminal 30 to steady power supply (vehicle battery) to ensure that the required power management settings can be applied to the device in the right manner.
* Permanent disconnection from the power supply is only permitted when the device was set to sleep mode before.
* Connect terminal 15 correctly and configure secure switching to sleep mode in the Power management section of the device configuration.
* Do not disconnect the device from the power supply until it has completely switched to sleep mode (all LEDs off).

If you have any questions or anything is unclear, please contact our support before getting started. See Service and Support.

5.2.1. Power Supply

The *main plug connector* supplies the device with power. If you use the power supply unit from the kit, make sure you use the country adapter for your country.

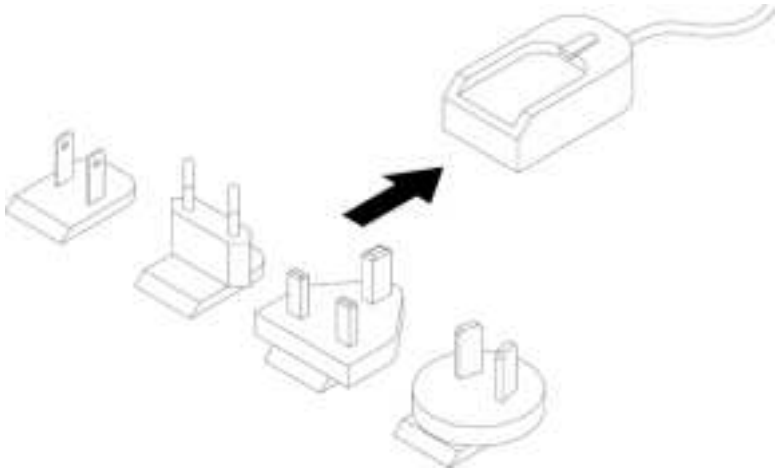


Figure 35. Power Supply Unit with Country Adapters

5.2.2. Charging the Battery

Before you use the device for the first time, fully charge the integrated battery using *main plug connector* cable supplied. See Start Cable for Main Plug Connector.

NOTICE

Note on the integrated battery:
* The integrated battery can only be charged in the limited temperature range of 0 °C … +45 °C / +32 °F … +113 °F.
* Battery operation of the device is only possible in a limited temperature range of -20 °C … +60 °C / -4 °F … +140 °F

INFORMATION

The `BATTERY - CHARGE LEVEL` device variable provides information on the current charge level of the integrated battery.
The `BATTERY - CURRENT` device variable (Index `0x5006`, Sub-Index `0x09`) provides information on the charging status of the integrated battery.
* `BATTERY - CURRENT > 0`: battery is being charged
* `BATTERY - CURRENT = 0`: battery is fully charged,and power is being supplied to the device via terminal 30
* `BATTERY - CURRENT < 0`: device is being supplied with power from the integrated battery

INFORMATION

Lithium-Polymer batteries have a limited storage time and lifetime. During storage, the charge level must be kept in certain limits. The limited lifetime reduces the full charge capacity of the battery after 500 charging cycles to 80% of the rated capacity.

5.2.3. CAN

Connect the device interfaces to the CAN bus whose data you want to visualize. For test purposes, connect the device to a PC using a communication gateway (e.g. CANview USB).
The CAN connection terminal CAN-High and CAN-Low signals must match the signals of the connector on the device. You can connect ground of the power supply connector with CAN1-GND or CAN3-GND because the CAN1 and CAN3 interface has no galvanic isolation. The CAN2 interface is galvanically isolated from the rest of the circuit and must not be connected with supply-GND.

The following table provides an overview of some CAN baud rates in relation to the bus length:

Table 41. CAN baud rates

CAN baudrate	Maximum bus length
1 Mbit/s	25 m
800 kbit/s	50 m
500 kbit/s	100 m
250 kbit/s	250 m
125 kbit/s	500 m
50 kbit/s	1000 m

5.2.4. CAN Bus Termination

In any bus system, signal reflections at the end of a wire or cable can cause interference which can in turn cause transmission errors. To minimize the reflections, place a termination resistor at each end of transmission lines. The terminating resistance between CAN-High and CAN-Low must match the characteristic impedance of the transmission lines.

In CAN bus networks, normally unshielded, twisted cable pairs are used for signal transmission. The characteristic impedance of the transmission lines is around 120 ¬. So, the termination resistor between CAN-High and CAN-Low must be rated 120 ¬.

5.2.5. Mobile Radio and GNSS Antenna

Some types of the device (types 3351, 3373, 3377, 3477, 3577, 3355, 3357, 3651, 3653, 3657, 3673, 3677) are equipped with external antenna ports for mobile radio and GNSS signals.

The antenna *ANT LTE GNSS DA 3M0 FAKRA-D FAKRA-C FAR* (part number 157000121) features a port for mobile radio signals (FAKRA-D - violet) and a port for GNSS signals (FAKRA-C - blue).

DANGER

Danger of explosion due to the operation of electrical equipment in potentially explosive atmospheres.
Risk of severe or fatal injury.

* Observe the applicable regulations and precautions for potentially explosive areas.
* Do not mount the antenna in the close proximity of easily ignited substances (e.g. fuel tanks) and insufficiently shielded electronic devices.

CAUTION

Health hazards of radio-frequency energy
Risk of minor injury.

* Make sure the device is switched off during installation.
* During operation, observe a distance of at least 20 cm between the antennas and personnel.
* Do not store or operate antennas together with other antennas or transmitters.

NOTICE

Reduced antenna gain.
Problems with the mobile network connectivity can be caused by an insufficient antenna setup.

* Do not extend the antenna cable.
* Only use the antennas which are supplied as Proemion accessories.
* Change the mounting position of the CANlink mobile to reduce the distancebetween antenna and the device.
* Order an alternative antenna with longer antenna cable.
* In case of using the antennas which are supplied with the hardware kit or as Proemion accessories: Ensure that the minimum bending radius of the antenna cables is not smaller than 8 times the outer diameter.

MOBILE RADIO CONNECTOR

Connect the antenna's FAKRA-D plug (violet) to the device's FAKRA-D port (violet).

NOTICE

Risk of property damage.
The device or antenna could be damaged.

* Only use antennas with a maximum gain as specified in the Technical Data, refer to regulatory notes in Safety Information for CE, UKCA, FCC, ISED, etc. Notes.

GNSS CONNECTOR

Connect the antenna's FAKRA-C plug (blue) to the device's FAKRA-C port (blue)

NOTICE

Risk of property damage The device or antenna could be damaged.

* Only use active GNSS antennas with LNA, gain max. 25 dBi, voltage 3.3 V_{DC}, current max. 40mA.

INFORMATION

Mount the GNSS antenna so that it is level with the horizon and has full view of the sky above.

5.2.6. Switching the Device On/Off

The device does not have an on/off switch.

The device can be powered on by each of the following conditions:
- **Terminal 15** level is high
- **CAN message** is present at **CAN1** (wakeup via CAN2 is not possible)
- Detection of a specific **Acceleration Sensor Wake-up Force**
- **Cyclic wakeup time** is elapsed

The device can be set to sleep mode by the following conditions:
- Terminal 15 level is low and Power Management - **Shutdown Delay Time** is > 0
- Power Management - **CAN sleep Time** is > 0 and noconfigured CAN messages are received during the configured time
- Power Management - **Time to Sleep** was set by an external controller (terminal 15 must be low and no CAN messages are present)

Permanent disconnection from the power supply is only permissible if the device has been set to sleep mode before. For further details regarding the different power management functions, please refer to Power management.

NOTICE

Device defect due to power failure.
Destroyed hardware component on the device. Repair not possible.
Destroyed file system on the device. Repair by Proemion necessary.

* Permanently connect terminal 30 to steady power supply (vehicle battery) to ensure that the required power management settings can be applied to the device in the right manner.
* Permanent disconnection from the power supply is only permitted when the device was set to sleep mode before.
* Connect terminal 15 correctly and configure secure switching to sleep mode in the Power management section of the device configuration.
* Do not disconnect the device from the power supply until it has completely switched to sleep mode (all LEDs off).

NOTICE

Battery low voltage.
In the case of variants with an internal rechargeable battery and no Power Management configuration, the device continues to operate in Battery mode until it is switched off via the low voltage disconnect function.

* Permanently connect terminal 30 to steady power supply (vehicle battery) to ensure that the required power management settings can be applied to the device in the right manner.
* Connect terminal 15 correctly and configure secure switching to sleep mode in the Power management section of the device configuration.

In case the proper settings are not made, you can switch the device off via the Reset button: Disconnect the main plug connector. Actuate the inlying button using an appropriate tool with a diameter of approx. 1mm.

The LEDs and the device are switched off. Please be aware that this is an emergency procedure with the risk of device defect due to power failure!

5.3. Activation

Except from a customizable version of the device variant 3677, the device is equipped with an integrated eSIM card. Upon delivery, the eSIM card already has an eSIM profile with all the necessary communication settings. Before you can use the device, it must be activated via the DataPortal. If a device of a customized 3677 variant has to be activated, the system integrator must ensure that the corresponding nano SIM card and the necessary services are activated for the respective country of use.

1. Open the DataPortal login page: DataPortal
2. Log in to the DataPortal with your login credentials.

INFORMATION

If the required permission setand feature switch is not enabled for the activation of the device, please get in contact with the administrator of your organizationor our support team. See Service and Support.

Follow the instruction in chapter Provisioning and GoLive in the DataPortal User Manual

5.4. Configuring the Device

The device is delivered with a basic configuration. Customize the configuration to your purposes by defining the CAN messages to be logged.
You load new configurations to the device via CAN interface or the DataPortal. Configuration is described below using the CAN interface. For more detailed information on configuration using the DataPlatform, see chapters Configuration update and Safe Remote Updates Guideline.

5.4.1. Connecting the Device to the PC

To configure the device with a PC, you must connect it with the PC. In this example, using a CANview USB from the Launch Kit.

1. Connect the CANview USB to a PC using the cable *USB connection cable, USB-A to USB-B, 2 m*.
2. Place a CAN bus termination on the D-Sub connector of the CANview USB.
3. Use the cable *Start cable for main plug connector* with the CAN1 or CAN2 plug to connect the CANlink mobile to the CAN-bus termination of the CANview USB.
4. Use the cable *Start cable for main plug connector* and the power supply unit from the launchkit to connect the CANlink mobile to the power grid.

¬ The ON LED lights up in constant green.

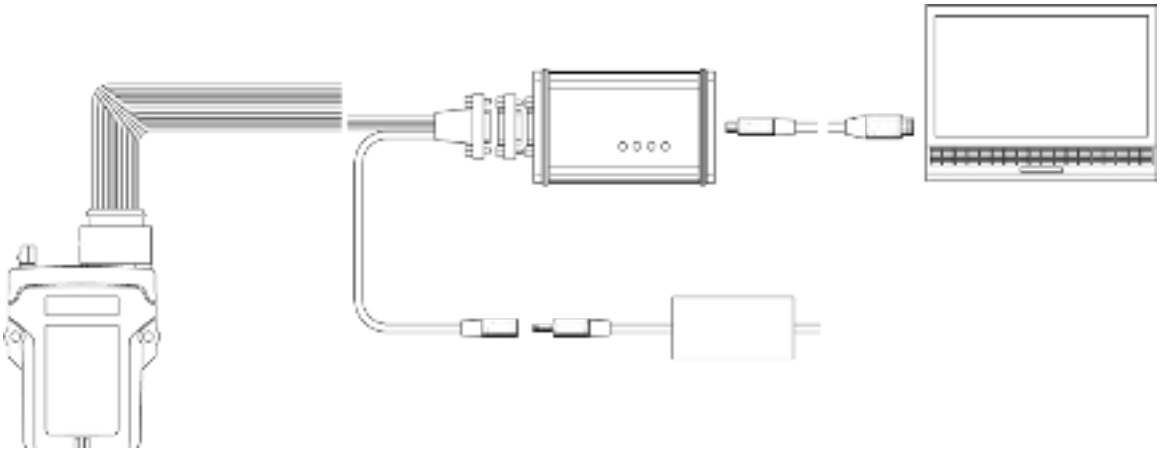


Figure 36. CANlink mobile 3000 Connection to PC via CANview USB

INFORMATION

Please be aware that the CANlink mobile 3600 is **not equipped** with an integrated CAN bus termination resistor. The displayed labatory setup above will work with just one CAN bus termination resistor. When doing the system integration at the intended machine, it must be ensured that the CAN bus is terminated with a CAN bus termination resistor of 120 Ohm at each end of the CAN bus line. Please also refer to CAN Bus Termination

5.4.2. Making Communications Settings

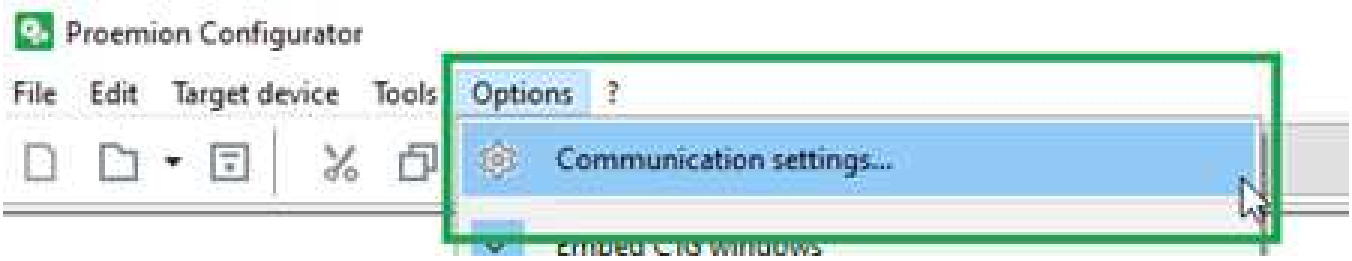
Before you can start using the device, you must define the communication settings once

INFORMATION

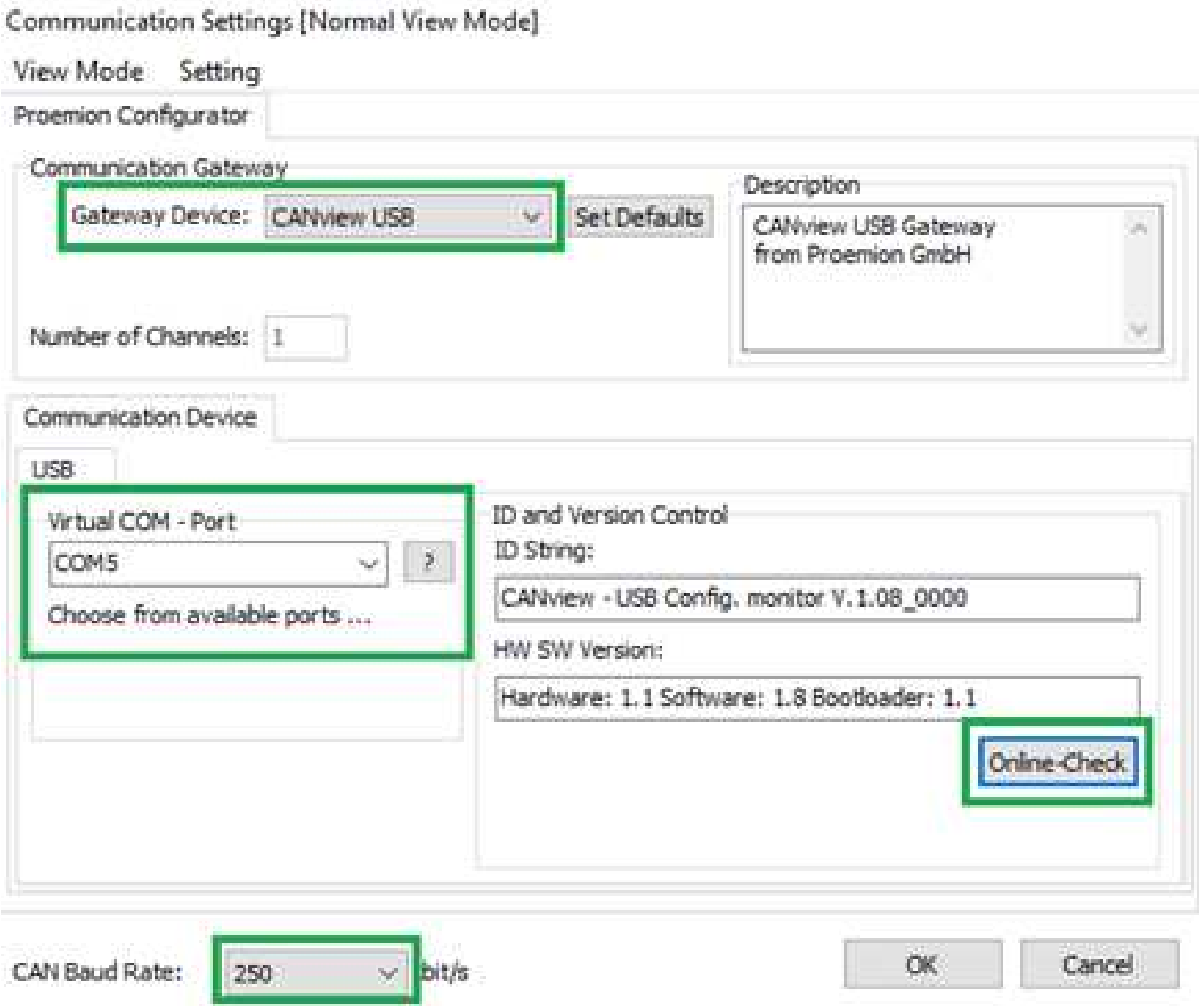
Install the USB driver pack from the Download Center before connecting the device to a PC using a USB port. See Installing Software.

1. Connect the device to a PC. See Connecting the Device to the PC.
2. Start the Proemion Configurator software.
3. Click on OPTIONS ¬ COMMUNICATIONS SETTINGS in the menu.

   ¬ The window COMMUNICATION SETTINGS opens.



4. In the COMMUNICATION GATEWAY field, go to the GATEWAY DEVICE list and select the device CANVIEW USB.
5. In the USB tab, go to the VIRTUAL COM-PORT list and select the port you require (e.g. COM5).
6. In the CAN BAUD RATE list, select the baud rate 250 KBIT/S.
7. Click on the ONLINE-CHECK button to check the connection.



¬ If the connection is successful, the device information is shown in the ID AND VERSION CONTROL field in the ID STRING and HW SW VERSION fields.

8. Click on the OK button to save the settings.

¬ You have completed the communication settings.

5.4.3. Node Scan

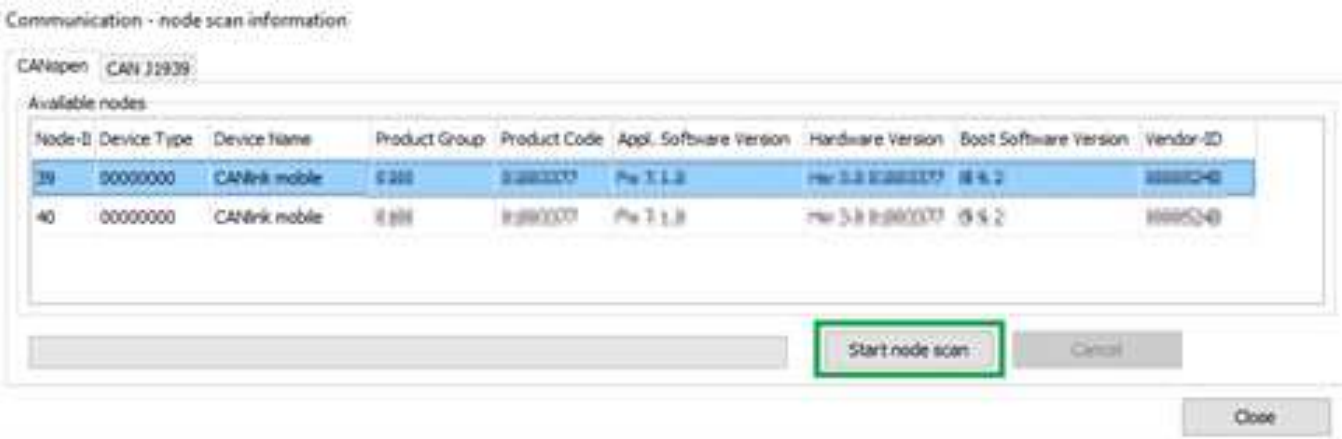
Perform a node scan to check the connection.

1. Connect the device to a PC. See Connecting the Device to the PC.
2. Start the Proemion Configurator software.
3. Click on TOOLS > NODE SCAN in the menu.
   Alternatively, you can click on the button in the toolbar.

¬ The COMMUNICATION-NODE SCAN INFORMATION window opens.

4. Click on the START NODE SCAN button.

¬ The CAN devices connected are displayed with their CAN open Node-IDs, product codes, and information on hardware and software versions.

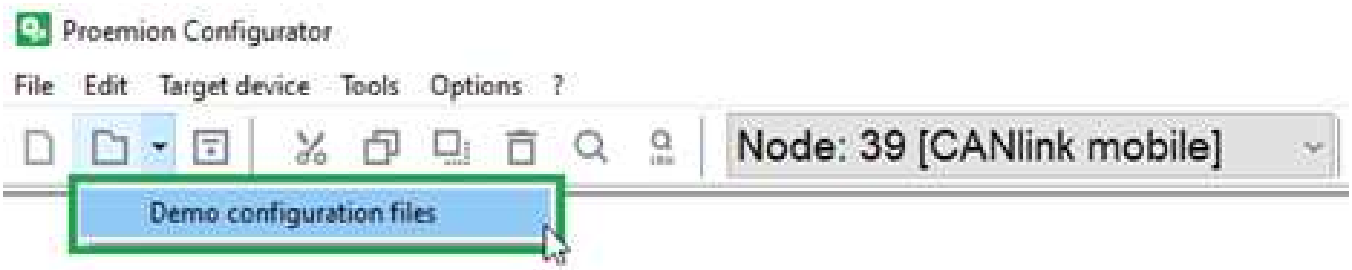


5. Select the device you want to configure.
6. Click on the CLOSE button.

¬ The Node-ID and the designation of the selected device are shown in the toolbar.

5.4.4. Customizing the demo configuration File

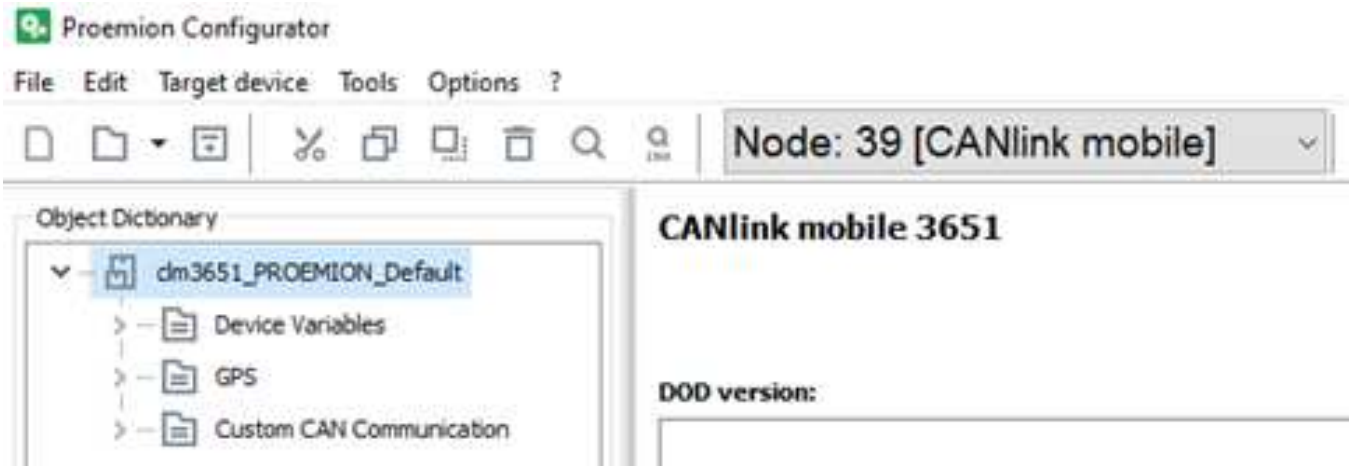
1. Connect the device to a PC. See Connecting the Device to the PC.
2. Start the Proemion Configurator software.
3. Click on the arrow in the toolbar and select DEMO CONFIGURATION FILES.



¬ The OPEN DOD FILE window is shown.

4. Navigate to the correct folder for your device (in this example CANLINK mobile 3351) and open one of the files with the extension *.DOD.

¬ The selected demo configuration file is loaded.

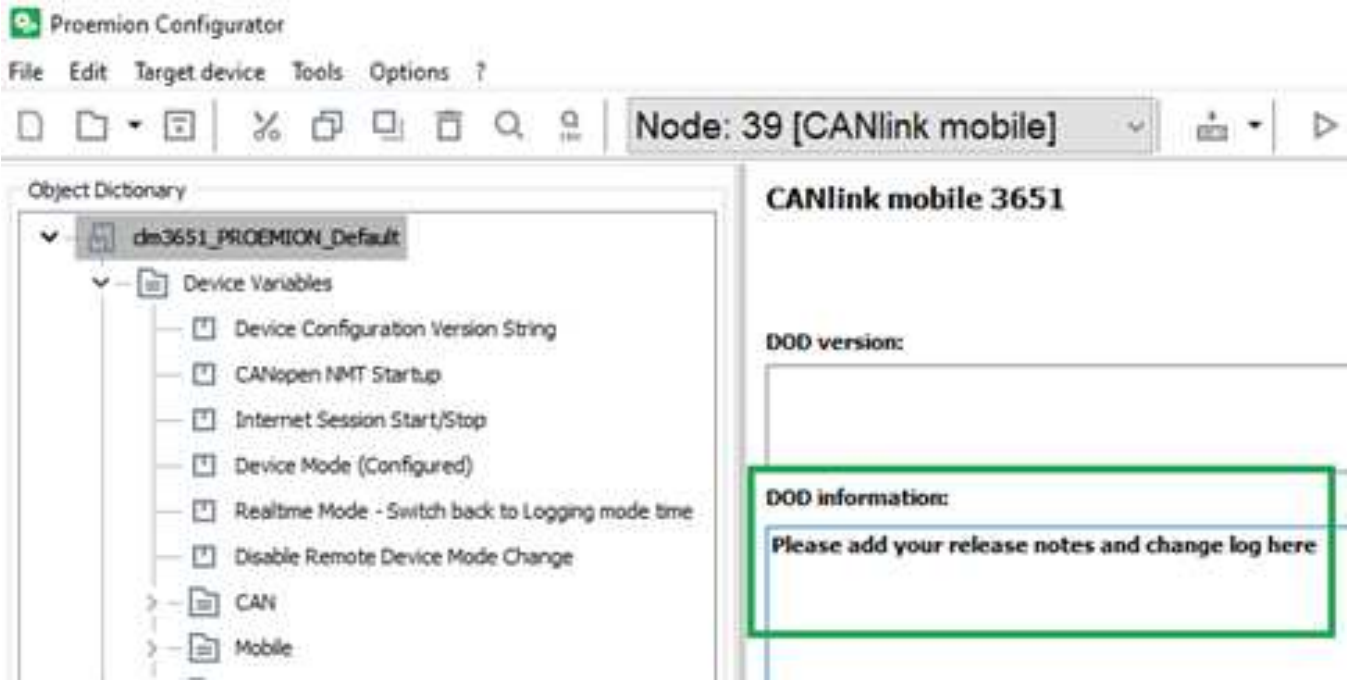


5. Click on FILE > SAVE AS… in the menu.
6. Save the file under a different name to avoid overwriting the original file.

> You can enter a designation for the configuration in the DEVICE CONFIGURATION VERSION STRING object of the DEVICE VARIABLES. This text is displayed as a DOD version in the DataPortal under Communication Unit Details and in the configuration version history.
>
> - Use an unequivocal designation for every configuration. Differentiate between various versions of a configuration by adding a version number.

7. Adjust the configuration file to your requirements. See Proemion Configurator.
8. Customize the DEVICE CONFIGURATION VERSION STRING

9. Enter notes on the adaptations completed in the DOD INFORMATION field.



INFORMATION

Save the file with the current configuration in case you need the configuration again later. It is not possible to read off the current configuration from the device.

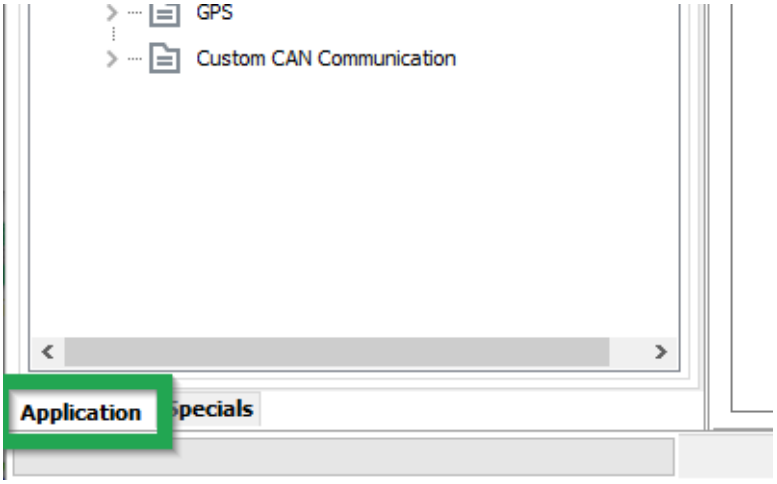
INFORMATION

If there is no Demo Configuration file available, you must create a new configuration for the device. The Object Dictionary Groups and DEVICE VARIABLES required must be set-up manually in this case. See Creating Object Dictionary Groups and Objects.

5.4.5. Loading the Configuration to the Device via CAN Interface

After you have created your own configuration file, load the configuration to the device.

1. Connect the device to a PC. See Connecting the Device to the PC.
2. Start the Proemion Configurator software.
3. Define the communication settings for the CANview USB device. See Making Communications Settings.
4. Complete a Node Scan and select the CAN node of the corresponding device.
5. Choose FILE ¬ OPEN…¬ from the menu.
6. Open the desired configuration file.
7. Select the APPLICATION tab.



8. Click on the DOWNLOAD ALL ENTRIES button in the toolbar.

¬ The DOWNLOAD DATA TO DEVICE window is shown.

9. Click on the START button to start the download to the device.

10. Wait until the download is completed.

NOTICE

Loss of function or configuration.
Disconnection from the power supply during the update process can lead to a loss of the function or the configuration.

* Do not disconnect the power supply during updating.

¬ The configuration has now been installed on the device.

1. Click on the RESET CAN NODE button.
2. If you have changed the CAN baud rate (DEVICE CAN BAUD RATE) in the configuration, check whether the configuration has been correctly adopted.
3. Change the CAN baud rate of the CANview USB. See Making Communications Settings.
4. Perform a Node Scan to check the connection.

¬ The ON LED lights up in constant green.
¬ The STATUS LED flashes green, then lights up in constant green.

INFORMATION

For further information on how to perform a remote configuration update, please refer to chapter DataPlatform.

5.5. CAN-CAN-Bluetooth/WLAN Bridge

Operation as a CAN-CAN-Bluetooth bridge enables wireless transfer of CAN data between two CAN bus systems. In this case, two CANlink mobile devices or one CANlink mobile 3000 in combination with one CANlink wireless replace the CAN cable.

INFORMATION

For operation as a CAN-CAN bridge, you can choose the Bluetooth or WLAN wireless interfaces. Simultaneous use of both wireless interfaces is not possible.

After switching on, a connection is automatically established between a configured master and a slave device. Data is exchanged bidirectionally as soon as the connection between the two devices has been established.

For more information on the CAN-CAN Bluetooth bridge and CAN-WLAN bridge operating modes, refer to the *CANlink wireless Series 3000 Manual* on the Download Center.

5.6. CAN-Bluetooth Interface

Operation as a CAN-Bluetooth interface enables wireless transmission of CAN data to other Bluetooth-capable devices, such as the CANlink wireless, CANlink Bluetooth, PCs, smartphones, or tablets, on which the CAN data can then be recorded and evaluated. The exchange of data is bidirectional with the support of the Proemion Byte Command Protocol transmission protocol as soon as the software has established a connection to the device.

We recommend using the Proemion Dashboard software for visualization and evaluation of the data received. Alternatively, you can use software you program yourself.

	For more information on the CAN-Bluetooth interface operating mode, refer to the *CANlink wireless Series 3000 Manual* and *Byte Command Manual* manuals on the Download Center.

5.7. CAN-WLAN Interface

Operation as a CAN-WLAN interface enables wireless transmission of CAN data to other WLAN-capable devices such as the CANlink wireless, PCs, smartphones or tablets. The CAN data is then recorded and evaluated on these devices. The data transfer is bidirectional with the support of the Proemion Byte Command Protocol as soon as the software has created a connection to the device.

We recommend using the Proemion Dashboard software for visualization and evaluation of the data received. Alternatively, you can use software you program yourself.

The device can be integrated in an available network infrastructure (infrastructure mode). As a mini access point, the device can function as WLAN access point, providing a WLAN in infrastructure mode for other WLAN-capable devices. Then the device can provide the network parameters via a DHCP server.

	For more information on the CAN-WLAN interface operating mode, refer to the *CANlink wireless Series 3000 Manual* and *Byte Command Manual* manuals on the Download Center.

5.8. Connecting the Device to the DataPlatform

Before starting the device for the first time, you must connect it to the DataPlatform.

1. Connect the power supply unit with the power connector of the *start cable for main plug connector cable*.
2. Plug the power supply unit into the mains power supply.

   ¬ The ON LED lights up in constant green.
   ¬ The STATUS LED flashes green.

3. Wait until the STATUS LED lights up continuously.

   ¬ The device is now connected to the DataPlatform.

4. Log into the DataPortal and check that the device is connected to the DataPlatform.
5. If your device does not appear in the machine overview, you must activate the device first.

5.9. Mounting the Device

Below you will find instructions on how to mount the device.
To ensure the housing provides proper fire protection and to achieve the best possible reception of radio signals, make sure you install the device in the correct position.

NOTICE

Risk of property damage.

* The device can be mounted with the plugs pointing to the left or right. Mounting with the plugs pointing up is not permitted. Mounting with the plugs pointing down is not recommended due to the risk of water ingress.
* Only mount the device in one of the installation orientations shown in this chapter.
* The device is protected against mechanical impacts according to class IK07 (IEC62262 impact energy 2 joules). To achieve a higher class, you must provide external protection when installing the device

NOTICE

Reduced antenna gain
Problems with the mobile network connectivity can be caused by an insufficient antenna setup.

* Do not extend the antenna cable.
* Only use the antennas which are supplied as accessories by Proemion.
* Change the mounting position of the CANlink mobile to reduce the distance between antenna and the CANlink mobile or order an alternative antenna with longer antenna cable.
* In case of using the antenna supplied in the hardware kit: Ensure that the minimum bending radius of the antenna cables is greater than 8 times the outer diameter.

INFORMATION

The mounting material is not included in the scope of delivery.
Optionally, you can use the *MOUNTING SET M5 HOUSING GH1208* (part number 141000017).
The mounting set contains the following components:

* 2 socket-head screws `DIN912 – M5 x 30 mm`
* 4 lock washers `M5, di/da = 5.3/9 mm`
* 2 hexagon nuts `DIN934 / ISO4032 – M5`

5.9.1. Mounting Orientations

The view elements of the two LEDs on the device do not comply with the flammability class required for a fire protection housing.

Fire protection of the housing is only guaranteed in the installation positions shown in figures `A`, `B` or `C`.

Please note that fire protection is not guaranteed in the installation positions shown in figures `I` and `II`.

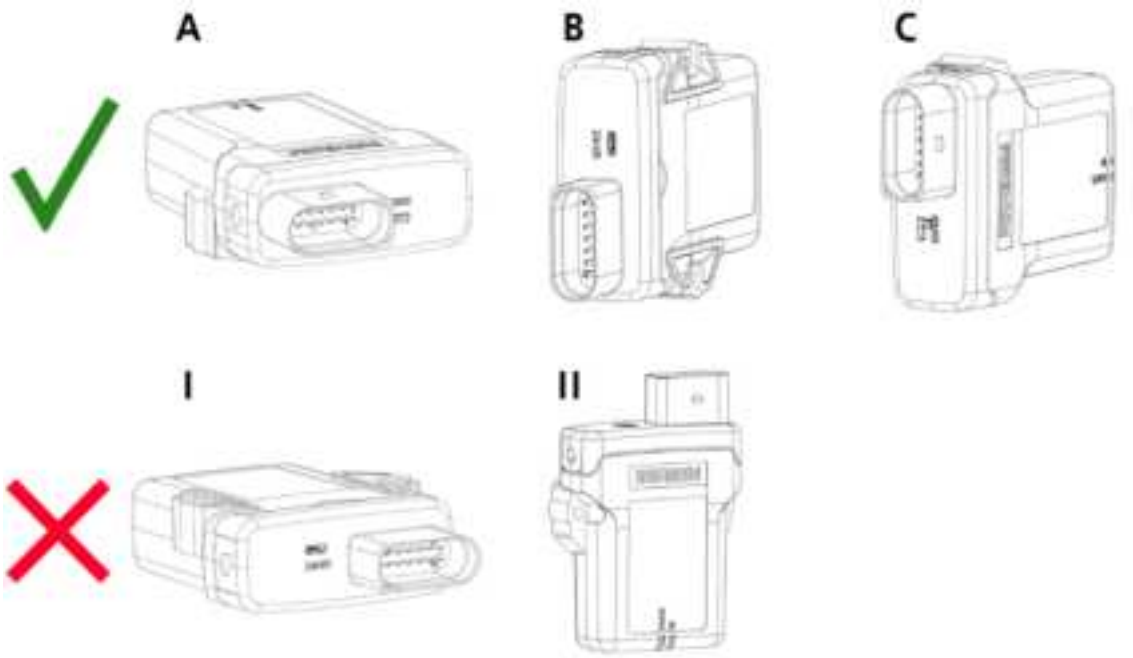


Figure 37. Mounting orientations of CANlink mobile 3000

NOTICE

Water ingress

* Please make sure that the mounting orientation of your device is either as shown in figure `A`, `B` or `C`.

NOTICE

Reduced antenna gain

* Please be aware that the recommended mounting orientation for devices with internal antenna is as shown in figure `A`.

5.9.2. Antenna Positioning

The internal antennas (types 3311, 3333, 3337, 3611, 3633, 3637) are installed inside the housing on the top of the device. For the best possible reception of GNSS, Bluetooth, WLAN and mobile radio signals, the device should be mounted in the position shown here.

NOTICE

Inadequate radio connection.
The radio connection is influenced by RF-damping labels, objects, or walls.

* Only mount the device in the installation position shown in chapter Mounting the Device.
* Choose the mounting location so that as few obstructions as possible can influence the radio connection.
* Do not stick additional labels on the device. Depending on the nature of the material, these stickers can severely impair the signal quality.
* The integrator must not modify the device (i.e. place RF-damping labels on it) or mount the device in such a way, that antenna performance is influenced.
* It is the full responsibility of the integrator, to integrate the device in his application in such a way, that an adequate antenna performance is achieved, and the regulatory requirements are fulfilled.

CANlink mobile 3600

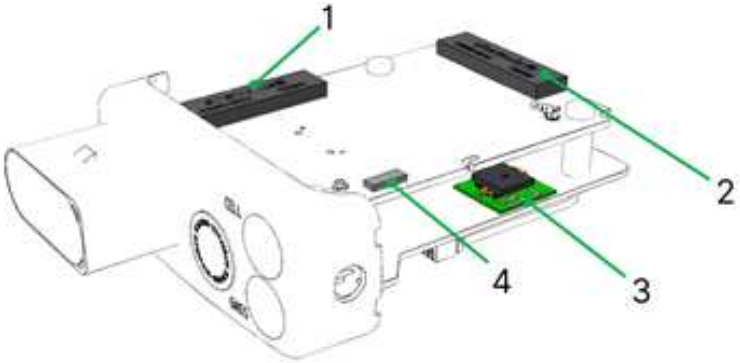


Figure 38. Antenna locations in CANlink mobile 3600

1. Diversity mobile radio antenna
2. Main mobile radio antenna
3. Bluetooth/WLAN antenna
4. GNSS antenna

CANlink mobile 3000

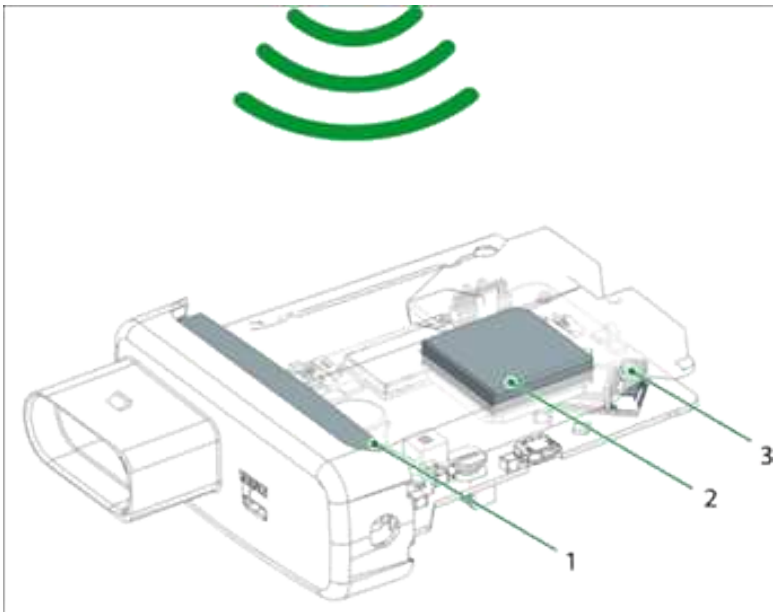


Figure 39. Antenna locations in CANlink mobile 3000

1. Mobile radio antenna
2. GNSS antenna
3. Bluetooth/WLAN antenna

5.9.3. Mounting

Mount the device directly with 2 socket-head screws (M5) inserted in the mounting holes on the sides and screwed to the mounting surface. For detailed information on the distances between the holes, see Technical Drawings.

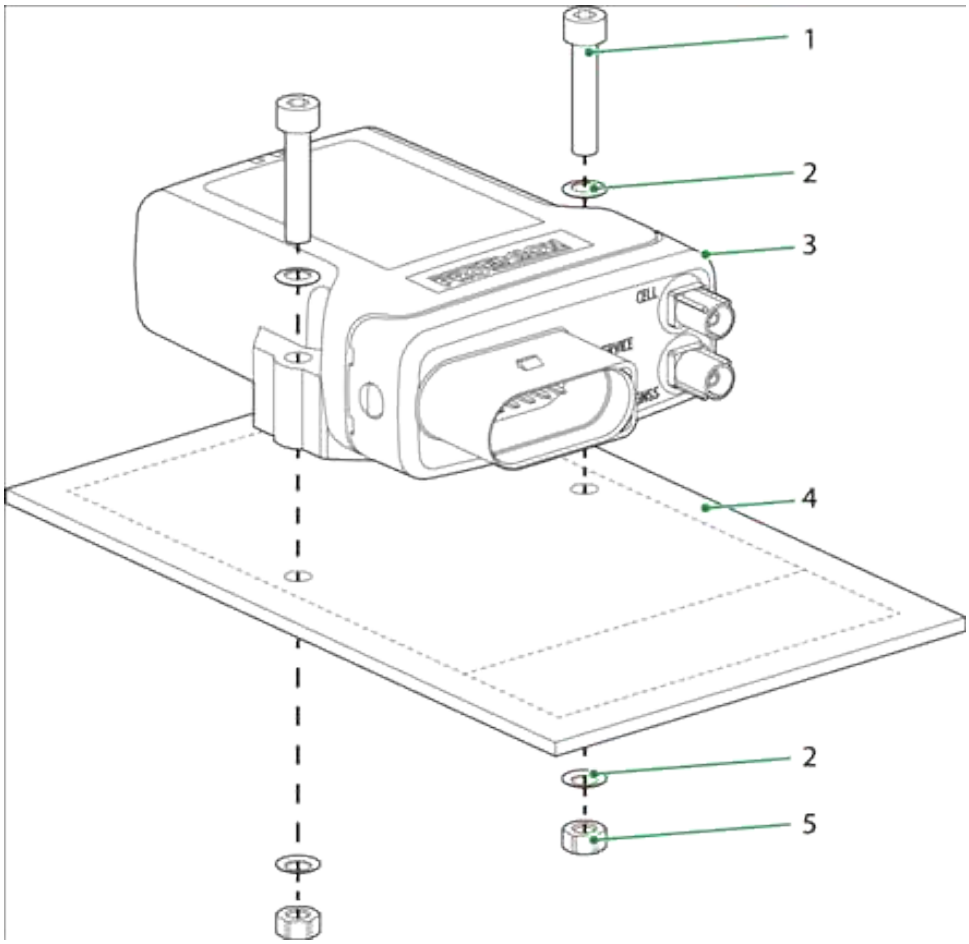


Figure 40. Direct screw mounting, horizontal

1. Socket-head screw `DIN912 – M5 x 30 mm`
2. Lock washer `M5, di/da = 5.3/9 mm`
3. CANlinkmobile
4. Screw mounting surface `D = 3 mm`
5. Hexagon nut `DIN934 / ISO4032 – M5`

NOTICE

The recommended tightening torque for assembly is 2.2Nm

5.10. Installation Study

In order to ensure correct operation of the CANlink mobile hardware when it is installed on the machine under real setup and environmental conditions, Proemion recommends performing an installation study..

The installation study ideally consists of two phases:

#	Phase	Description
1	Verification	In the initial phase of the installation study, it is essential to verify the setup requirements in regards to the specification of the CANlink mobile.
2	Validation	During the validation phase, the device is tested under real operating conditions and its suitability for the planned application is assessed. Several iterations and corrective actions may be required at this stage.

5.10.1. Verification

The machine manufacturer and system integrator needs to clarify the issues according to the checklist below:

Table 42. Checkpoints for Verification

#	Checkpoint
1	Specify the setup and environmental conditions of the planned application at the final destination of the machine.
2	Ensure that the setup conditions within the machine and the environmental conditions meet the specification of the CANlink mobile.
3	Make sure that the CANlink mobile can be installed according to the recommendation in the chapters Cable Management and Mounting the Device.
4	Check that the antenna can be installed and aligned as recommended in chapters Mobile Radio and GNSS Antenna, Antenna Positioning.
5	Check that the recommended settings from chapter Power management can be realized with the machine setup.

For more information regarding the initial setup, also refer to the document CANlink mobile 3000 Quick Start Guide at the Download Center.

5.10.2. Validation

Once the Verification of the setup and environmental conditions regarding the specification of the CANlink mobile was completed, it is recommended to proceed with the validation. At this stage of the system integration, the suitability of the CANlink mobile for the above-mentioned criteria under real setup conditions must be determined. It is also advisable to evaluate the setup already in the prototype phase concerning power management, remote update ability, data consumption, remote and signal strength.

Prerequisites

Before the validation can be started, the machine manufacturer and system integrator must meet the following requirements:

Table 43. Prerequisites for Validation

#	Prerequisite
1	The machine and the programming of its control units correspond to the final series status.
2	The machine is available for validation under real operating conditions for at least one week.
3	The CANlink mobile is installed according to Mounting the Device.
4	The CANlink mobile is wired according to Cable Management and Power management.
5	The CAN baudrate(s) of the CANlink mobile are set correctly. The default CAN baudrate is `250 kbit/s`. Please make sure that the CAN baud rate (s) at the machine are matching the CAN baud rates of the individual CAN interfaces of the CANlink mobile.
6	The antenna is installed and aligned according to Mobile Radio and GNSS Antenna, Mobile Radio and GNSS Antenna and Antenna Positioning.
7	All cables, antennas, hoses, etc. must be laid and connected.
8	All housing parts of the machine must be installed according to the final series status.
9	The CANlink mobile was activated according to Provisioning / Go Live and is available with the status *live* within your DataPortal account.

For more information regarding the initial setup, also refer to the document CANlink mobile 3000 Quick Start Guide at the Download Center .

Perform Installation Study

In case that the necessary prerequisites are fulfilled, it is recommended to perform an installation study under real setup and environmental conditions.

1. Login with your DataPortal user.
2. Check the firmware status of the CANlink mobile according to chapter Firmware Management at the DataPortal User Manual. If necessary, update the firmware of the CANlink mobile to the latest official firmware version.

   Whenever a remote update is done, it is recommended to follow the instruction according to the Safe Remote Updates Guideline.

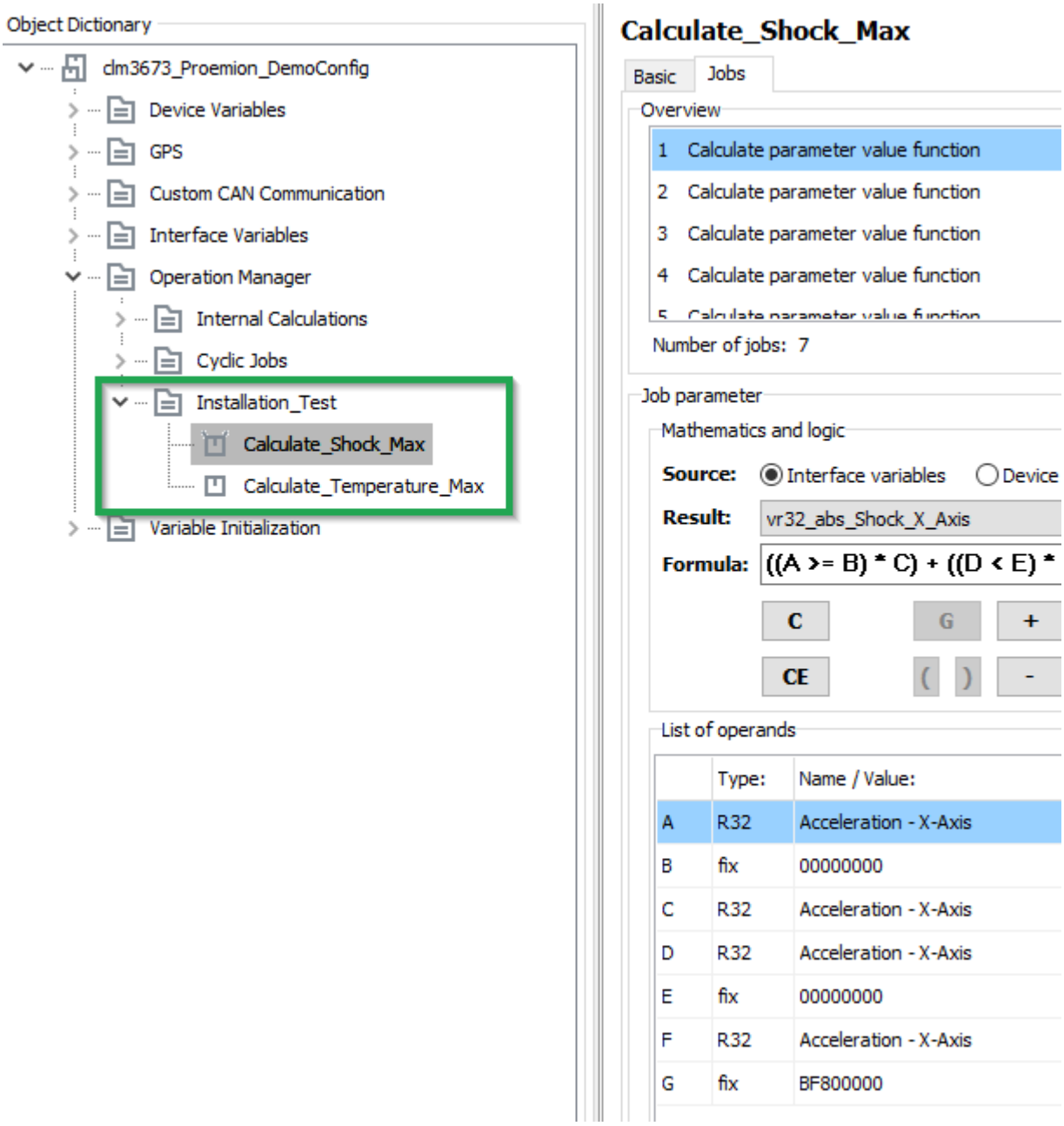
3. Download the *PROEMION_DemoConfig.pdc* file from the Download Center and assign it to the corresponding machine model which needs to be evaluated. See also chapter PDC Management at the DataPortal User Manual.
4. Download the demo configuration for the used CANlink mobile from the Download Center.

   The *PROEMION_DemoConfig.pdc* and *clm36xx_Proemion_DemoConfig.DOD* configuration files are designed to transfer and parse a few selected standard metrics from the J1939 standard, as well as values from the internal sensors. In the installation study, in particular the acceleration values and the device temperature are taken into account.

   In case that the machine data is not in accordance with the J1939 standard, add the device parameters to the customized device configuration and PDC. Please get in contact with the Proemion Support for further assistance with the configuration of the test setup.

5. Open the *clm36xx_Proemion_DemoConfig.DOD* with the Proemion Configurator software. Please also refer to Configuring the Device.
6. Ensure that the configuration contains the operations *Calculate_Shock_Max* and *Calculate_Temperature_Max*.

   Demo Configuration for Install Study



If the required demo configuration for your specific variant of the CANlink mobile is not available at the Download Center yet, please get in contact with the Proemion Support.

7. Adapt the configuration in regard to CAN baudrate and [Power Management].

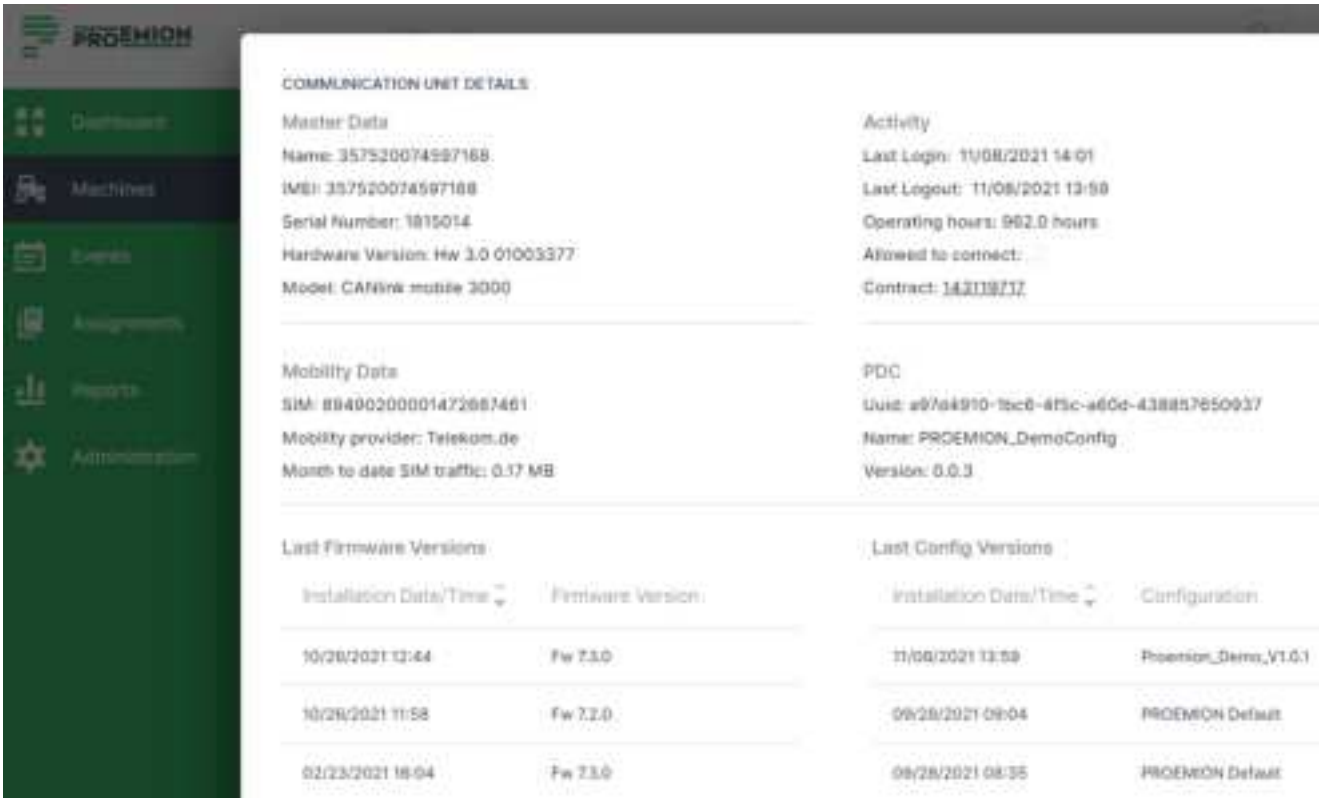
It is essential for a successful installation study and optimized data consumption, to have already a clarified concept about the required Power management settings and the connected CAN bus. Ideally, the terminal 15 monitoring is established and there is no CAN traffic when the ignition key is off.

8. Update the device configuration according to chapter Configuration update via DataPlatform.

Whenever a remote update is done, it is recommended to follow the instructions according to the Safe Remote Updates Guideline.

9. Check the status of the communication unit. See chapter Communication Details at the DataPortal User Manual manual.

   Communication Unit Update History

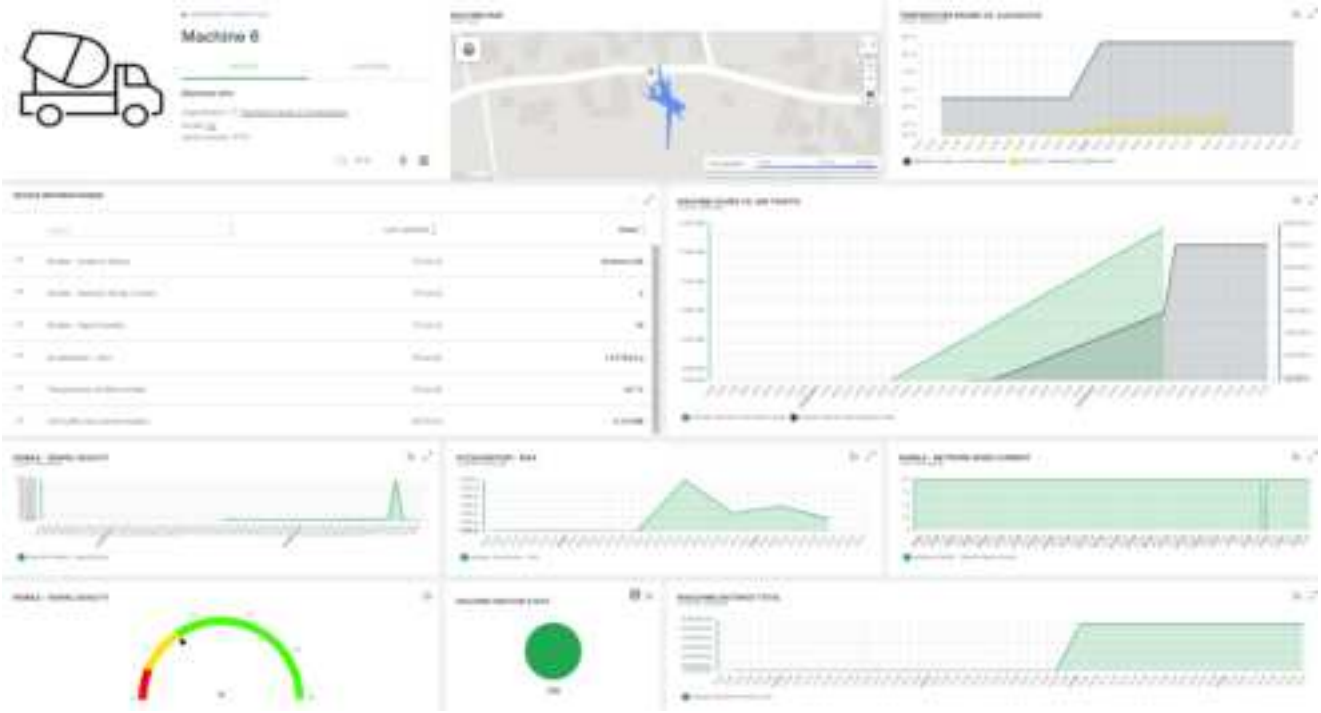


10. Once the configuration files are installed and assigned, start with the install study under real conditions of use and monitor the parameters as mentioned in the table

Table 44. Tests for System Integration

#	Check
1	Ensure that the wakeup and shutdown behavior is correct and in accordance with recommended [Power Management] settings.
2	Ensure that the device temperature stays within the allowed range during real machine operation.
3	Monitor the maximum shock values. Perform corrective action if it turns out that there is too much vibration and shock at the installed CANlink mobile.
4	Monitor the mobile network signal quality. Optimize the antenna position if necessary.
5	Ensure that the logged metrics from the machine are displayed correctly. Check the CAN bus connection if necessary.
6	During the system integration also monitor the current mobile network mode.

Dashboard for Monitoring



Please get in contact with support@proemion.com, if further assistance with adding the necessary device parameters to the logging configuration and default PDC file is required.

11. Once the install study with the default configuration is completed, install and assign your customized configuration files (`.dod` and `.pdc`).
12. With the customized configuration files installed, check again the power management settings. Make sure that the device is switched on and off by the terminal 15.
13. Ensure that all configured signals are complete and transmitted correctly.
14. Check the SIM traffic in relation to the machine operation hours and transmitted signals. Make sure that the consumed data volume under real conditions of use corresponds to the selected hosting contract.
15. Carry out continuous visual checks on the hardware.
16. When the installation study is complete, ensure that CANlink mobile has not been adversely affected in the tested mounting position.

Table 45. Additional Tests for System Integration

#	Check
1	Ensure that the device was not harmed by water ingress during the installation study.
2	Ensure that the housing material of device was not harmed by chemicals during the installation study.
3	Ensure that the device and its cable management was not harmed by maximum shock values.

17. In the event that the installation study has revealed any weak points, take appropriate corrective measures and repeat the installation study.
18. Perform the configuration update with the `*.dod` for the final application. Follow the instructions from the Safe Remote Updates Guideline.
19. When the installation investigation has been successfully completed, adjust your device configuration PDC Management and Dashboard Management for the final application. The recording of device temperature, shock values, signal quality, etc. is not required for the customer application.

6. Operation

This chapter contains information on operating the device and the Proemion Configurator software.

6.1. Proemion Configurator

Configure the device using the Proemion Configurator. See also Customizing the demo configuration File. To alter the configuration of your device, first connect it to the PC. See Connecting the Device to the PC.

INFORMATION

Before you connect the device to a USB port on your PC, install the USB driver packet from the Download Center. See Installing Software.

INFORMATION

You can find additional information on the individual objects (device variables) in Proemion Configurator under the *Additional Information* field for each object.
Always use the latest version of Proemion Configurator with the updated information texts.

TIP

Download the current software version from our website.

The Proemion Configurator software can be downloaded at our website: Document Library or Download Center

In case of problems, the Connectivity check utility can be used to check the connectivity of our software tools with our services from your site's network.

6.1.1. Creating Object Dictionary Groups and Objects

You can use the Proemion Configurator tree structure to create, rename, or delete object dictionary groups or objects.

This chapter explains how to create object dictionary groups and objects.

The following example shows creation of the object RECEIVE MESSAGE PDO. This object is used to receive and log CAN messages.

To create the object, you need the CUSTOM CAN COMMUNICATION object dictionary group and then the RECEIVE CAN MESSAGES (PDOs) object dictionary group.

1. Start the Proemion Configuratorsoftware.
2. Choose FILE ¬ OPEN from the menu.
3. Open the configuration file you want.
4. Right-click on the top entry in the tree structure to open the context menu.
5. In the context menu, click on NEW OBJECT DICTIONARY GROUP ¬ CUSTOM CAN COMMUNICATION.

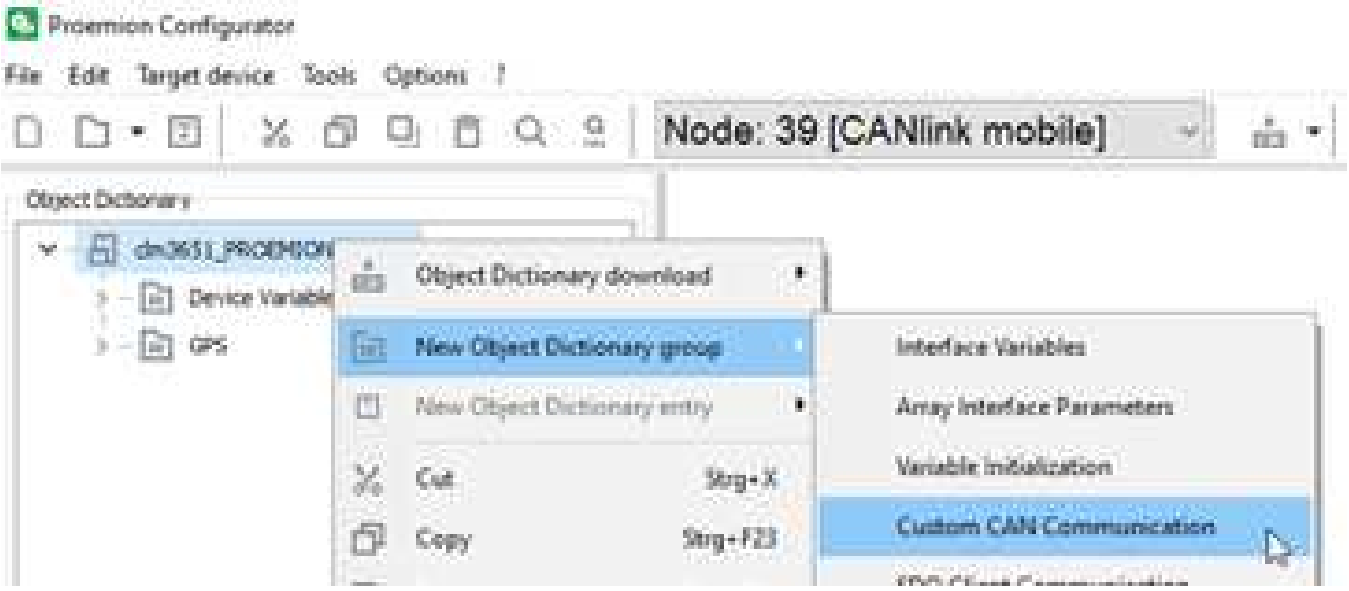


Figure 41. Object Dictionary Group - CUSTOM CAN COMMUNICATION

6. Right-click on the object dictionary group CUSTOM CAN COMMUNICATION.
7. In the context menu, click on NEW OBJECT DICTIONARY GROUP ¬ RECEIVE CAN MESSAGES (PDOs)

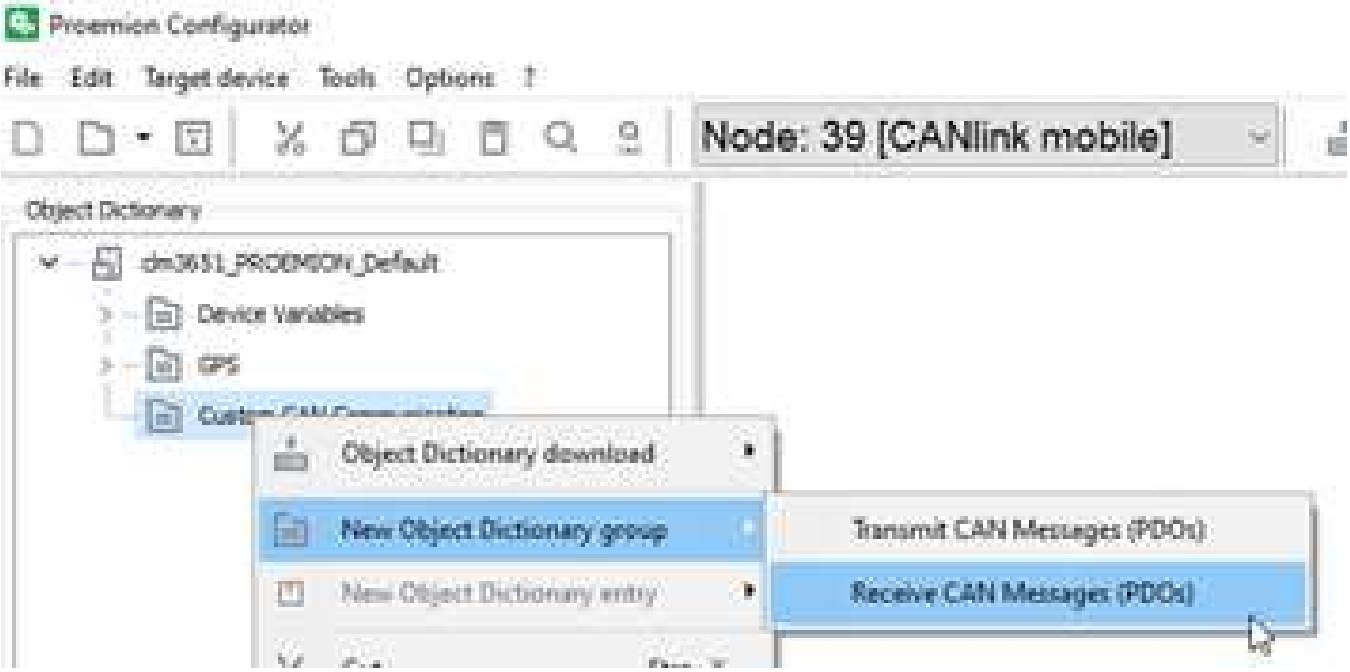


Figure 42. Object Dictionary Group - RECEIVE CAN MESSAGES (PDOS)

8. In the context menu, click on NEW OBJECT DICTIONARY ENTRY ¬ RECEIVE MESSAGE PDO.

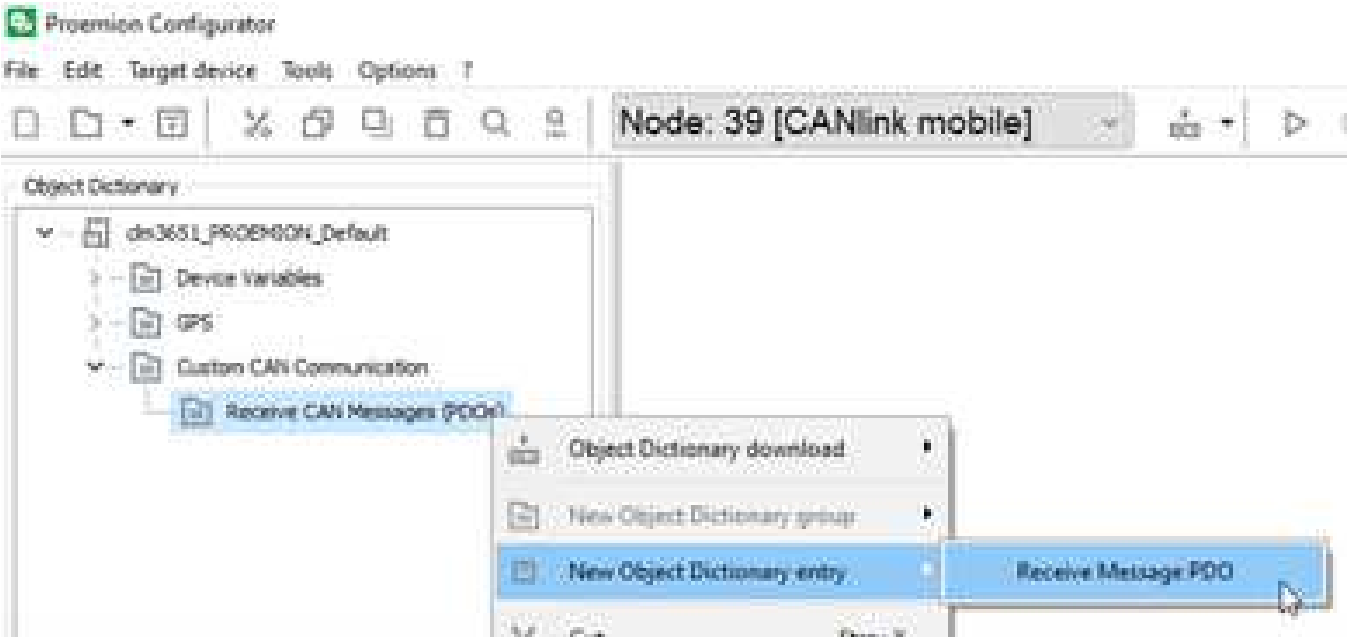


Figure 43. NUMBER OF NEW OBJECTS AND THEIR VERSION

9. In the NUMBER OF NEW OBJECTS field, enter how many objects (received messages) you want to create.

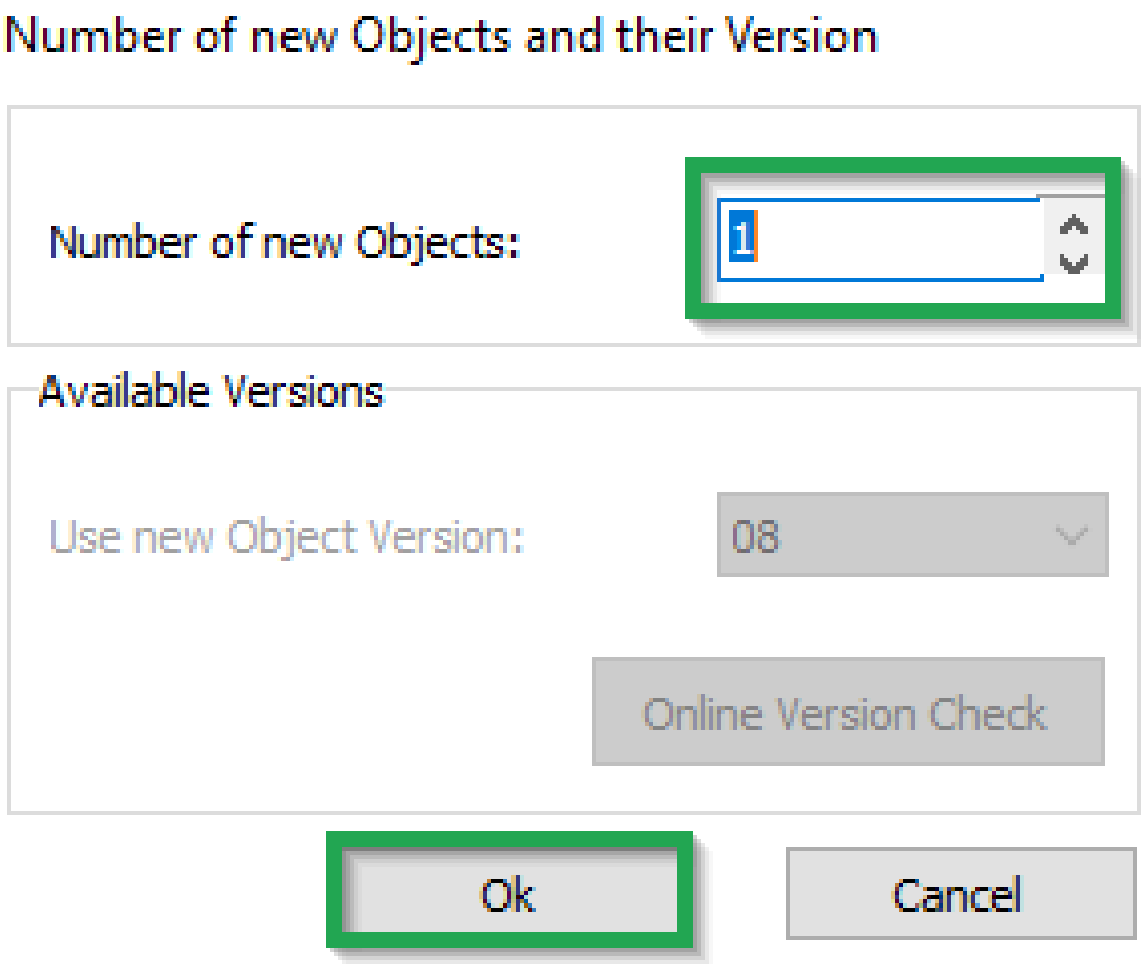


Figure 44. NUMBER OF NEW OBJECTS

10. Click OK.
    ¬ The object RECEIVE MESSAGE PDO is created.
11. To rename an entry in the tree structure, click on the corresponding entry to select it. Click on the entry again to rename it.

6.2. Logging Mode

In Logging mode, the device logs CAN messages, GNSS data, and internal variables.

All the recorded data is saved in an internal, nonvolatile memory and automatically sent to the DataPlatform when a connection is available.

NOTICE

The internal nonvolatile memory also stores recorded data as `*.CLF`-files. The maximum number of files which can be stored on the internal memory is 4000 files with a file size up to 1 KB. When the total of 4000 files is reached, newly saved files will overwrite the oldest file.

NOTICE

After the first initialization, the device is automatically in Logging mode. If it is then switched to RealTime mode, the device remains in RealTime mode after a restart.

NOTICE

Before you start logging data, check the device status in the machine overview in the DataPortal. The device must be in Logging mode.

The colored dot in the machines list indicates the status:
* Grey – device is offline
* Green – device is in Logging mode
* Blue – device is in RealTime mode
To change the device mode, go to the machine details page, click Manage ¬ Advanced Functions ¬ Device mode

For further information on the DataPortal functionality, refer to the Document Library.

6.2.1. Configuring Logging mode

1. Start the Proemion Configurator software.
2. Choose FILE ¬ OPEN from the menu.
3. Open the configuration file you want.
4. Click on the DEVICE MODE (CONFIGURED) variable in the DEVICE VARIABLES object dictionary group.

Figure 45. DEVICE VARIABLES Object Dictionary

5. In the DEVICE MODE (CONFIGURED) field, enter the value 0.
   ¬Logging mode is enabled.

NOTICE

Pay attention to configuration of the DEVICE-MODE variable when starting up the device for the first time.

After manual switchover of the connection mode or after an automatic switchover by a RealTime client software, the device remains in the mode last activated.

* If required, configure the automatic switchover of the device. See Configure automatic switch back to logging mode.

6.2.2. Configure automatic switch back to logging mode

The device is equipped with an automatic switchover function from RealTime to Logging mode.

Usually,the device is set to Logging mode and transmitting data to the DataPlatform. In case that a service engineer needs to establish a Realtime session for getting access to the CAN bus, the device is switched from Logging mode to RealTime mode. When the Realtime session was stopped, the device will automatically switch over to the Logging mode after a specified period. This will avoid a lack of logging data when the service engineer does not switch the device back to Logging mode when it is finished.

You can enable the automatic switchover function and determine a period (unit: `minutes`). If no RealTime signal is received from a RealTime client software within this period, the device automatically switches back to Logging mode.

1. Right click on DEVICE VARIABLES and select NEW OBJECT DICTIONARY ENTRY ¬ DEVICE VARIABLES.
2. When the DEVICE VARIABLES object dictionary group is open, add the REAL TIME MODE - SWITCH BACK TO LOGGING MODE TIME object to it.

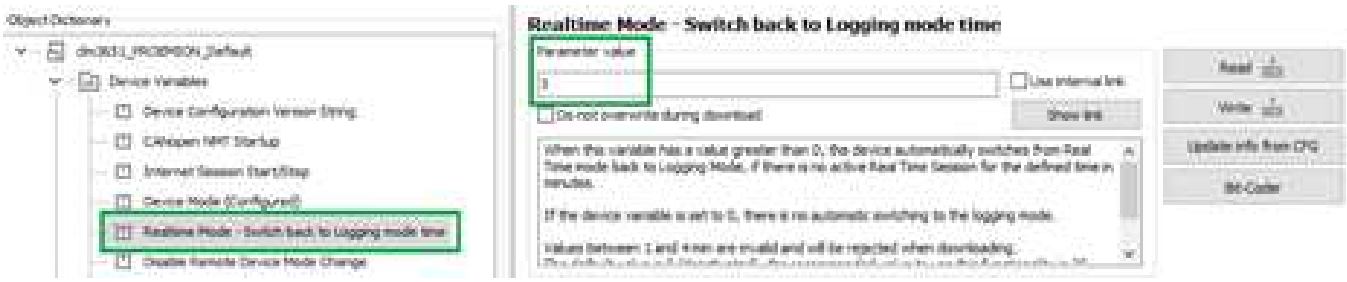


Figure 46. REALTIMEMODE -SWITCH BACK TO LOGGING MODE TIME

3. Enter the required value in the REALTIME MODE - SWITCH BACK TO LOGGING MODE TIME field.
4. Click on the SAVE CHANGES button to save the change.
   ¬ The automatic switchover function is enabled.

INFORMATION

The `value = 0` disables the automatic switchover function.
A `value >=5` enables the automatic switchover function and simultaneously defines the period after which the device switches to Logging mode.
Values from `1` to `4` are not permitted

6.2.3. Configuring variables for CAN communication

To enable CAN communication and data logging, you must configure the following variables.

CAN Settings

The variables required concern the CAN connection and belong to the object dictionary group DEVICE VARIABLES.

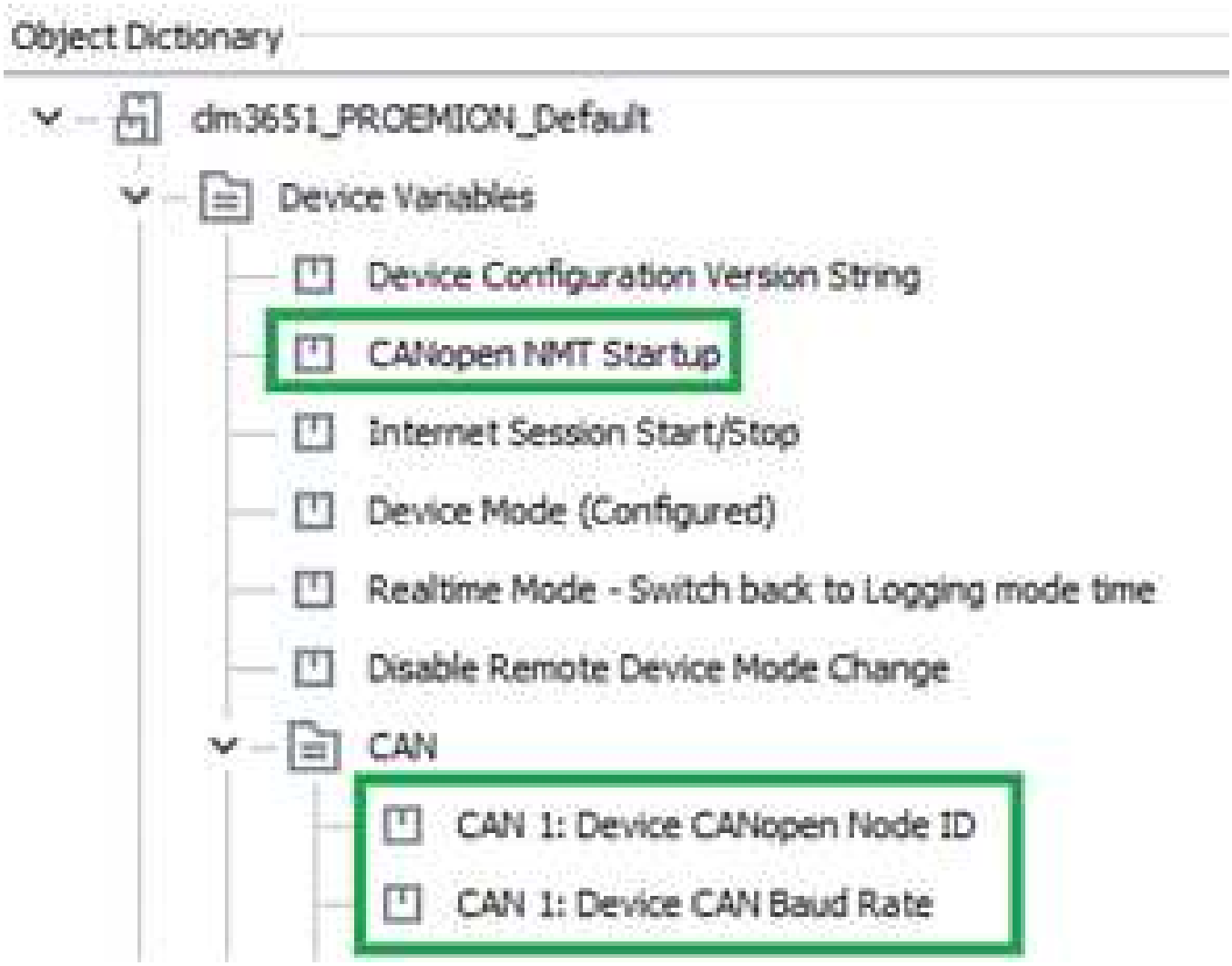


Figure 47. Object Dictionary Group DEVICE VARIABLES

Table 46. CAN Variables

Variable	Value	Function
CANOPEN NMT STARTUP	`0`	Automatically sets the device to CANopen mode "Operational".
CAN1/CAN2/CAN3:DEVICE CANOPEN NODE-ID	`1 … 127`	The CANopen node address (can be left at the standard value).
CAN1/CAN2/CAN3:DEVICE CAN BAUD RATE	min. 50 kbit/s; max. 1 Mbit/s (default: 250 kBit/s)	The baud rate at which the CAN bus operates.

Logging Variables

The variables required concern the logfile and belong to the DEVICE VARIABLES ¬ LOGGING object dictionary group.

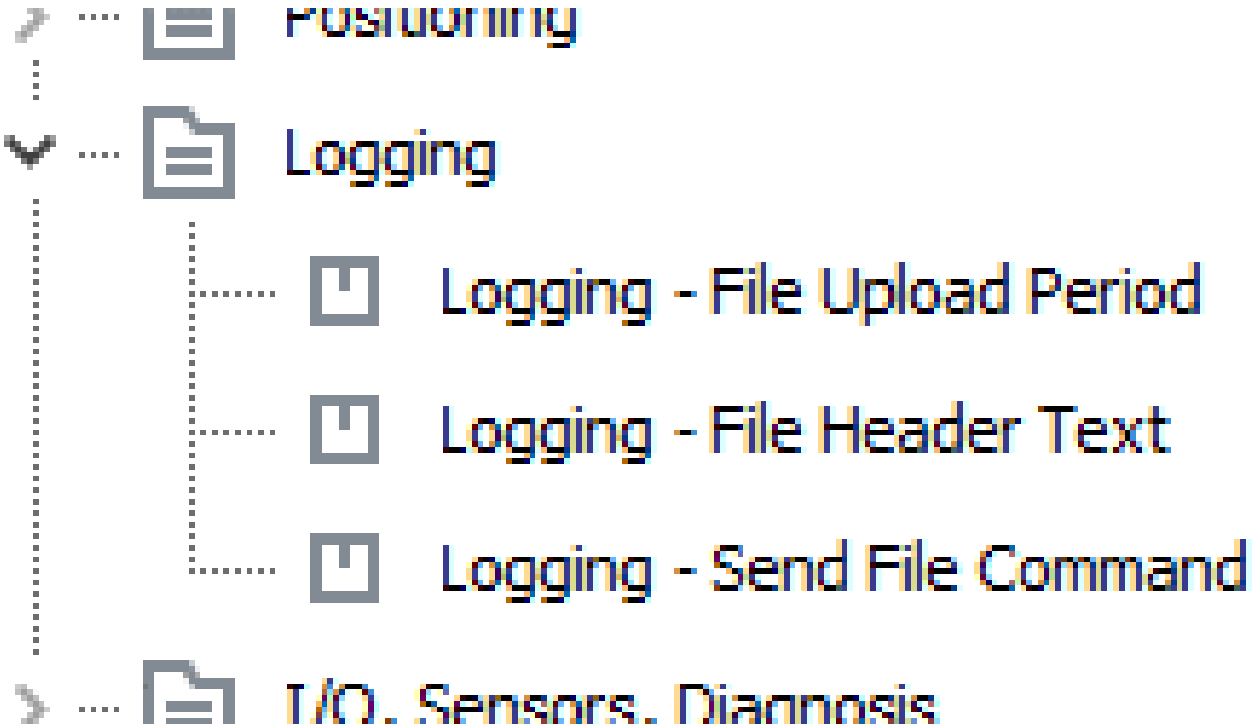


Figure 48. LOGGING Object Dictionary Group

Table 47. Logging Settings

Variable	Function
LOGGING – FILE UPLOAD PERIOD	Period in which the logfile is completed and sent to the DataPlatform. `value = 0 ` ¬ data is sent when the size of the logfile reaches 1 kB.
LOGGING – FILE HEADER TEXT	Information text in the header of each logfile. Can contain version information for instance (max. 32 characters).
LOGGING – SEND FILE COMMAND	Assign any value to the variable during operation in order to immediately close and transfer the existing logfile.

INFORMATION

The logfile is sent to the DataPlatform when its size reaches 1kb regardless of the period set.

6.2.4. CAN logging Example 1 – Cyclic logging

In the following, the example of a J1939 message is used to explain the general procedure for configuring CAN reception messages.
The procedure can also be applied to other CAN messages from other CAN protocols.
For detailed information on creating objects, see Creating Object Dictionary Groups and Objects.

CREATING A PGN 61444

1. Create the object dictionary group CUSTOM CAN COMMUNICATION > RECEIVE CAN MESSAGES (PDOS) .
2. Create the RECEIVE MESSAGE PDO object in the RECEIVE CAN MESSAGES (PDOS) object dictionary group you have created.
3. Rename the RECEIVE MESSAGE PDO object to PGN 61444.

RECEIVE MESSAGE COMMUNICATION PARAMETERS

1. Select the COMMUNICATION tab
2. Make the following settings.

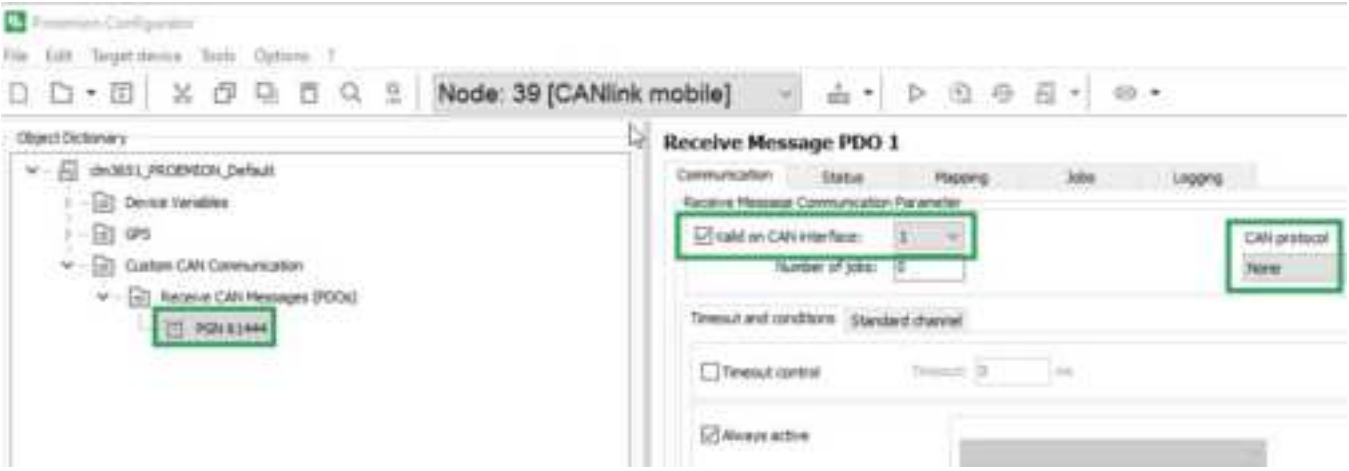


Table 48. Communication in PGN 61444

Description	Selection	Function
VALID ON CAN INTERFACE	Set	Enabling the configuration, defining the CAN interface for reception (if several are available).
CAN PROTOCOL	None	The receive CAN message is a single message (Layer 2). It is not treated according to a superordinate CAN protocol.

TIMEOUT AND CONDITIONS

Select the TIMEOUT AND CONDITIONS tab.

Make the following settings.

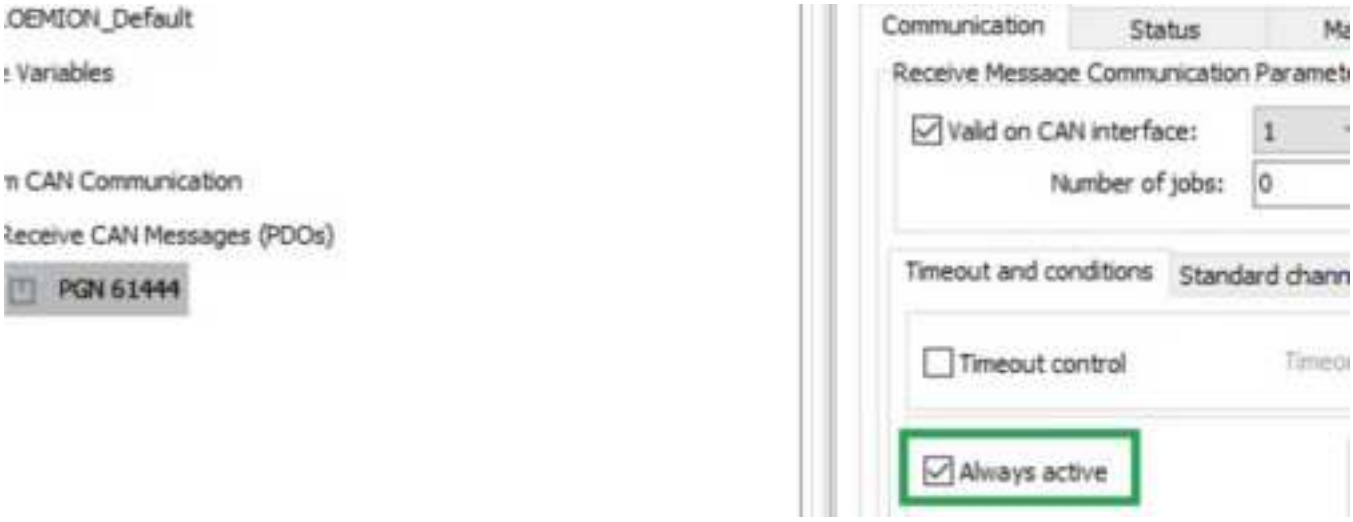


Table 49. Communication in PGN 61444 - Timeout and conditions

Description	Selection	Function
ALWAYS ACTIVE	Set	The CAN message is received irrespective of events or conditions.

STANDARD CHANNEL

Select the STANDARD CHANNEL tab.

Make the following settings.

Table 50. Communication in PGN 61444 - Standard Channel

Description	Selection	Function
FULL CAN MESSAGE OBJECT	Set	Assigns the receive message to a controller channel.
ID-LENGTH	29-bit ID	ID length of the CAN message to be received.
DOWN-SAMPLE	Set	Receive message max. every 100 ms.
COB-ID	Fix (`00F00400`)	Fixed identifier of the receive message (J1939 PGN 61444).
MASK	Fix (`00FFFF00`)	Determines that bits 8 … 24 of the identifier fixed in COB-ID must not vary in the identifier of the received message. In the J1939 protocol, the first bits of the identifier define the priority and the last bits of the identifier define the source address. These are ignored when the message is received.

LOG ALL DATA BYTES EVERY 60 SECONDS

In this example, all data bytes are simply logged cyclically every 60 seconds. There are no additional conditions, and the data bytes are not checked.

LOGGING - CONDITIONS

Define the following settings for the PGN 61444 object.

Select the LOGGING tab.

Select the CONDITIONS tab.

Make the following settings.

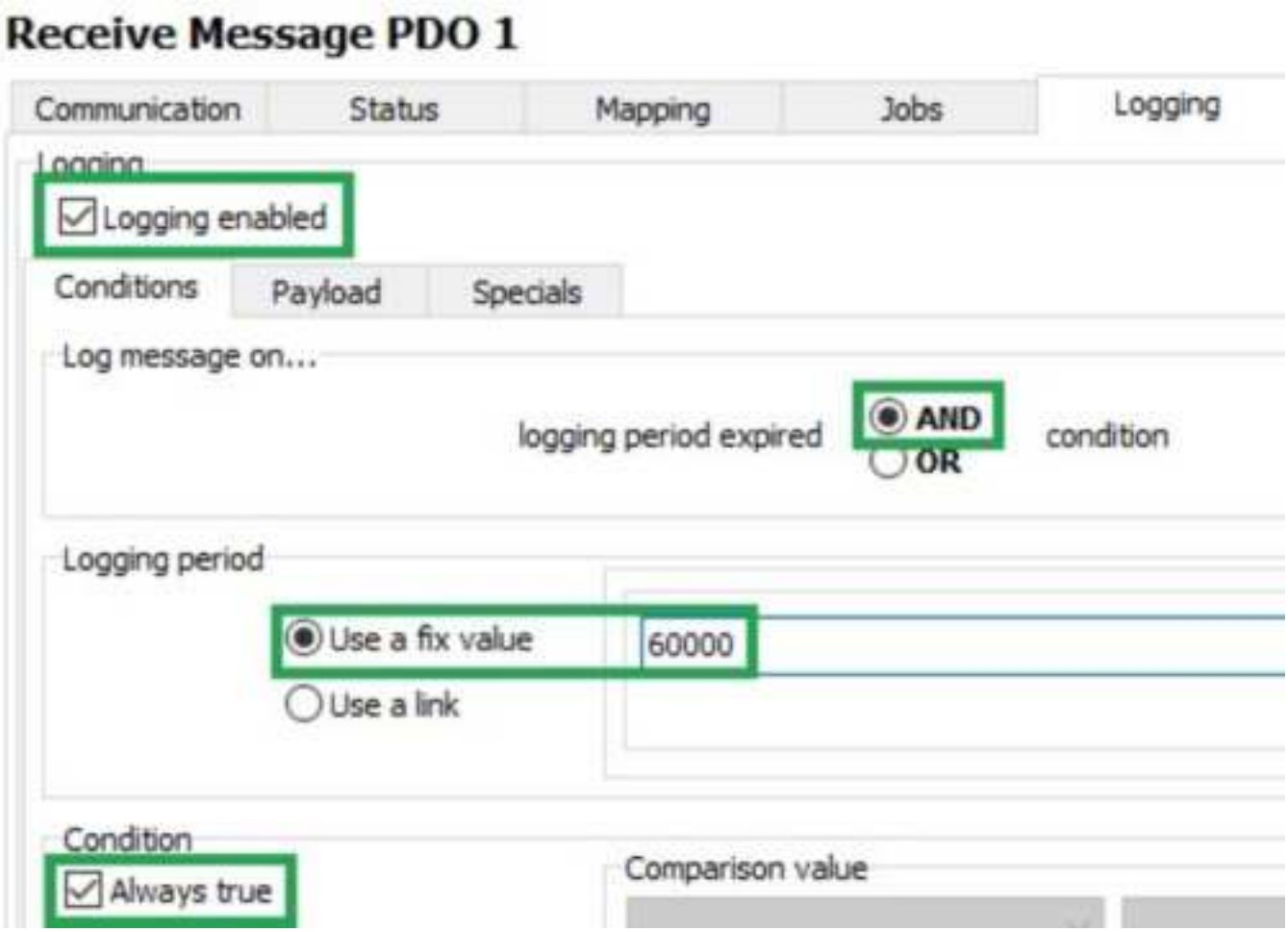


Table 51. Logging in PGN 61444 - Conditions

Description	Selection	Function
LOGGING ENABLED	Set	Logging enabled
LOG MESSAGE ON	AND	The data is only logged when timeout is reached AND the condition is met.
LOGGING PERIOD	Use a fixed value (60000)	Duration of the logging interval in milliseconds.
CONDITION / ALWAYS TRUE	Set	Logging takes place without prior checking of conditions.

Payload

Select the PAYLOAD tab.

Make the following settings.

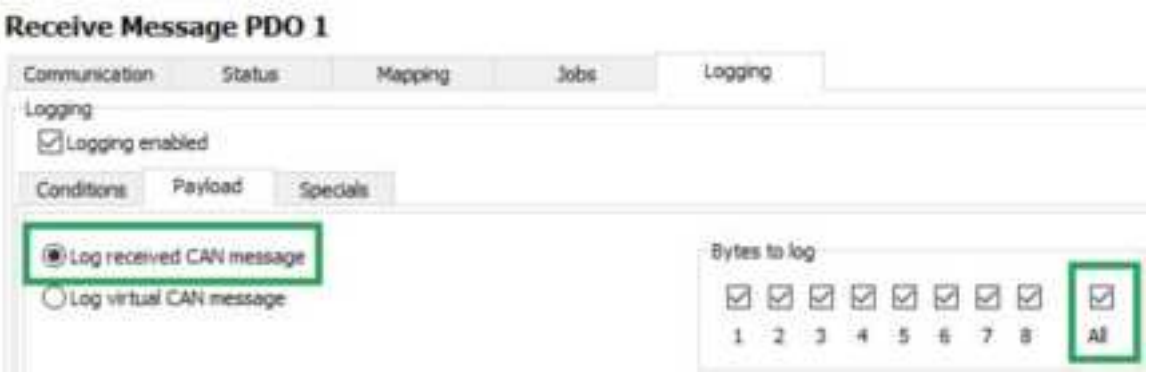


Table 52. Logging in PGN 61444 - Payload

Description	Selection	Function
LOG RECEIVED CAN MESSAGE	Set	Log data of the receive CAN message.
BYTES TO LOG	All	Log all data bytes.

Click on the SAVE button.

Load the configuration to the device. See Loading the Configuration to the Device via CAN Interface.

¬ You have completed the configuration for logging of all data bytes of the J1939 PGN 61444 every 60 seconds.

6.2.5. CAN logging Example 2 – Logging specific data bytes under certain conditions

In this example, specific data bytes are logged under defined conditions.

Data bytes 2 … 5 and 8 of the CAN messages received are logged when the engine speed (data bytes 4 and 5) changes by ± 500 rpm, or every 10 minutes.

A received CAN message is processed with the following functions:

- Mapping
- Jobs
- Logging

VARIABLES

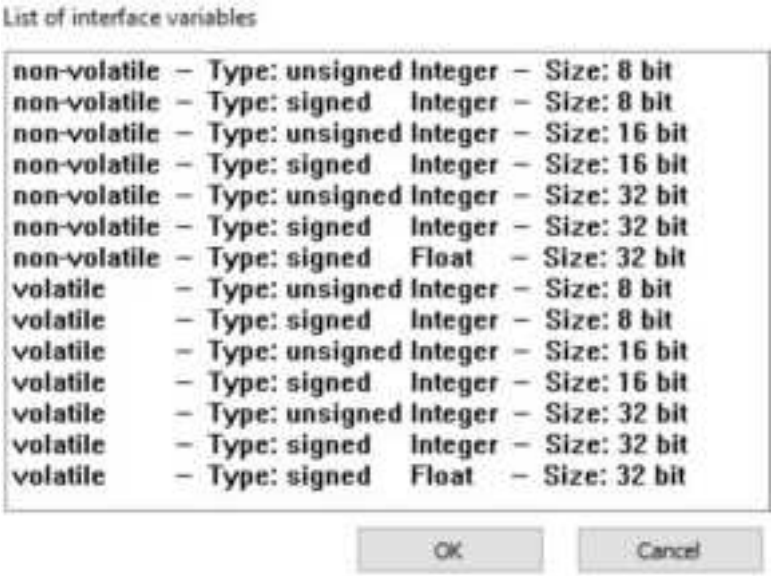
If you want to log data under defined conditions, you need certain variables for checking values.

These variables belong to the INTERFACE VARIABLES object dictionary group.

Create the INTERFACE VARIABLES object dictionary group.

In the INTERFACE VARIABLES object dictionary group, create four new INTERFACE VARIABLE objects.

¬ The LIST OF INTERFACE VARIABLES window opens.



Select the first INTERFACE VARIABLE object according to the following table.

Table 53. Interface Variable object

Designation	Type	Sign	Size
volatile U8 Trigger	volatile	unsigned	8 bits
volatile S32 Engine Speed new	volatile	signed	32 bits
volatile S32 Engine Speed old	volatile	signed	32 bits
non-volatile U16 threshold value	non-volatile	unsigned	16 bits

Click on the OK button.

¬ The INTERFACE VARIABLE object with the selected settings is created.

Repeat this procedure for the other three INTERFACE VARIABLE objects.

Rename the four INTERFACE VARIABLE objects according to the table.

Define a threshold value for the NON-VOLATILE U16 THRESHOLD VALUE object.

¬ The four INTERFACE VARIABLE objects are displayed

LOGGING – CONDITIONS

Define the following settings for the PGN 61444 object.

Select the LOGGING tab.

Select the CONDITIONS tab.

Make the following settings.

Table 54. Logging in PGN 61444 - Conditions

Description	Selection	Function
LOG MESSAGE ON	`OR`	The data is logged when timeout is reached OR the condition is met.
LOGGING PERIOD	Use a fixed value (`600000`)	Duration of the logging interval in milliseconds.
CONDITION / ALWAYS TRUE	not set	The data is logged depending on the result of the check.
COMPARISON VALUE	`volatile U8 Trigger`	Logging depends on the VOLATILE U8 TRIGGER variable.
NUMBER OF BITS CONTAINING DATA	`08`	All 8 bits of the variable are compared with COMPARISON VALUE.
ACTIVE IF COMPARISON VALUE	`<>0`	Data is only logged if the variable VOLATILE U8 TRIGGER is not equal to 0.
TRIGGER CONDITION	Level triggered - This operation will be carried out each time the condition is true.	Logging is enabled as long as the variable VOLATILE U8 TRIGGER is not equal to 0.

PAYLOAD

Select the PAYLOAD tab.

Define the following settings.

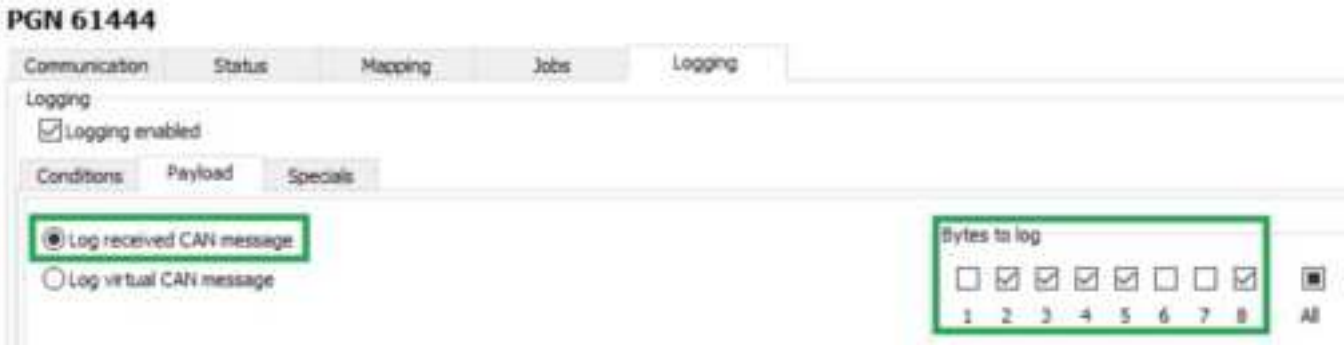


Table 55. Logging in PGN 61444 - Payload

Description	Selection	Function
LOG RECEIVED CAN MESSAGE	Set	Log data of the receive CAN message.
BYTES TO LOG	2 … 5 and 8	Logging selected data bytes

MAPPING - ACTIVE CONDITION

During mapping, data is copied from the CAN message to variables. You can then process the copied data in the device and perform calculations.

Select the MAPPING tab.

Select the ACTIVE CONDITION tab.

Define the following settings.

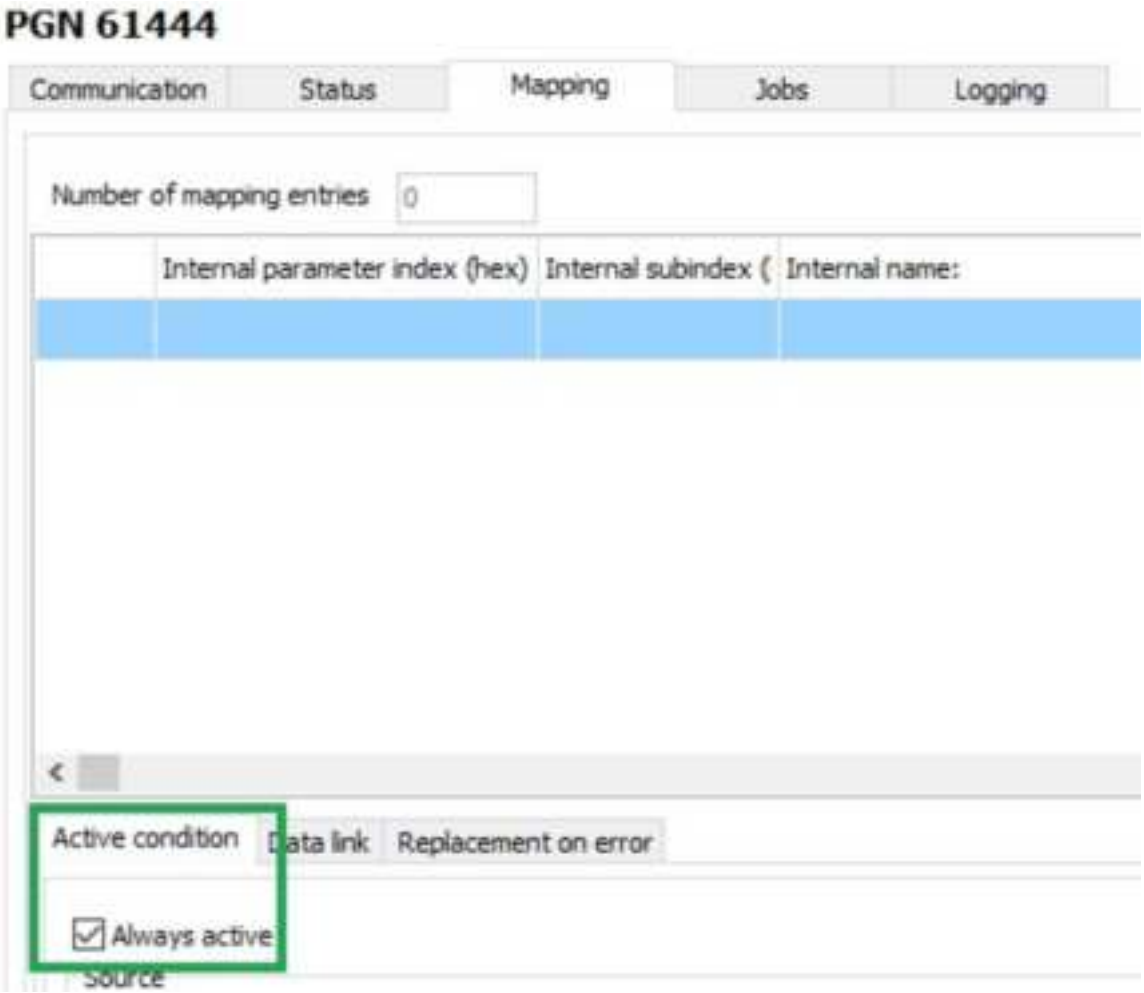


Table 56. Mapping in PGN 61444 – Active Condition

Description	Selection	Function
ALWAYS ACTIVE	Set	Mapping always takes place without conditions.

DATA LINK

Select the DATA LINK tab.

Define the following settings.

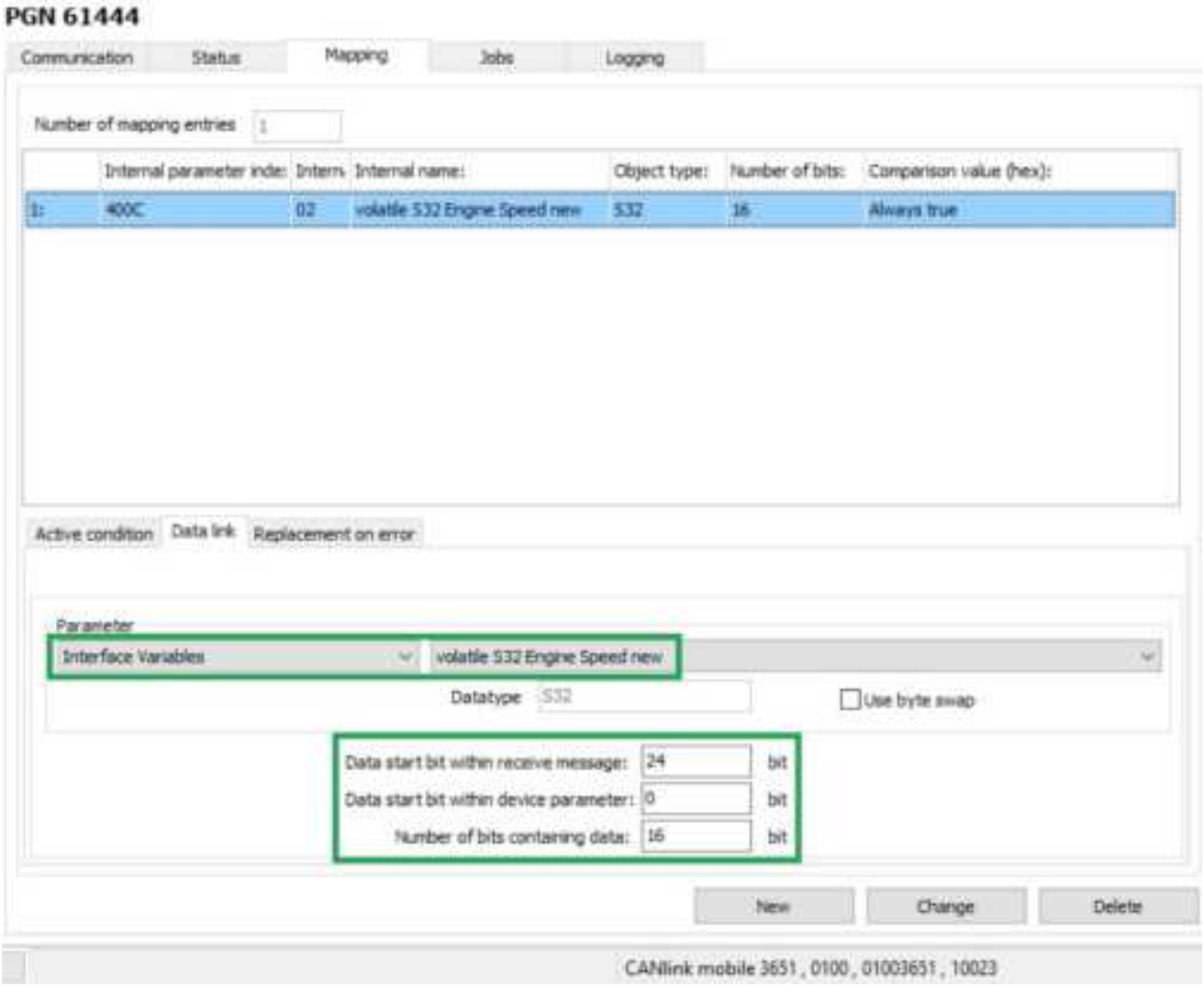


Table 57. Mapping in PGN 61444 – Data link

Description	Selection	Function
PARAMETER	volatile S32 Engine Speed new	The data is written to the VOLATILE S32 ENGINE SPEED NEW variable.
DATA START BIT WITHIN RECEIVE MESSAGE	24 bits	The data used starts with bit 24 (from the 4th byte).
DATA START BIT WITHIN DEVICE PARAMETER	0 bits	The data used begins from bit 0
NUMBER OF BITS CONTAINING DATA	16 bits	The data used has 16 bits (2 bytes).

Click on the NEW button to create the mapping entry.

¬ The mapping entry is adopted in the table.

¬ The data is copied into the internal variable on reception of a CAN message.

JOBS

Every time a CAN message is received, jobs are performed after mapping and before logging.

In the JOBS tab, configure the calculation operations you need for your job.

For the example configuration, you need two jobs with the function CALCULATE PARAMETER VALUE FUNCTION. With this function, you perform calculation operations and overwrite interface variables with calculated values.

JOB 1

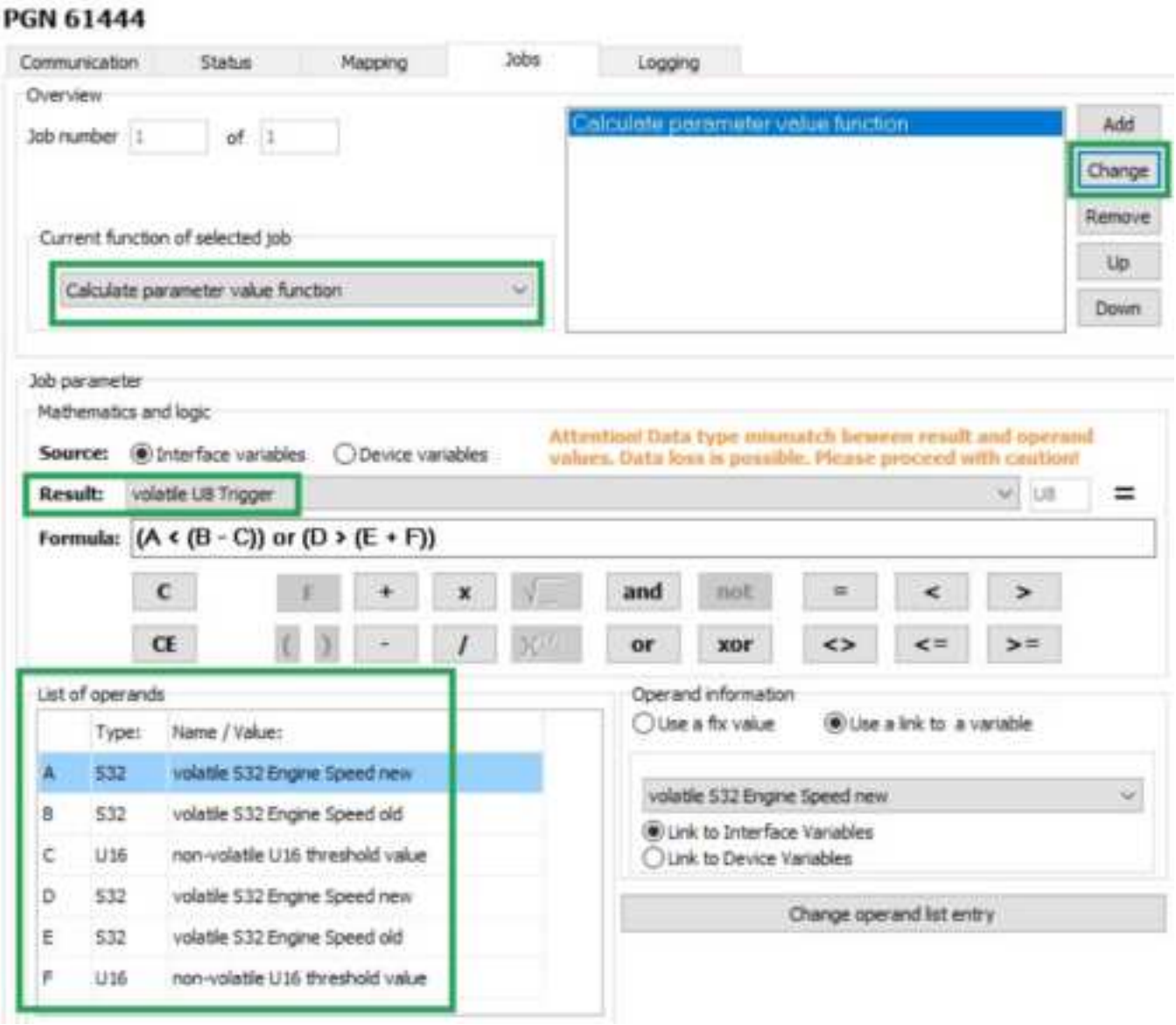
With the first job, you check whether the current speed is above or below the threshold value. If one of these two cases applies, the VOLATILE U8 TRIGGER variable should be set to the value 1. This triggers logging of the CAN message.

1. Select the JOBS tab.
2. In the CURRENT FUNCTION OF SELECTED JOB list, select the function CALCULATE PARAMETER VALUE FUNCTION.
3. In the RESULT list, select the trigger VOLATILE U8 TRIGGER.
4. Using the buttons in the MATHEMATICS AND LOGIC section, enter the calculation operations `(A < (B – C)) or (D > (E + F))`.
5. Click on button A.

INFORMATION

If you click on a placeholder (e.g. A), this opens the window INPUT OPERAND INFORMATION OR OPEN A NEW OPERATION.
You can find the allocation of the variables for this example in the table below.

6. Click on the variable in the list that you want to allocate the placeholder to.
7. Click on the CHANGE button when you have entered the calculation operations completely.



8. Allocate the following variables to the placeholders:

Table 58. Variables - Job 1

Variable	Type	Name/value
A	S32	volatile S32 Engine Speed new
B	S32	volatile S32 Engine Speed old
C	U16	non-volatile U16 threshold value
D	S32	volatile S32 Engine Speed new
E	S32	volatile S32 Engine Speed old
F	U16	non-volatile U16 threshold value

The buttons for entering the calculation operations have the following functions:

Table 59. Buttons for calculation operations

Buttons	Description
C CE	`C` = Clear: Deletes the entire calculation operation `CE` = Clear Entry: Only deletes the last symbol entered
A	Add variables to the calculation operation.Click on the button to open a window. Assign fixed values, interface variables or device variables to the variables. After you have defined a variable, the display on the button switches to the next variable. The selected variables are listed under LIST OF OPERANDS, including their values and types.
+ x - /	Basic calculation types (`addition`, `subtraction`, `multiplication`, `division`)
and or	`and` = logical `AND` link. If **all** linked operands are true or not equal to zero, the job-result is `1`. Otherwise, the job-result is `0`. `or` = logical `OR` link If at least **one** of the linked operands is true or not equal to zero, the job-result is `1`. Otherwise, the job-result is `0`. If both linked variables are full-number values (integers), the link is made by bits.
= < > ≠ ≤ ≥	Comparative value (`equal to`, `less than`, `greater than`, `not equal to`, `less or equal to`, and `greater or equal to`). The job-result is `1` when the comparison is true. The job-result is `0` when the comparison is not false.
( )	Brackets

Note
The calculation formulas are evaluated **from left to right**. Mathematical priority rules are not observed! Define the priority calculations in the formula using brackets.

JOB 2

In the second job, you replace the value of the VOLATILE S32 ENGINE SPEED OLD variable with the value of the VOLATILE S32 ENGINE SPEED NEW variable as soon as the VOLATILE U8 TRIGGER variable has the value 1. This updates the speed from which the deviation should be detected.

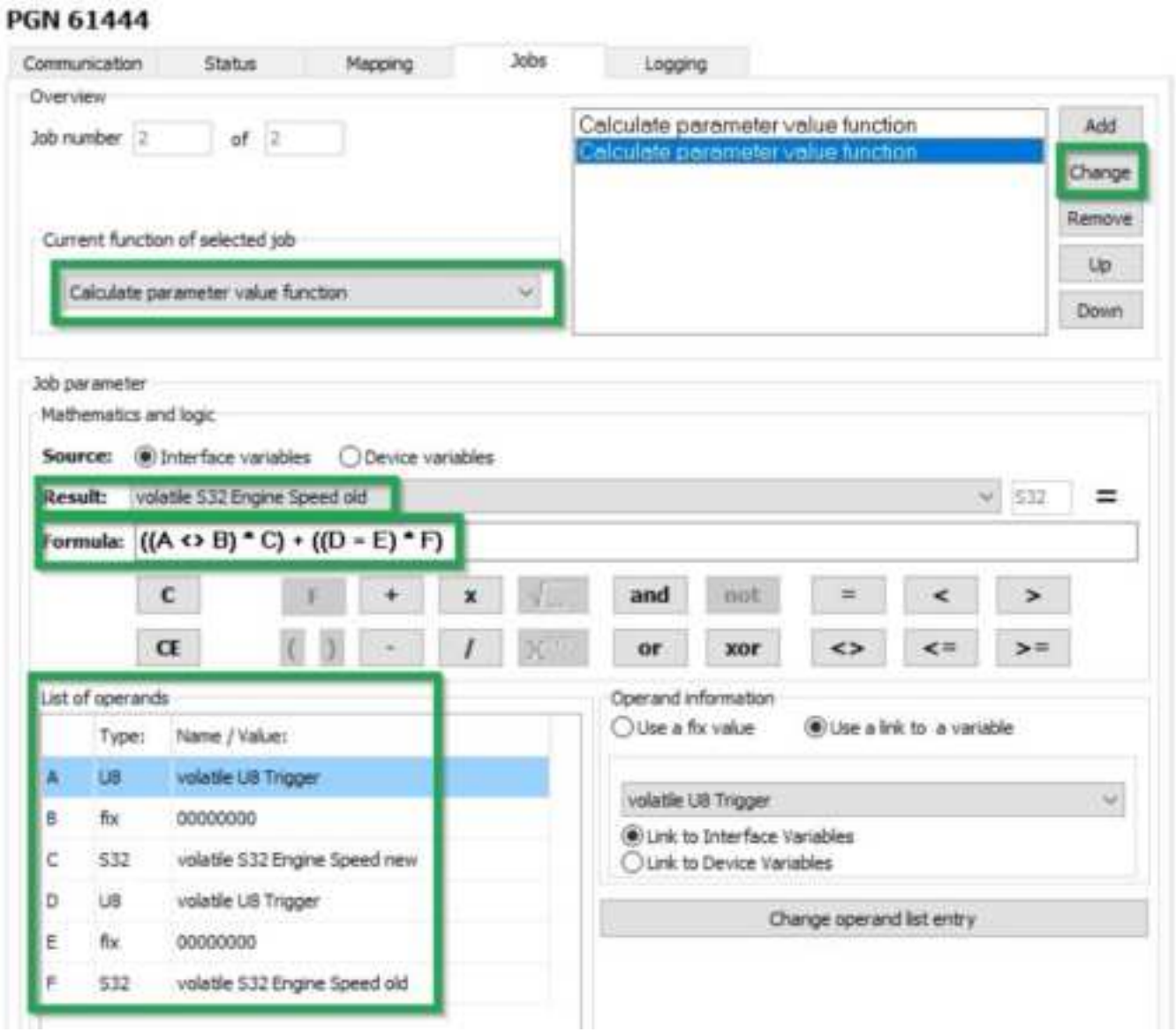
This updates the speed from which the deviation should be detected.

1. Select the JOBS tab.
2. In the CURRENT FUNCTION OF SELECTED JOB list, select the function CALCULATE PARAMETER VALUE FUNCTION.
3. In the RESULT list, select the trigger VOLATILE S32 ENGINE SPEED OLD.
4. Using the buttons in the MATHEMATICS AND LOGIC section, enter the calculation operations `((A <> B) * C) + ((D = E) * F)`.
5. Click on button A.

INFORMATION

If you click on a placeholder (e.g. A), the window INPUT OPERAND INFORMATION OR OPEN A NEW OPERATION opens.
You can find the allocation of the variables for this example in the table below.

6. Click on the variable in the list that you want to allocate the placeholder to.



7. Allocate the following variables to the placeholders:

Table 60. Variables - Job 2

Variable	Type	Name/value
A	U8	volatile U8 Trigger
B	fix	00000000
C	S32	volatile S32 Engine Speed new
D	U8	volatile U8 Trigger
E	fix	00000000
F	S32	volatile S32 Engine Speed old

8. Click on the NEW button when you have entered the calculation operations completely.
9. Click on FILE > SAVE in the menu.
10. Load the configuration to the device. See Chapter Loading the configuration to the device.

¬ You have completed the configuration for logging specific data bytes.

6.2.6. CAN logging Example 3 - On Change Logging

On receipt of CAN messages whose content seldom changes, you can activate the VALID ON CHANGE option.

If the option is activated, a CAN message received is only recorded by the device if a value within the data bytes has changed.

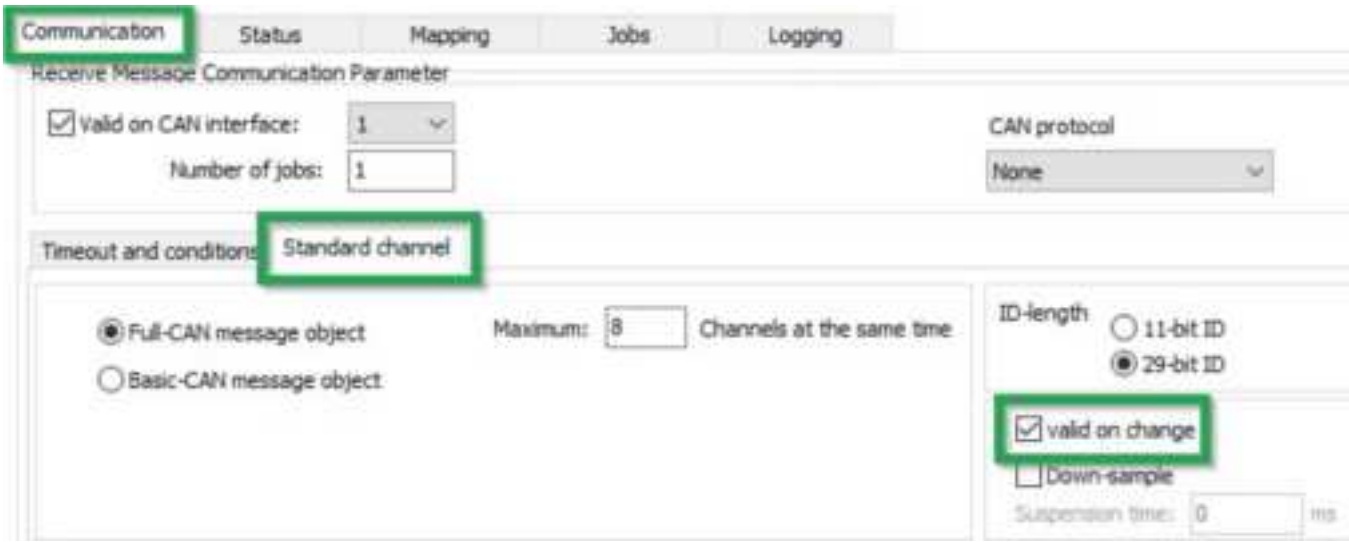
This option can be activated for standard 11-bit and 29-bit CAN messages as well as for J1939 CAN messages.

NOTICE

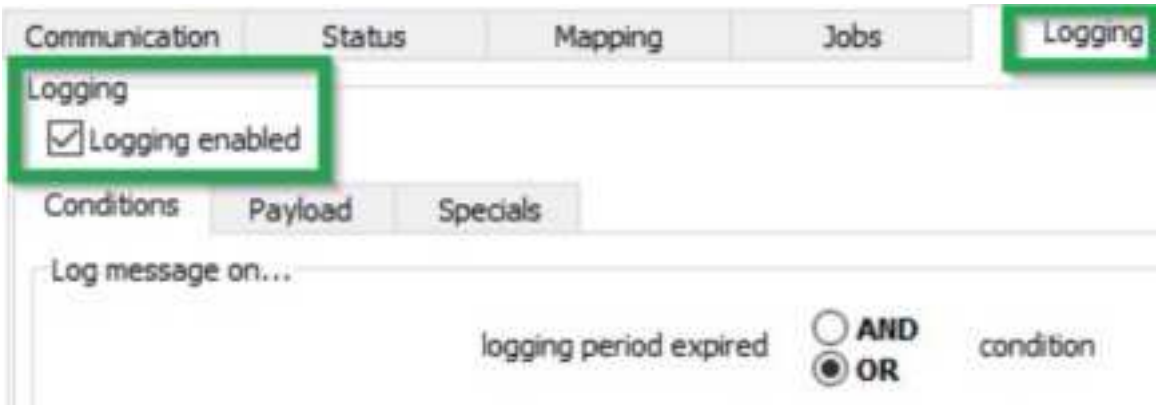
High data volume
High data volume.
If the VALID ON CHANGE option is activated, the DOWN-SAMPLE option is automatically deactivated and no longer limits the frequency of recording. Each CAN message received with a modified content will be recorded by the device.
This leads to high data volumes in the case of CAN messages whose content changes in the millisecond range.

* Only activate the VALID ON CHANGE option for carefully selected messages.

1. Navigate to the COMMUNICATION section.
2. Move to the STANDARD CHANNEL section and click to enable the VALID ON CHANGE option.



3. Navigate to the LOGGING section.
4. Move to the LOGGING section and click to tick the LOGGING ENABLED option.



¬ CAN messages received with a modified content are recorded.

6.2.7. Logging GNSS position data

The GNSS position data contains information on longitude and latitude, altitude and direction as well as speed, time and date.

Data is only logged when valid position data is received.

Define the following settings:

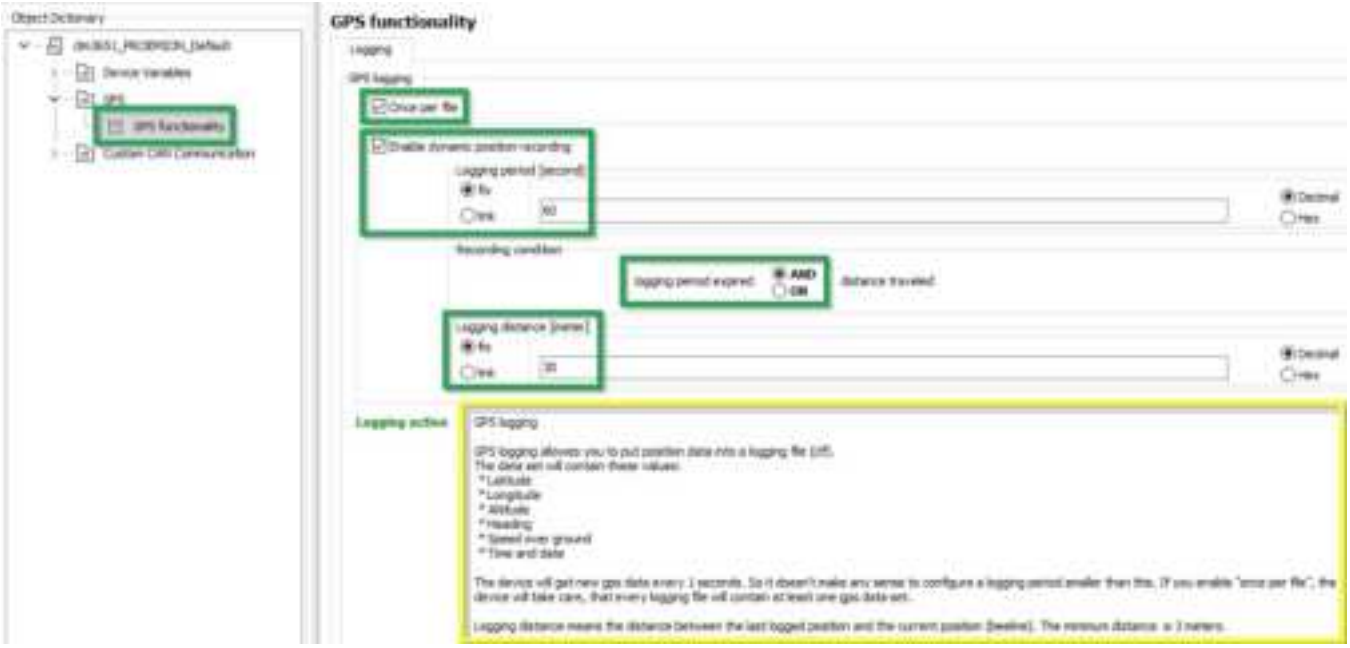


Table 61. GPS functionality settings

Variable	Function
ONCE PER FILE	Each logfile contains position data at least once.
ENABLE DYNAMIC POSITION RECORDING	Enables/ Disables the position data logging.
LOGGING PERIOD (SEC)	Time period during which the position data should be logged.
AND / OR	`AND`: Position data is logged if both conditions (time and distance) are met. `OR`: Position data is logged if one of the conditions (time or distance) is met.
LOGGING DISTANCE (METERS)	Distance between the last position logged and the current position (linear distance).

NOTICE

Oversampling due to too-frequent logging of GNSS position data.
High data consumption or high number of write cycles into the internal memory.

At the following settings, the position data is logged every 100 ms:
Logging period = 0
Logging distance = 0
These settings generate a high data consumption. If there is no mobile radio connection, the position data is written to the device's internal memory instead. This considerably reduces the service life of the internal memory.

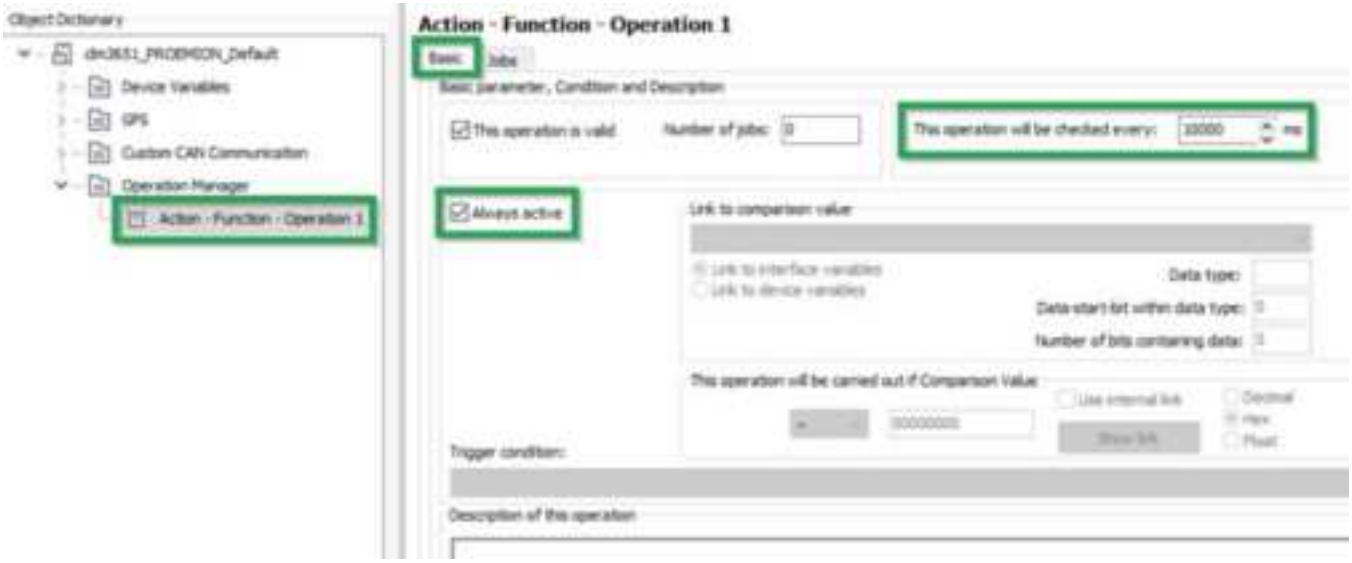
* Under Variable Logging period, enter a value >= 1 second because the device only receives new GNSS data every 1 second.
* Under Variable Logging distance, enter a value above the GNSS accuracy.

6.2.8. Configuring the logging of internal variables

You can log various internal variables. Internal variables can be both device variables and interface variables.

To log internal variables, you need an ACTION - FUNCTION - OPERATION object in the OPERATION MANAGER object dictionary group. With the object ACTION – FUNCTION – OPERATION, up to 8 internal variables can be logged in one process as a virtual CAN message.

1. Start the Proemion Configurator software.
2. Choose FILE > OPEN from the menu.
3. Open the desired configuration file.
4. Create an OPERATION MANAGER object dictionary group.
5. Create an ACTION - FUNCTION - OPERATION 1 object in the OPERATION MANAGER object dictionary group.
6. Select the BASIC tab.

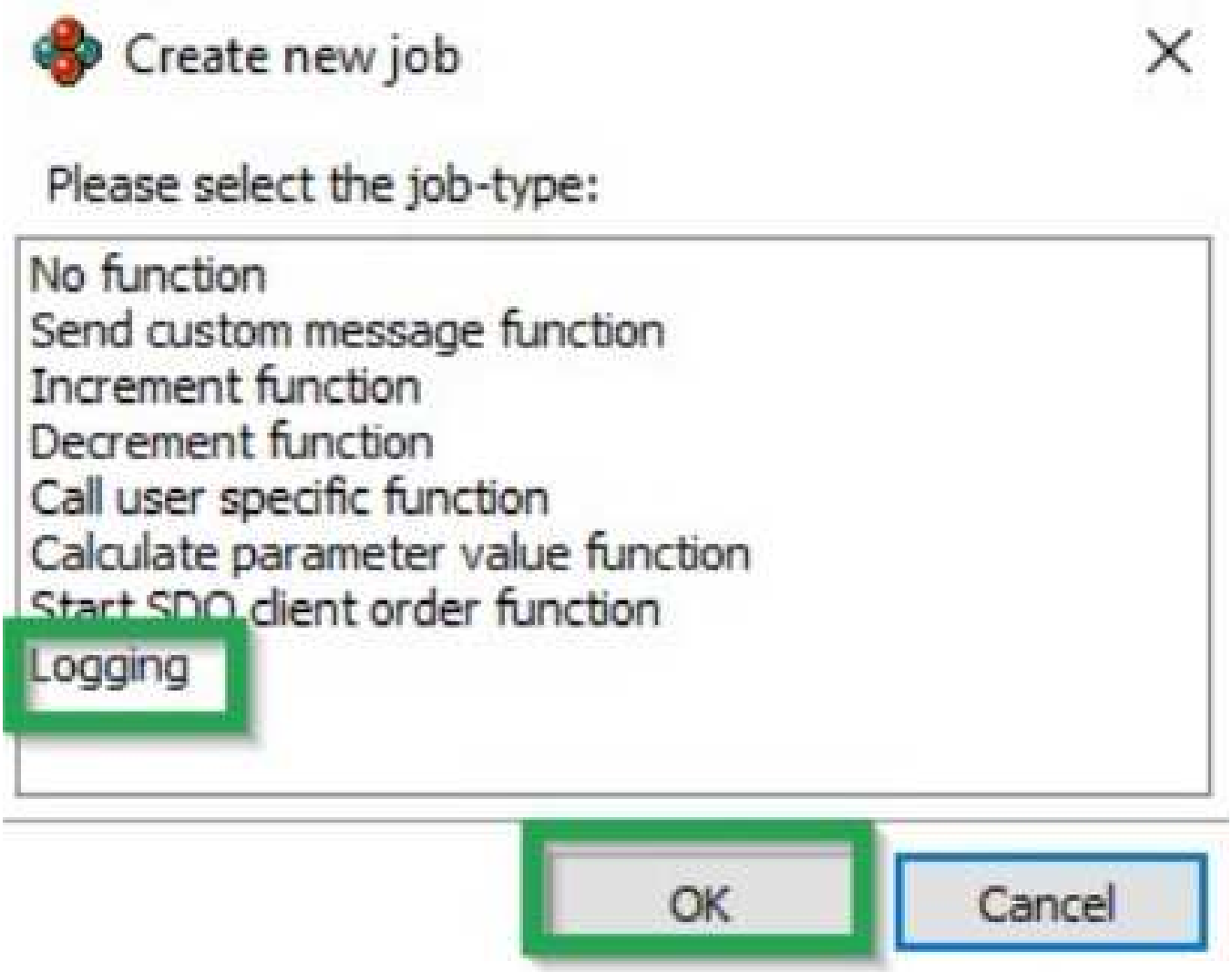


7. Enter a value in milliseconds in the THIS OPERATION WILL BE CHECKED EVERY field. This value determines the intervals at which the variables are logged.
8. Check the ALWAYS ACTIVE box. Logging takes place irrespective of conditions. Alternatively, you can define conditions for logging.
9. Click on the SAVE button.
10. Select the JOBS tab.

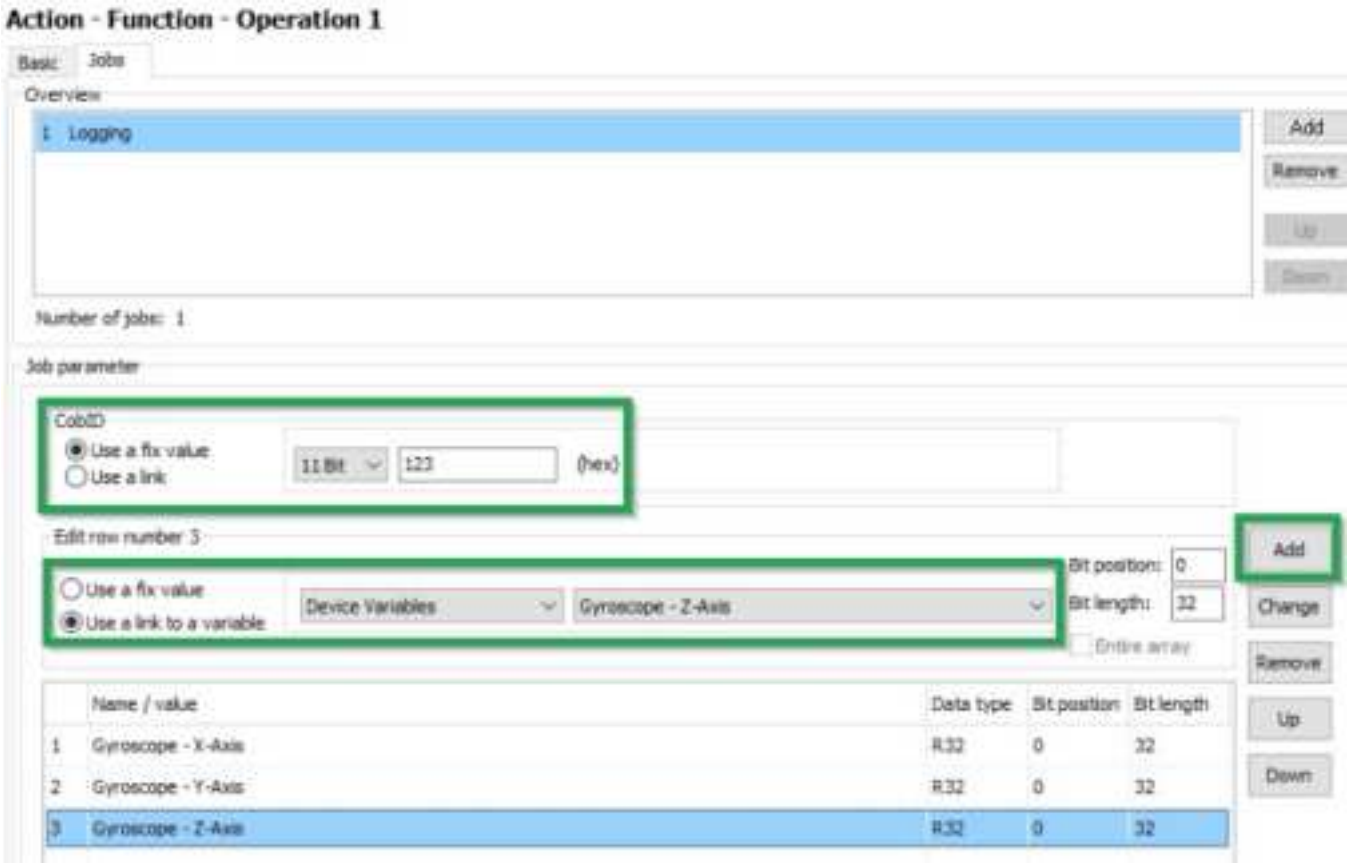
11. In the OVERVIEW field, click on the ADD button.

    ¬ The CREATE NEW JOB window opens.

12. Select the LOGGING job type.
13. Click on the OK button.



14. In the COBID field, enter the ID (hex) for the virtual CAN message. The ID must not be used by other CAN messages.
15. In the ADD NEW ROW field, select the variable type and the variable.
16. In the JOB PARAMETER field, click on the ADD button.



17. Add further variables if required.
18. Click on FILE > SAVE in the menu.

¬ You have completed the configuration for logging of internal variables.

6.2.9. Evaluating the data logged on the DataPlatform

WRITING A PARSING CONFIGURATION FILE (PDC) AND ASSIGNING IT TO A MACHINE

In order to be able to evaluate the logged messages and display the signals on the DataPlatform, you must create an additional configuration file (PDC file) and assign it to the device on the DataPlatform.

INFORMATION
A detailed description on how to create a PDC file, can be found at the PDC Manual.

6.3. RealTime Mode

In RealTime mode, CAN messages are transmitted bidirectionally.
CAN messages and GNSS data can be transmitted close to RealTime.

Alternatively, the device can use a WLAN or Bluetooth connection to receive and transmit data from an external receiver, e.g. the CANlink wireless.

Configuration is done with the Proemion Configurator. The basics are described in Configuring.

NOTICE

Before starting RealTime transmission, check the device status in the machine list in the DataPortal.

The colored dot in the Machines list indicates the connection status:
- grey - device is offline
- green - device is in Logging mode
- blue - device is in RealTime mode

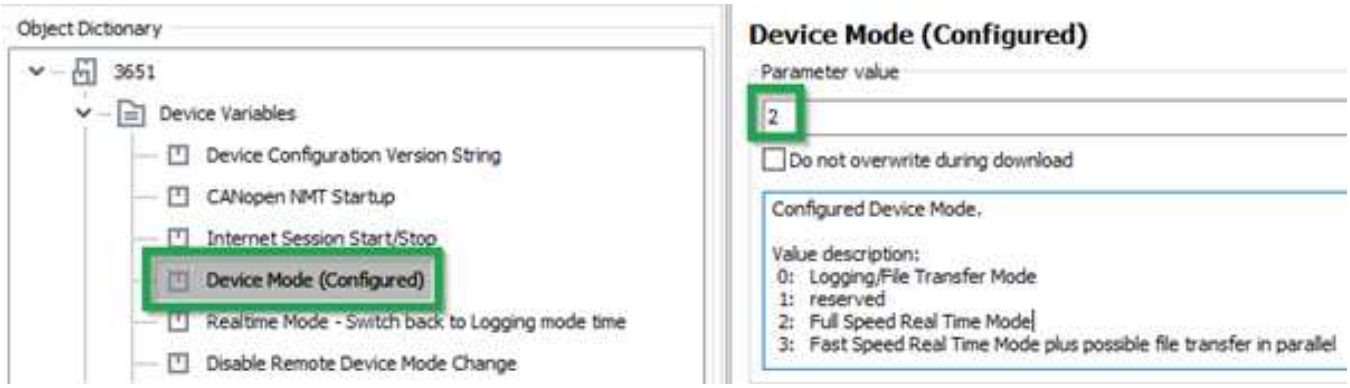
¬ To change the device mode, go to the machine details page, click Manage ¬ Advanced Functions ¬ Device mode

For further information on the DataPortal functionality, refer to the DataPortal DataPortal User Manual.

6.3.1. Configuring RealTime mode

1. Start the Proemion Configurator software.
2. Choose FILE > OPEN from the menu.
3. Open the configuration file you want.
4. Click on the DEVICE MODE (CONFIGURED) variable in the DEVICE VARIABLES object dictionary group.
5. In the DEVICE MODE (CONFIGURED) field, enter the value 2.

¬ You have configured the RealTime mode.



NOTICE

Configuring the DEVICE-MODE variable during first startup of the device.
After manual switchover of the connection mode or after an automatic switchover by a RealTime client software, the device remains in the mode last activated.

- If required, configure the automatic switchover of the device. See Configure automatic switch back to logging mode.

6.3.2. Creating a RealTime Connection and Evaluating CAN messages

For a RealTime connection and evaluation of CAN messages, you can use the **Proemion Dashboard** software.

	For more information on how to configure and use the **Proemion Dashboard** software, refer to the Software Documentation RMtools Dashboard. See Software and Accessories.

6.3.3. Setting a Reception Filter

You can filter CAN messages for transmission to the DataPlatform.
Set the filters by using the **Proemion Dashboard** software.

	For more information on how to configure and use the **Proemion Dashboard** software, refer to the Software Documentation RMtools Dashboard. See Software and Accessories.

6.4. File Transfer

You can use the device to transfer files between the DataPlatform and the machine's CAN open network.

6.4.1. Transfer User File via the DataPlatform

Performing controller updates without being physically on-site is an increasingly important application for many OEMs. This chapter describes how a user file can be transferred from the Proemion DataPlatform via internet and cellular network to a CANlink mobile and from there to an ECU via CAN Bus.

A common use case for this function could be a parameter update of the ECU. The update file is loaded remotely into the CANlink mobile and stored within the internal filesystem. An external device can then download the file by using SDO commands on the CAN bus. The CANlink mobile only acts as a gateway with an integrated CANopen file server. Please be aware that the transferred files are not checked or controlled in any way by the CANlink mobilee itself. So, the files must be checked and processed by the target device (ECU).

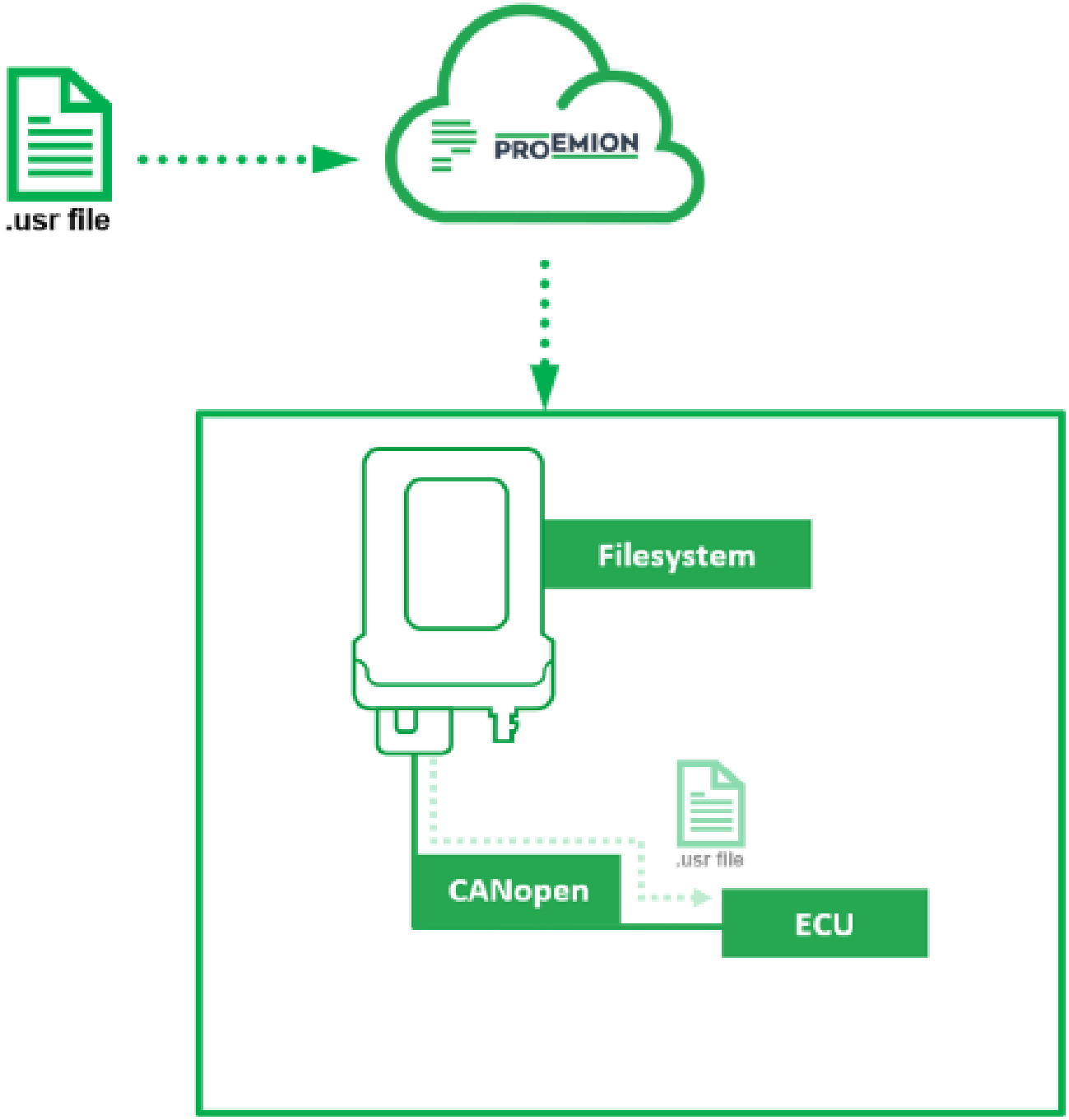


Figure 49. Transfer User File via the DataPlatform to the Target Device (ECU)

INFORMATION

Required file properties

As the files are neither handled or checked by the Proemion DataPlatform nor by the CANlink mobile, any file format and file content can be transferred. But independent from the user file format and content, the files must be named according to the following rules:

1. The file name must consist of eight letters or digits
2. The file extension must be `*.usr`

Example of a valid file name: `Update01.usr`

Upload the File from the DataPlatform to the CANlink mobile

1. Please make sure that your DataPortal user has the permission set `machine-admin` assigned.
2. Login to your Proemion DataPortal Account.
3. Go to ¬ Administration ¬ Transfers (1).
4. Click on UPLOAD FILE (2).
5. Select the desired machine (3).
6. Select the desired `*.usr` file for upload (4).
7. Click on UPLOAD (5).

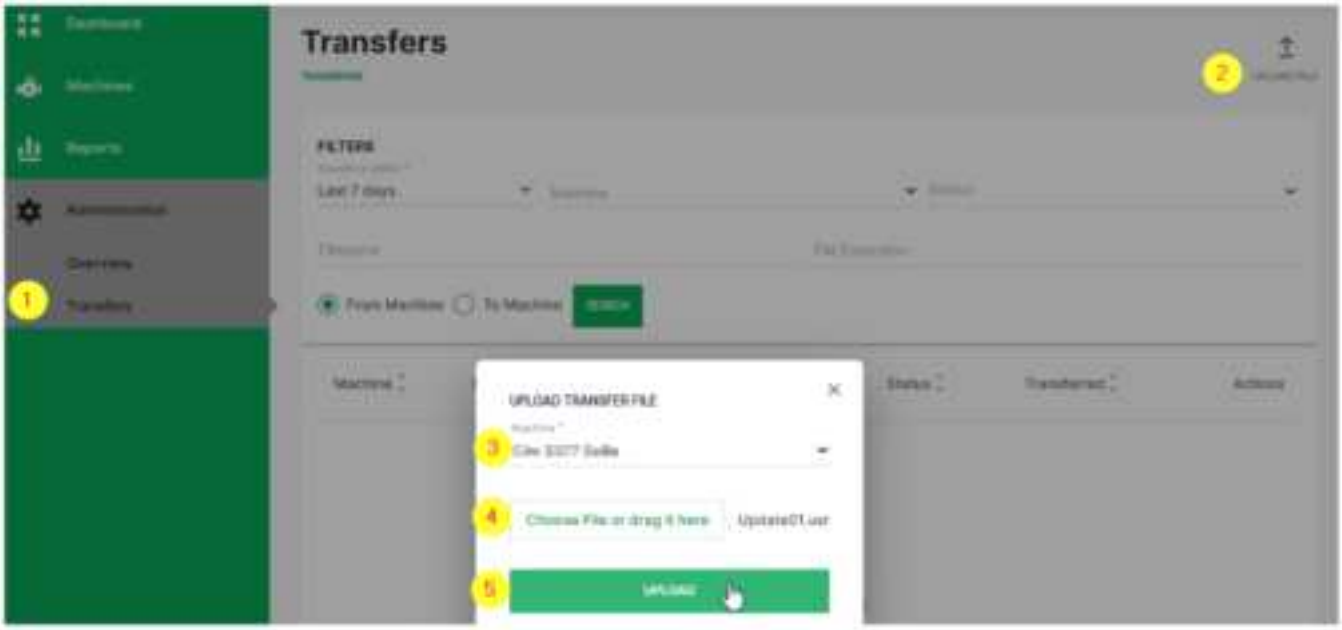


Figure 50. File Upload Dialog

¬ The uploaded file will appear in the file transfer list after successful upload.
¬ The DataPlatform manages the file transfer to the selected machine (CANlink mobile) automatically as soon as the device is ready to receive the file.

Figure 51. File Upload/ Receive Dialog

NOTICE
In case that a file transfer directly via the REST API is required, please refer to the instructions at the DataPlatform API docs Rest API.

Transfer the file from the CANlink mobile to the ECU via CAN

The CANlink mobile has an internal file system that can be accessed by CANopen SDO commands. The protocol for the file handling communication on CAN Bus is CANopen. SDO requests and the SDO block transfer protocol are used to exchange commands and payload.

INFORMATION

Further information on file transfer can be found in CANopen File Server.

1. As indication that a new file had been received by the CANlink mobile, the device variable with index `0x5402` sub index `0x01` is automatically set to `0x01`. Herewith any ECU on the CAN network can poll the status of this device variable to monitor the reception of new files.
2. In the next step the ECU must check the name of the available files which were uploaded to the CANlink mobile. This is done by writing the command string `ls` into device variable with Index `0x4444` Sub Index `0x01`.
3. Check the status of this command. Read out the device variable with Index `0x4444` Sub Index `0x03`. The status should be `3` (= `LIST`).
4. Read out the content of device variable with Index `0x4444` Sub Index `0x02`. This will give you the exact **file name**.
5. The download of the specific file to the ECU can be triggered by writing the command string `rd "[file_name]"` into device variable with Index `0x4444` Sub Index `0x01`.
6. Check the status of this command. Read out the device variable with Index `0x4444` Sub Index `0x03`. The status should be `2` (= `READ`).
7. To download the file content, read out the domain of device variable with Index `0x4444` Sub Index `0x02`.
8. Once the downloaded file has been processed successfully at the ECU, it should be deleted in the CANlink mobile by writing the command string `del "[file_name]"` into the device variable with Index `0x4444` Sub Index `0x01`.
9. To enable the download of a new file, the device variable with Index `0x5402`, Sub Index `0x01` must be set to `0x00`.

NOTICE

The maximum file size is limited by the built-in flash memory of the CANlink mobile. It must be ensured that there is minimum of 8 Mbyte of free memory available for logging and other internal device processes. The free memory is to be checked by reading out the device variable with Index `0x4444` Sub Index `0x04`.

6.4.2. Generic File Transfer

Transferring a File to the DataPlatform

A simple transfer of files up to 128k Byte via the CAN bus to the DataPlatform is implemented in the device. The files are saved in the device in an internal nonvolatile memory and automatically transferred to the DataPlatform when a server link is established.

The following steps are required for the transfer:

1. An external device transfers a file using the CANopen SDO protocol to the object `0x5421, 0x03` of the CANlink mobile:
   DEVICE VARIABLES ¬ FILE TRANSFER TRANSMIT - FILE DATA - CACHED MODE
2. An external device transfers the file name using the CANopen SDO protocol to the object `0x5420, 0x03` of the CANlink mobile as a string in the format 8.3 (see File Transfer Restrictions):
   DEVICE VARIABLES ¬ FILE TRANSFER TRANSMIT - FILENAME - CACHED MODE
3. An external device writes the value 1 to the object `0x5422, 0x03` of the CANlink mobile which triggers automatic file transfer to the DataPlatform:
   DEVICE VARIABLES ¬ FILE TRANSFER TRANSMIT - COMMAND - CACHED MODE

You can find out the current free memory space available using the object `0x5423, 0x04` (DEVICE VARIABLES ¬ FILE TRANSFER TRANSMIT - GET FREE SPACE - CACHED MODE). If memory space is available, several files can be logged in the device. The files are then automatically transmitted to the DataPlatform in the order in which they were written to the device.

For detailed information on creating objects, see Creating Object Dictionary Groups and Objects.

Reading a File Transferred by the DataPlatform

The DataPlatform can transfer files in segments of 1024 bytes each via the device. The files transferred by the DataPlatform are saved to a CANopen control unit in the device in an internal, volatile memory and can be read out of the device by the CANopen network.

Proceed as follows to be able to read out files transferred from the DataPlatform.

1. Check that the object `0x5402, 0x00` has the value `0x01`. This value indicates that a file has been transferred to the device from Proemion.
   FILE TRANSFER RECEIVE - INDICATION
2. If the object has the value `0x01`, you can read the file name from the object `0x5400, 0x00`.
   FILE TRANSFER RECEIVE - FILENAME
3. Read off the file from the object `0x5401, 0x00`.
   FILE TRANSFER RECEIVE - FILE
4. When the file has been read out, write the value 0 in the object `0x5402, 0x00`. FILE TRANSFER RECEIVE - INDICATION

¬ The device is then ready to receive a new file from the DataPlatform.

For detailed information on creating objects, see Creating Object Dictionary Groups and Objects.

File Transfer Restrictions

Restrictions apply to file transfer. The following conditions must be met:

- The file names must have 8 characters and the file extension must have 3 characters (8.3 format).
- Characters permitted for the file name and file extension are :
  `"A", … "Z"`, `"a", … "z"` and `"0", … "9"`
- The following file extensions are reserved for internal use only and may not be used for customer application:
 <code>*.obr</code>, <code>*.obw</code>, <code>*.obc</code>, <code>*.dbs</code>, <code>*.prg</code>, <code>*.bin</code>, <code>*.clf</code>, <code>*.msg</code>

If these conditions are not met, the file will be rejected by the device and/or DataPlatform.
This blocks transmission in both directions. To clear the blockage, you must delete the faulty file from the DataPlatform or from the file transfer.

	Further information on how to delete faulty files from the DataPlatform can be found here: DataPortal User Manual ¬ File Transfer.

6.5. CANopen File Server

The CANlink mobile offers a local nonvolatile file storage that can be accessed by CANopen SDO. This functionality for example is used for providing ECU update files to the machine received from the DataPlatform. Please also refer to Transfer User File via the DataPlatform.

The following functions are available for data access via the SDO:

Table 62. CANopen File Server Functions

Function Code	Option	Description
`wr`	`["]path name ["]`	Write in file (always in Append mode)
`del`	`["]path name["]`	Delete file or directory
`rd`	`["]path name["] [-o n] [-l m]`	Read out of file
`ls`		List file or directory
`cd`	`[["]path["]] [..] [\]`	Change directory

File or path names that contain a space must be placed in quotation marks.

NOTICE

Folder or file names should consist of the following characters:

* `letters` (uppercase/lowercase)
* `numbers`
* ¬ (space)
* _ (underscore)
* – (hyphen)

For file names, a dot `.` is also accepted. However, it is also possible to create file names without a dot `.`.

NOTICE

If a given path name starts with a `\`, the path is considered as starting in the root folder.

In case that the path name does not start with an `\`, the path is considered as starting within the current folder.

NOTICE

Please be aware the filename `ls.txt` is reserved for the automatically generated listing file.

The following functions are available following data access via CANopen:

Table 63. CANopen File Server Functions

Index	Subindex	Meaning	Data Type	Description
`0x4444`	`0x01`	Command	`String`	See function descriptions. Please be aware that the maximum accessible file path size is 253 characters.
`0x4444`	`0x02`	Data	`Domain`	See function descriptions

Index	Subindex	Meaning	Data Type	Description
0x4444	0x03	Status	U16	The following states are displayed: 0 = OK / IDLE 1 = WRITE 2 = READ 3 = LIST 65535 = ERROR
0x4444	0x04	Available size	U32	Memory space available on file system in bytes
0x4444	0x05	File size	U32	Size of current file selected, in bytes
0x5402	0x01	Status	U16	The following states are displayed: <code>0</code> = <code>*.usr</code>-file not completely available <code>1</code> = <code>*.usr</code>-file completely available

INFORMATION

The SDO client must wait until the file system status flag `0x4444 sub 0x03` reads `0x0000` - `OK / IDLE` after sending the delete file command before issuing any other SDO communication.

* The device may not respond to the SDO requests while it's deleting the file and thus generate an SDO timeout also for reading the file system status flag.
* Do not issue any other SDO communication requests until the status reads `OK / IDLE`

6.5.1. Function Description

The following sections describe the individual functions and structure of the respective commands.

When entering commands, pay attention to the correct spelling and notation.

If spaces are contained, the path and file input must be set in quotation marks. If no spaces are contained, the use of quotation marks is optional.

`WR` - Write

- Structure of the command: `wr "path\name"`

If the `wr` command is written to the command object, the device checks whether a file with this name exists. If no file is available, a new one is created.

An error code appears in the status object if the file cannot be opened to be written to or an error occurs.

The current file size is displayed in the file size object. The data content can then be written in the data object.

After completing the write operation to the data object, the file is automatically closed and the command deleted.

Directories can also be created with this command.

NOTICE

The `WR` command always works in append mode.
To overwrite an existing file, delete all old files manually beforehand.

NOTICE

For the `wr` command, the following rules must be considered:

* When only creating a folder, the command must always end with a `\`.
* If no `\` is provided, a file is created without an extension.
* If no `\` and no `.` is provided, a file is created without an extension.

`DEL` - Delete

- Structure of the command: `del "path\name"`

If the `del` command is written to the command object, the device checks for existing files with this name. If the file exists, it will be deleted.

An error code appears in the status object if the file cannot be deleted or an error occurs.

When the process is completed, the command is deleted.

Directories can also be deleted in this way.

`RD` - Read File

- Structure of the command: `rd "path\name" [-o n] [-l m]`

If the `rd` command is written to the command object, the device checks for existing files with this name.

An error code appears in the status object if the file does not exist or an error occurs.

The file size object displays the size of the current file. The data content can be read out of the data object.

After completing the read operation from the Data object, the file is automatically closed, and the command deleted.

The following options are available with this command:

- `-o n` - Offset: n bytes
  The read process starts at the byte-position specified. Decimal or hexadecimal values are possible.
- `-l m` - Length: m bytes
  The number of bytes specified (maximum till the end of the file) is read out of the file. Decimal or hexadecimal values are possible. To specify hexadecimal value use the prefix `0x`, for example `0xA`.

NOTICE

When using the `rd` command, it must be ensured that the order of the arguments is kept as shown in the example:
`rd "path\name" [-o n] [-l m]`

`LS` - List file or directory

- Structure of the command: `ls`

If the `ls` command is written to the command object, a file and directory list can be read out of the data object.

Directory names are identified by < and >. A line feed `[CRLF]` occurs after each entry.

When the read operation from the Data object is completed, the command is deleted.

INFORMATION

The result of the `ls` command looks like this example:

Content of USER:
< . >
< .. >
ls.txt
< folder_name >
usrfile1.usr
usrfile2.usr
usrfile3.usr

`CD` - Change Directory

- Structure of the command: `cd ["path"], [..], [\]`

If the `cd` command is written to the command object, the device checks whether a directory with this name exists. If a directory with this name exists, it is opened.

An error code appears in the status object if the directory does not exist or an error occurs.

When the process is completed, the command is deleted.

The following options are available with this command:

- `"path"` - Change to the directory specified.
- `..` - Change to the directory level one level higher.
- `\` - Change to the root directory.

6.6. Encrypted Data Transfer

The device supports encrypted data transfer to the DataPlatform according to the TLS standard (Transport Layer Security).

Encrypted data transfer is already enabled when the device is delivered.

The variables required belong to the DEVICE VARIABLES object dictionary group.

Table 64. Encrypted Data Transfer

Variable	Function
ENABLE ENCRYPTED DATA TRANSFER	`0` = disable encrypted data transfer `1` = enable encrypted data transfer
REMOTE SERVER PORT	`60200` = port for unencrypted data transfer `61200` = port for encrypted data transfer

NOTICE

Encrypted data transmission may be prohibited in some countries. Please observe local regulations on encrypted data transfer.

INFORMATION

After a device reset to factory settings, encrypted data transfer is enabled as default.

6.7. Important device variables

This chapter provides information on important device variables that control the device functions.

6.7.1. Positioning

The device is equipped with a GNSS receiver. The GNSS receiver can process signals from the following satellite navigation systems:

- GPS
- GLONASS
- BEIDOU

Set the combination of the satellite systems in the POSITIONING ¬ MODE (GNSS) variable. The POSITIONING ¬ MODE (GNSS) variable belongs to the DEVICE VARIABLES ¬ POSITIONING object dictionary group.

Table 65. Positioning – Mode (GNSS)

Variable	Function
POSITIONING - MODE (GNSS)	`0` = GPS only `1` = GPS + GLONASS `2` = GPS + BEIDOU `3` = GLONASS + BEIDOU

Table 66. Device variables - Positioning

Variable	Function
POSITIONING – ANTENNA STATUS	Status of the antenna
POSITIONING - POSITIONING DATA VALID	Status of the position system. Indicates whether valid position data is available
POSITIONING - ACTIVE SATELLITES	Number of satellites used
POSITIONING - LONGITUDE	Longitude
POSITIONING - LATITUDE	Latitude
POSITIONING - ALTITUDE	Altitude of the antenna above sea level
POSITIONING - SPEED OVER GROUND	Speed over ground
POSITIONING - GPS ODOMETER	GPS-based measurement of kilometers traveled
POSITIONING - HEADING	Direction in relation to North

6.7.2. WLAN and Bluetooth

Some types of the device are equipped witha radio module for WLAN and Bluetooth.
The DEVICE VARIABLES ¬ LOCAL WIRELESS object dictionary group contains the following variables:

Table 67. Device variables - Local Wireless

Variable	Function
WLAN - ENABLE	Enable and disable the WLAN interface
BLUETOOTH - ENABLE	Enable and disable the Bluetooth interface
WLAN - MAC ADDRESS	MAC address of the WLAN interface
BLUETOOTH - MAC ADDRESS	MAC address of the Bluetooth interface
WLAN/BLUETOOTH - FIRMWARE VERSION RADIO MODULE	Firmware version of the WLAN/Bluetooth module

You can find more information on further device variables of the wireless interface here: Download Center ¬ "CANlink wireless Series 3000" as well as in the explanatory texts in the Proemion Configurator software.

6.7.3. Input/Output Functions and Sensors

Depending on the hardware variant, the device is equipped with input and output functions. See Technical Data for details.

You can measure voltages between 0 V and 15 V with the analog inputs.

The DEVICE VARIABLES ¬ I/O, SENSORS, DIAGNOSIS object dictionary group contains the following variables:

Table 68. Device variables - I/O, Sensors, Diagnosis

Variable	Function
OPERATION TIME TOTAL	Device operation time in seconds.
DEVICE TIME (UNIX FORMAT)	Internal device time. The time is synchronized to UTC time by the GNSS satellites, NTP servers or the DataPlatform.
IO - DIGITAL OUTPUT	`0` = output `off` `1` = output `on`
IO - DIGITAL OUTPUT STATUS	`0` = output error `1` = output ok
IO - TERMINAL 30 VOLTAGE	Voltage on terminal 30 connector.
IO - TERMINAL 15 VOLTAGE	Voltage on terminal 15 connector.
IO - TERMINAL 15 (IGNITION)	`0` = input state low (`< 2.3 V`) `1` = input state high (`> 6 V`)
IO - DEVICE TEMPERATURE	Device internal temperature in `°C`
ANALOG INPUT 1	Voltage on analog input 1 in `Volts`
ANALOG INPUT 2	Voltage on analog input 2 in `Volts`
ANALOG INPUT 3	Voltage on analog input 3 in `Volts`
ACCELERATION - X-AXIS	Acceleration on the X-axis (in `g`)
ACCELERATION - Y-AXIS	Acceleration on the Y-axis (in `g`)
ACCELERATION - Z-AXIS	Acceleration on the Z-axis (in `g`)
GYROSCOPE - X-AXIS	Rate of rotation on the X-axis (in `°/s`)
GYROSCOPE - Y-AXIS	Rate of rotation on the Y-axis (in `°/s`)
GYROSCOPE - Z-AXIS	Rate of rotation on the Z-axis (in `°/s`)

The variables IO - DIGITAL OUTPUT, IO - ANALOG INPUT1, IO - ANALOG INPUT2, and IO - ANALOG INPUT 3 are available for the input/output functions.
To enable and configure the input/output functions, you must create additional options.

1. Create the IO MODULE CONFIGURATION object dictionary group.
2. Click the right-hand mouse button on the IO MODULE CONFIGURATION object dictionary group.
3. In the context menu, click on NEW OBJECT DICTIONARY ENTRY ¬ CHANNEL SETUP.
   ¬ You have created the objects ANALOG INPUT - CHANNEL 1, ANALOG INPUT - CHANNEL 2, ANALOG INPUT - CHANNEL 3 and DIGITAL OUTPUT - CHANNEL 4.

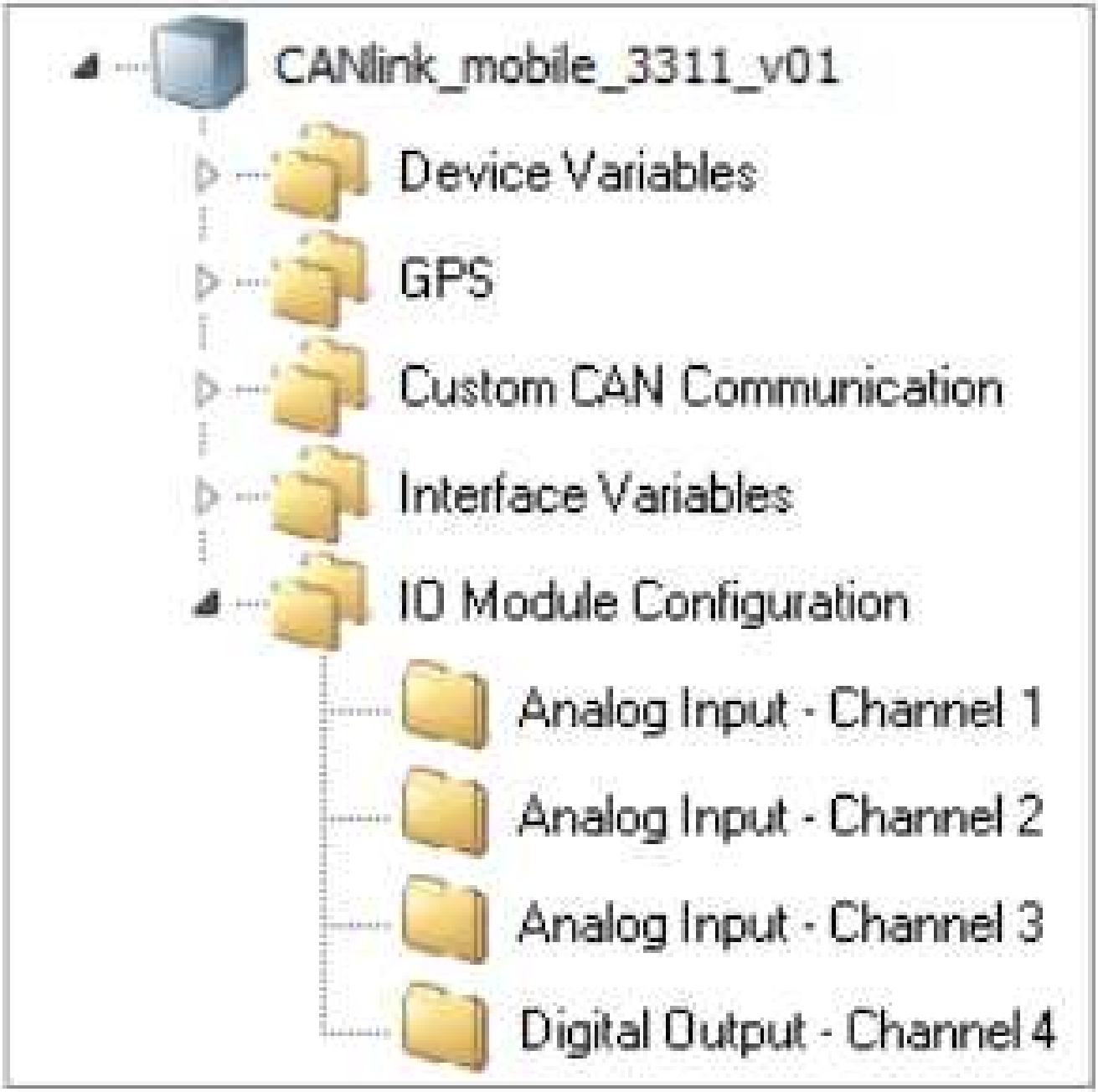


Figure 52. Input / Output Context Menu

Output Function

Define the settings for the output function under IO MODULE CONFIGURATION ¬ DIGITAL OUTPUT - CHANNEL 4.

1. Select the object DIGITAL OUTPUT - CHANNEL 4.
2. In the CHANNEL CONFIGURATION list, select the configuration ON–OFF DIGITAL OUTPUT.

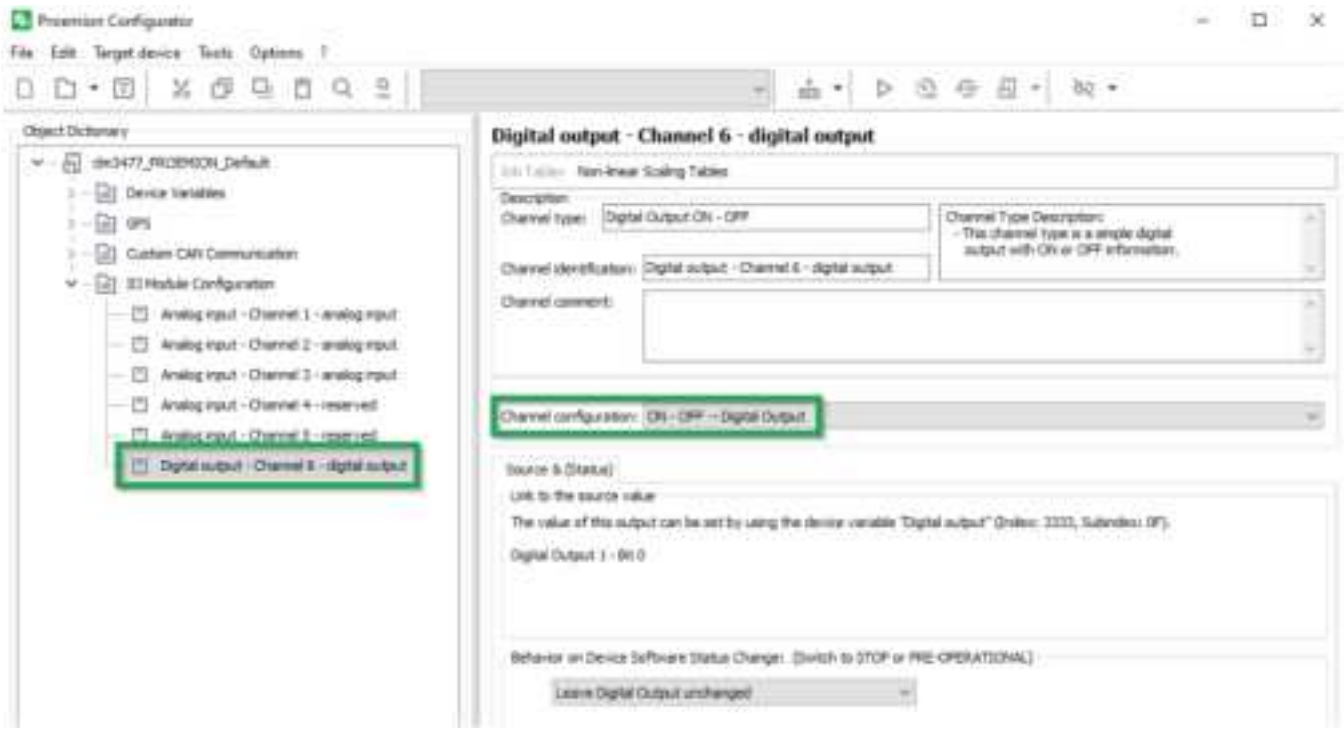


Figure 53. On - Off Digital Output

The following variables are available:

Table 69. Output Functions

Variable	Function
CHANNEL CONFIGURATION	Enable and disable the digital output.
BEHAVIOR ON DEVICE SOFTWARE STATUS CHANGE	Behavior on CANopen Mode STOP or PREOPERATIONAL. The output can retain its current value or be set to a defined value.

6.7.4. Battery

Some types of the device are equipped withan integrated battery. The DEVICE VARIABLES ¬ BATTERY object dictionary group contains the following variables:

Table 70. Output Functions

Variable	Function
BATTERY - CHARGE LEVEL	Current charge level (in `%`)
BATTERY - VOLTAGE	Measured voltage (in `Volts`)
BATTERY - CYCLE COUNT	Number of charge cycles so far
BATTERY - STATE OF HEALTH VALUE	Probable remaining capacity relative to nominal capacity (in `%`)
BATTERY - TIME TO EMPTY	Expected remaining time until full discharge (in `Minutes`)
BATTERY - FULL CHARGE CAPACITY	Probable capacity if fully charged (in `mAh`)
BATTERY - CURRENT	Current to or from the battery Value > `0`: charging Value = `0`: fully charged Value < `0`: discharging
BATTERY - TEMPERATURE	Current temperature (in `°C`)

INFORMATION

The integrated battery has a limited service life.

- Have the integrated battery replaced by our service department after 500 charging cycles. See Service and Support.

6.7.5. Operation Time Counter

The device is equipped with an internal operation time counter.

The OPERATION TIME TOTAL object belongs to the DEVICE VARIABLES ¬ I/O, SENSORS, DIAGNOSIS object dictionary group.

The operation time counter cannot be reset. The operation time counter runs as soon as the device is in Standard mode (not Sleep mode).

For detailed information on creating objects, see Creating Object Dictionary Groups and Objects.

6.7.6. Power management

To protect the device from damage and data loss, a correct wiring and configuration of the power management settings is mandatory. The main purpose of the power management settings is that the device has a safe shutdown before the supply voltage (terminal 30/31) is disconnected.

The required variables belong to the DEVICE VARIABLES ¬ POWER MANAGEMENT object dictionary group. For detailed information on creating objects, see Creating Object Dictionary Groups and Objects.

The following subsections provide an overview of the individual power management functions.

NOTICE

Wake up of the device is possible when at least one of following condition is fulfilled:

- The *IO - Clamp 15 (Ignition) State* is at level `high` (`> 6 V`)
- A CAN message is present at the CAN 1 or CAN 3 interface
- The *Power Management - Acceleration Sensor Wake-up Force* is enabled and the configured threshold is exceeded
- The *Power Management - Cyclic Wake-up Time* is enabled and the configured time is elapsed

Power Management - Shutdown Delay Time

The *Power Management - Shutdown Delay Time* is required for the terminal 15 monitoring. After recognizing ignition input (terminal 15) and CAN off-state, the device will continue operating for the specified time and then go to sleep mode.

NOTICE

The terminal 15 monitoring is only active if the value for the shutdown delay time is > 0

NOTICE

Make sure that there are no CAN messages present on the CAN bus anymore before the Shutdown Delay Time is elapsed. Otherwise, the device would either not switch to sleep mode or immediately wake up.

You can enable the *Power Management - Shutdown Delay Time* as follows:

1. Ensure that terminal 15 voltage from the machine is connected to the terminal 15 (input ignition signal) pin at the CANlink mobile device. See Switching the Device On/Off
2. Open the latest device configuration with the Proemion Configurator software.
3. Add the device variable *Power Management – Shutdown Delay Time to* your configuration.
4. Write the desired time in seconds into the parameter value input field.

NOTICE

The configured shutdown delay time should not be too short. It must be ensured that there is enough time for the device to finish its internal jobs, complete the latest clf file and transmit the file to the DataPlatform.

5. Save the updated configuration file with a new *Device Configuration Version String*.
6. Write the updated configuration to the device.
7. Perform a reset of the device.
8. Check if the new power management settings are applied correctly.

Power Management - CAN sleep Time

The *Power Management - CAN sleep Time* is to be used when the device should be automatically set to sleep mode in case that there is none of the configured CAN messages received by the device within a specified time period.

NOTICE
To set the device to sleep mode by the device variable *Power Management - CAN sleep Time*, the *IO - Terminal 15 (Ignition) State* must be low.

You can enable the *Power Management - CAN sleep Time* as follows:

1. Open the latest device configuration with the Proemion Configurator software
2. Add the device variable *Power Management - CAN sleep Time* to your configuration
3. Write the desired time in milliseconds into the parameter value input field.
4. Save the updated configuration file with a new *Device Configuration Version String*.
5. Write the updated configuration to the device.
6. Perform a reset of the device.
7. Check if the new power management settings are applied correctly.

Power Management - Time to Sleep

The *Power Management – Time to Sleep* is used when the device needs to be set to sleep mode by a connected controller with additional power management logic functionality.

NOTICE

Power Management - Time to Sleep is a volatile device variable and therefore considered as a one-time function.

NOTICE

The device will only enter sleep mode when the terminal 15 is at level low and no configured CAN message is left on the connected CAN bus.

NOTICE

While the countdown timer for *Power Management – Time to Sleep* is active, there is no reception and transmission of CAN messages possible

You can trigger the Time to Sleep by the controller as follows:

1. Ensure that the terminal 15 is at level low
2. Ensure that configured CAN message are not present on the connected CAN bus.
3. Write the desired count down time in seconds via your controller and a CANopen SDO message to Object Index `0x3333`, SubIndex `0x08`, `UInt8`.

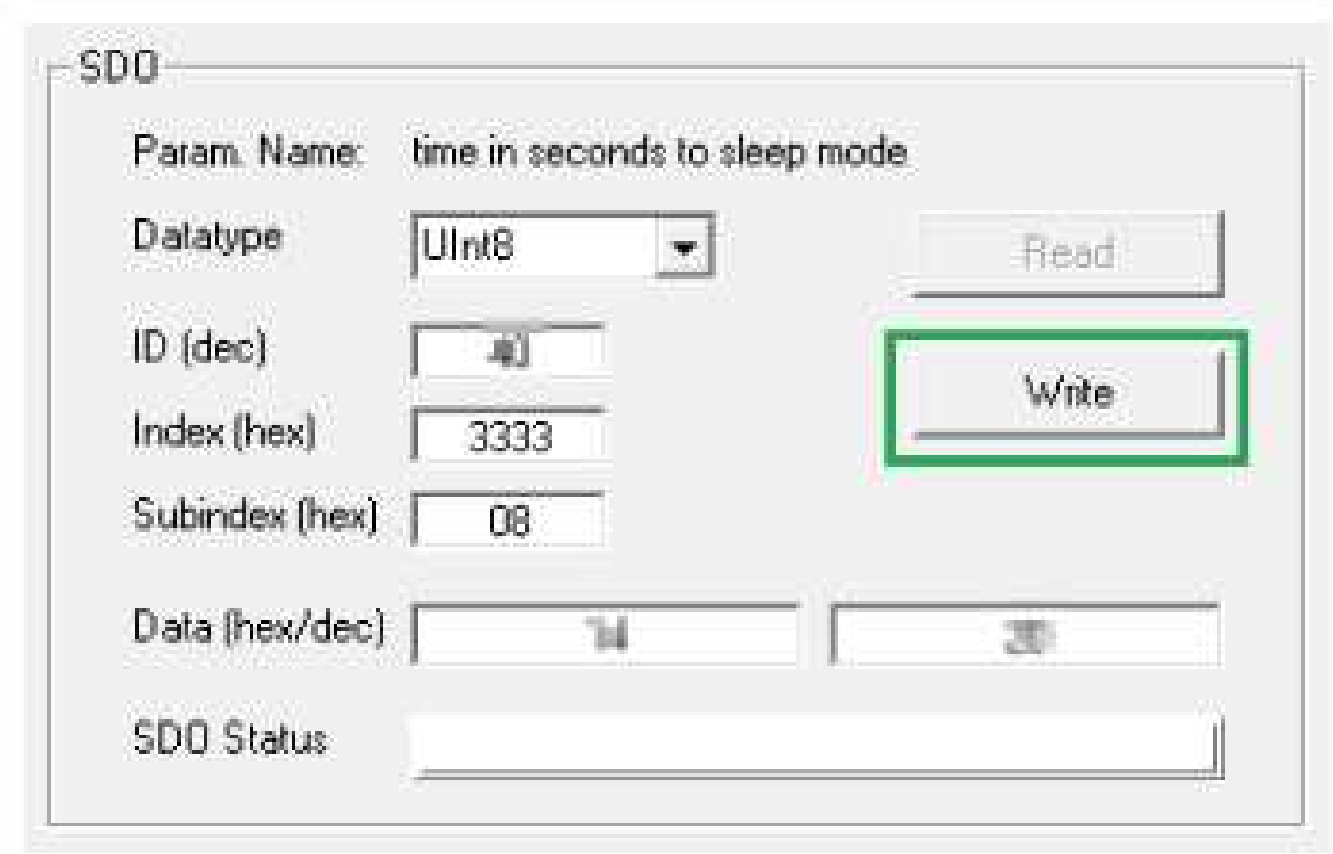


Figure 54. CANopen SDO

4. Check that the device is set to sleep mode after the specified time is elapsed.

Power Management - Acceleration Sensor Wake-up Force

When the internal accelerometer detects an acceleration force higher than the configured value, the device automatically wakes up from sleep mode.

You can enable the Acceleration Sensor Wake-up Forc eas follows:

1. Open the latest device configuration with the Proemion Configurator software.
2. Add the device variable *Power Management - Acceleration Sensor Wake-up Force* to your configuration.
3. Write the acceleration force into the parameter value input field.

NOTICE

The recommended threshold for the acceleration force is at least `1.2 g`. Otherwise the device might get into a kind of restart cycle.

4. Save the updated configuration file with a new *Device Configuration Version String*.
5. Write the updated configuration to the device.
6. Perform a reset of the device.
7. Check if the new power management settings are applied correctly.

Power Management - Cyclic Wake-up Time

When in sleep mode, the device will wake up from sleep mode automatically after the configured time period.

You can enable the *Power Management - Cyclic Wake-up Time* as follows:
1. Open the latest device configuration with the Proemion Configurator software
2. Add the device variable *Power Management - Cyclic Wake-up Time* to your configuration
3. Writethe desired time for the cyclic wake up in seconds into the parameter value input field.
4. Save the updated configuration file with a new *Device Configuration Version String*.
5. Write the updated configuration to the device.
6. Perform a reset of the device
7. Check if the new power management settings are applied correctly.

Power Management - Deep Sleep Flag

The use of *Power Management - Deep Sleep Flag* is especially recommended for devices with internal battery and additional wake up flags configured. This function was implemented to avoid that the that the device wakes up during storage time and transport and hence the battery gets discharged.

NOTICE

With deep sleep mode enabled, the device will ignore the configured wakeup flags such as cyclic wake up or acceleration force.

NOTICE

Power Management - Deep Sleep Flag is a volatile device variable and therefore considered as a one-time function.

Wake up of the device is possible when at least one of following condition is fulfilled:

- Rising edge on *IO - Terminal30 Voltage*
- The *IO - Terminal 15(Ignition) State* is at level `high` (`> 6 V`)
- A CAN message is present at the CAN1 or CAN 3 interface

You can set the device into deep sleep mode before transport as follows:

1. Open the latest device configuration with the Proemion Configurator software.
2. Add the device variable *Power Management – Deep Sleep Flag* to your configuration.
3. Write the value 0x01 into the parameter value input field of the device variable *Power Management – Deep SleepFlag* to enable the deep sleep mode
4. Add the device variable *Power Management – Time to Sleep* to your configuration.
5. Define a value for the countdown time in seconds to sleep mode in the parameter value input field.
6. Ensure that there are no CAN messages left on the CAN bus.
7. Ensure that the terminal 15 is at level low.
8. Write the updated configuration to the device.
9. Wait for the specified time until the device is set to deep sleep mode.
10. Verify that the device does not wake up by the configured wake-up flags such as acceleration force or cyclic wake up time.

6.7.7. GeoFence / GeoLeash

GeoFence Mode

The device is provided with a geofence monitoring function. This allows you to monitor whether the device is located inside or outside a pre-defined “fenced” area and when the device crosses the fence.

There are three ways to define the fence:

- Define center and radius of a circle. The center of the circle is defined as a fixed point.
- Define center and radius of a circle. The current position on enabling the function is used as the center of the circle.
- Two opposite points are defined for a rectangle. The variables belong to the DEVICE VARIABLES ¬ INTERNAL GEOFENCE object dictionary group.

Table 71. GeoFence Definition

Variable	Function
GEOFENCE - MODE	`0` = Geofence disabled `1` = GeoFence enabled, circle center and radius defined `2` = GeoFence enabled, circle center, current position, and defined radius `3` = GeoFence enabled, rectangle `4` = GeoLeash enabled, location monitoring, COORDINATE 2 ¬ LONGITUDE / RADIUS variable is a condition.
GEOFENCE - COORDINATE 1 ¬ LONGITUDE	Longitude for center of the circle or first corner of the rectangle
GEOFENCE - COORDINATE 1 ¬ LATITUDE	Latitude for center of the circle or first corner of the rectangle
GEOFENCE - COORDINATE 2 ¬ LONGITUDE / RADIUS	GeoFence Mode Circle: Radius of the circle GeoLeash Mode: Line length (unit: `meters`) GeoFence Mode Rectangle: Degree of longitude of second corner (Unit: `Decimal degree`, `-180 … 180`)
GEOFENCE - COORDINATE 2 ¬ LATITUDE	Latitude for the second corner of the rectangle

GeoFence Status

The GeoFence status can be used to trigger an event internally. The GeoFence status is updated every 2 seconds. Every time the GeoFence status changes, the time is written to a variable.

The variables belong to the object dictionary group DEVICE VARIABLES.

Table 72. GeoFence Status

Variable	Function
GEOFENCE STATUS	`0x00` = device is outside the fence `0x01` = device is inside the fence `0xFF` = status unknown (e.g. because no position data is available)
GEOFENCE - STATUS CHANGE UTC TIME	Time of GeoFence status change

For detailed information on creating objects, see Creating Object Dictionary Groups and Objects.

GeoLeash

The GeoLeash function enables you to monitor and display the location of the machine.

In this case, the location offset is determined by an adjustable limit value. The minimum limit value for the tolerated location offset is 100 meters.

The DataPortal can be used to activate the GeoLeash function and define the area to be monitored.

Figure 55. GeoLeash in the DataPortal

NOTICE

The GeoLeash and device internal Geofence functions cannot be used simultaneously. Please be aware that the GeoLeash function must be supported by the installed firmware. In case of problems, update to the latest firmware.

	Further information on the GeoLeash function is available in DataPortal DataPortal User Manual ¬ **GeoLeash**/ **Boundary** and **GeoLeash** (under **Reporting Tools**).

6.8. Protocols and Connections

The chapter Technical Data / Protocols contains an overview of the available protocols and connections.

	For further information on protocols and connections, refer to the Download Center.

6.9. Safe Remote Updates Guideline

6.9.1. Introduction

Our firmware is undergoing an intensive test program with automated tests during development and an explicit test for the final release candidate. Our tests are constantly extended also by items reported from the field. Nevertheless, there is still a remaining risk of problems occurring in special cases. Considering this, we recommend the following procedure for a remote firmware or configuration update campaign.

To minimize the risk, this guideline should be followed. By following the steps, a more secure and successful update can be achieved.

NOTICE
Risk of property damage * It is strongly recommended not to remotely update all machines in a single step with a new configuration or firmware.

6.9.2. Updating Steps

When planning a firmware or configuration roll-out, some steps should be considered so that the roll-out process is as safe and successful as possible. This guide is to be applied for each machine type / machine family (features: same configuration version, same initial firmware and – if applicable – same SIM card settings). By applying the guideline, the risks of errors occurring are minimized.

1. The first remote update should be carried out, if possible, on a simulator device, alternatively on an easily accessible sample machine. Check the success of this update.
2. In the second step, the remote update should be extended to a maximum of 10 machines. After rolling out the update, a check of success must be performed for each machine.
3. Subsequently, the remote update can be rolled out to a maximum of 15% of the fleet. In this case, a check of success must also be conducted after the roll-out.
4. In the last step, the rest of the fleet shall be updated.

6.9.3. Checking Success

Between the individual steps, please check randomly whether the device(s) behave(s) as expected:

- Check the device start,shutdown behavior in the machine environment
- Check the logged data
- Check file transfer to your ECU
- Check actions which you have configured
- Check special device behaviors which you have configured

6.10. Configuration update

You can use the Proemion Configurator to load a configuration update on the device.
The configuration update can be loaded to the device via the CAN interface or the DataPlatform. The device identifies and automatically loads the new configuration.
For more detailed information on how to create a device configuration, see Customizing the demo configuration File.

6.10.1. DataPlatform

Authorization to perform a configuration update must be enabled on the DataPlatform. Generally, users with administrator rights have this authorization.

INFORMATION

If you do not have authorization to perform a configuration update, contact Support. See Service and Support

1. Start the Proemion Configurator software.
2. Open the corresponding configuration file (`*.DOD`).
3. Click on TARGET DEVICE ¬ OBJECT DICTIONARY ¬ DOWNLOAD ¬ REMOTE DOWNLOAD - ALL ENTRIES or click on the arrow in the toolbar next to the DOWNLOAD ALL ENTRIES symbol.

Figure 56. Configuration Update

¬ The REMOTE CONFIGURATION DOWNLOAD TO TARGET(S) window opens.

4. Click on the SELECT DEVICES button in the window REMOTE CONFIGURATION DOWNLOAD TO TARGET(S) window.

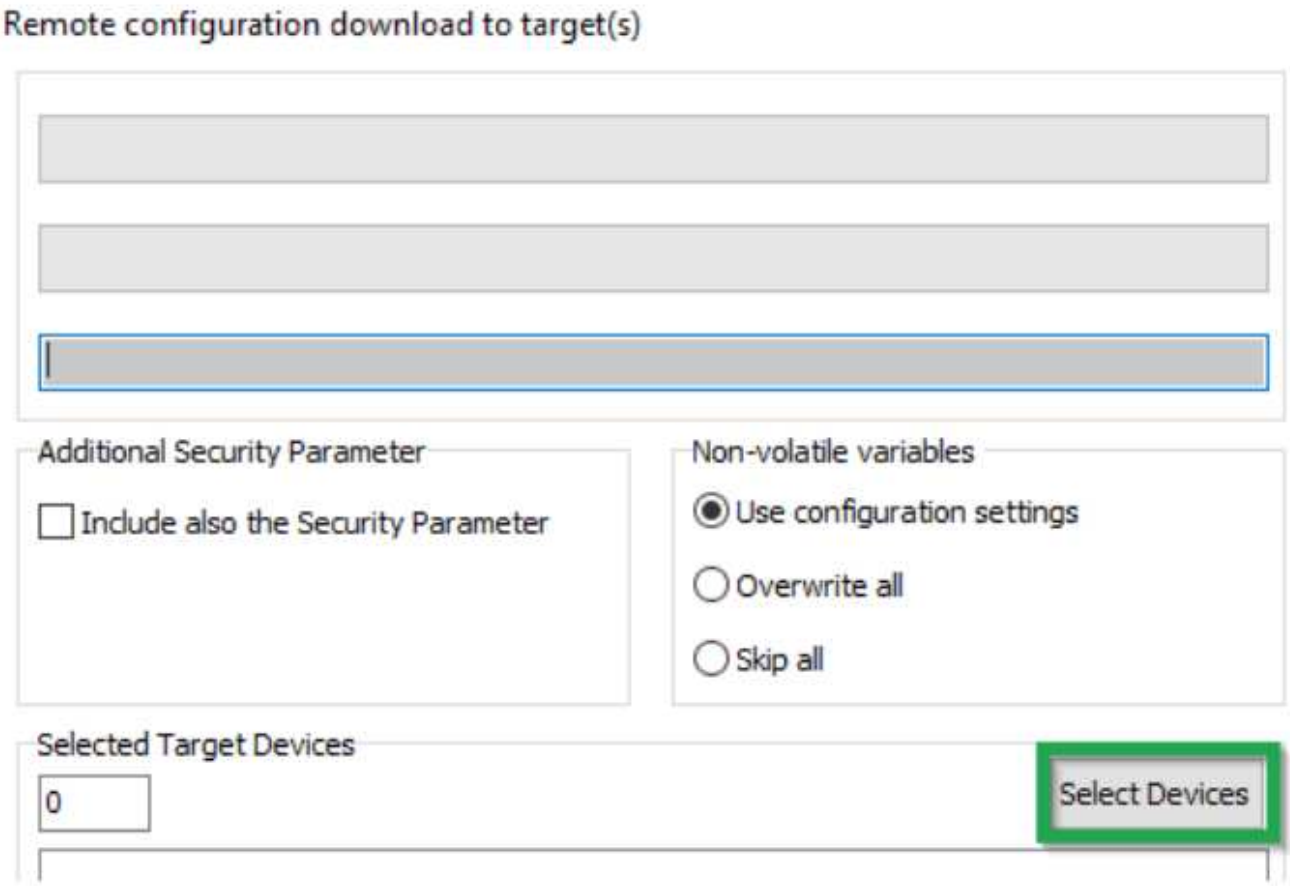


Figure 57. Configuration Update - Targets

¬ The SELECT DEVICES window opens.

5. Enter your DataPlatform user credentials in the SELECT DEVICES window.
6. Click on the LOGIN button.
7. Select the device.
8. Click on the OK button.

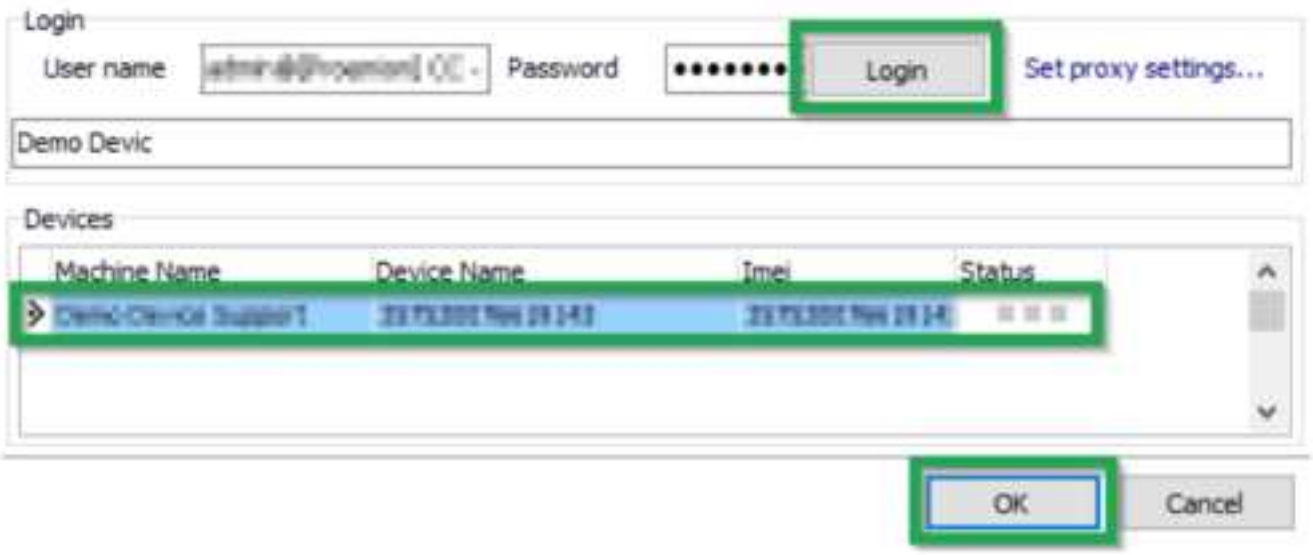


Figure 58. Configuration Update - Select Devices

NOTICE

Loss of connection due to incorrect parameters.

The online connection may be lost due to incorrect provider parameters. In most cases, it is not necessary to update the security variables, so this should be avoided.

* Before every update of the security variables, check the provider parameters.
* Refer to Safe Remote Updates Guideline and follow the recommended update process.

9. Click on the START button in the REMOTE CONFIGURATION DOWNLOAD TO TARGET(S) window.

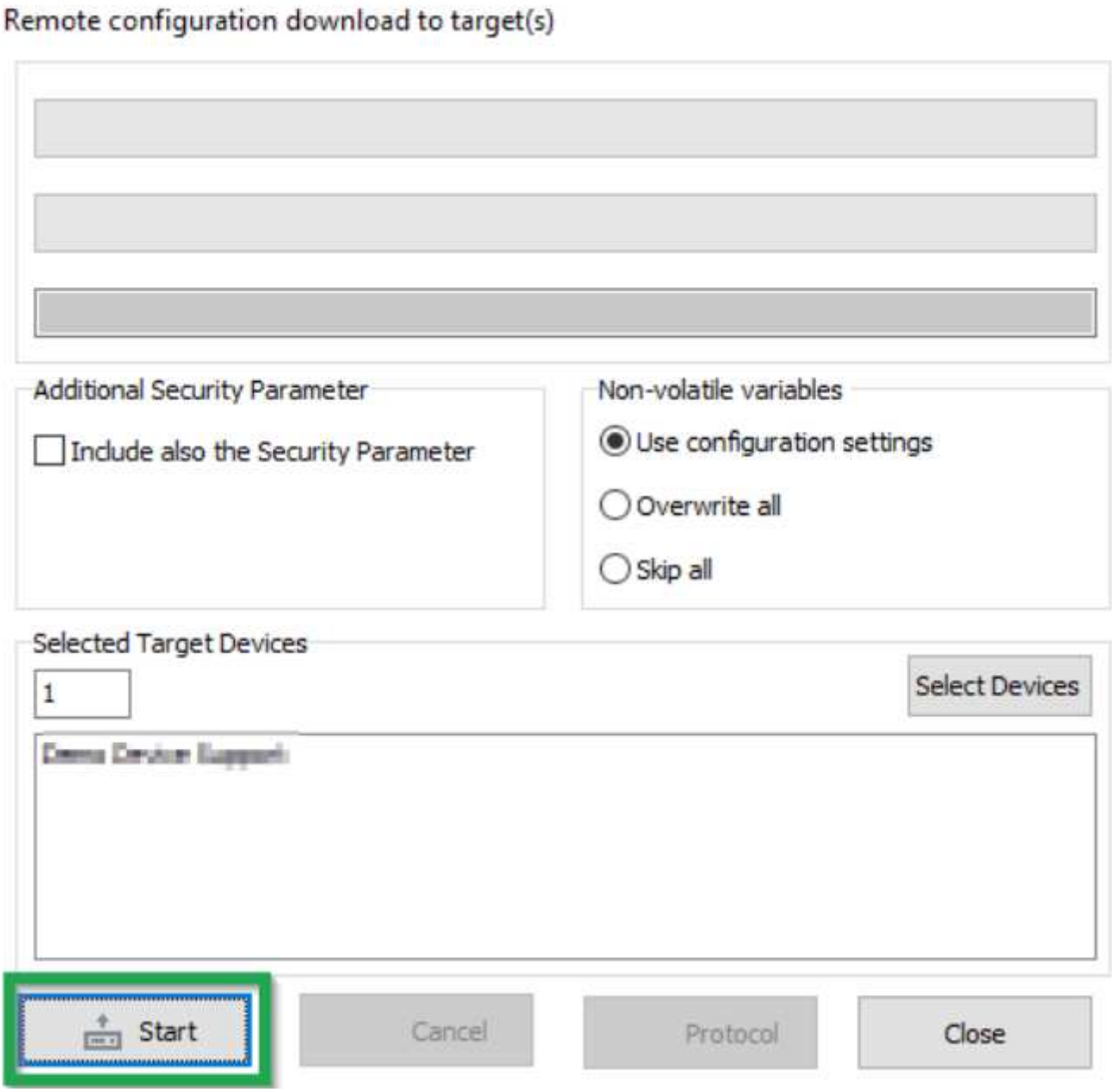


Figure 59. Configuration Update - Download to Target

¬ The following warning appears. The user is warned against downloading untested configuration files.

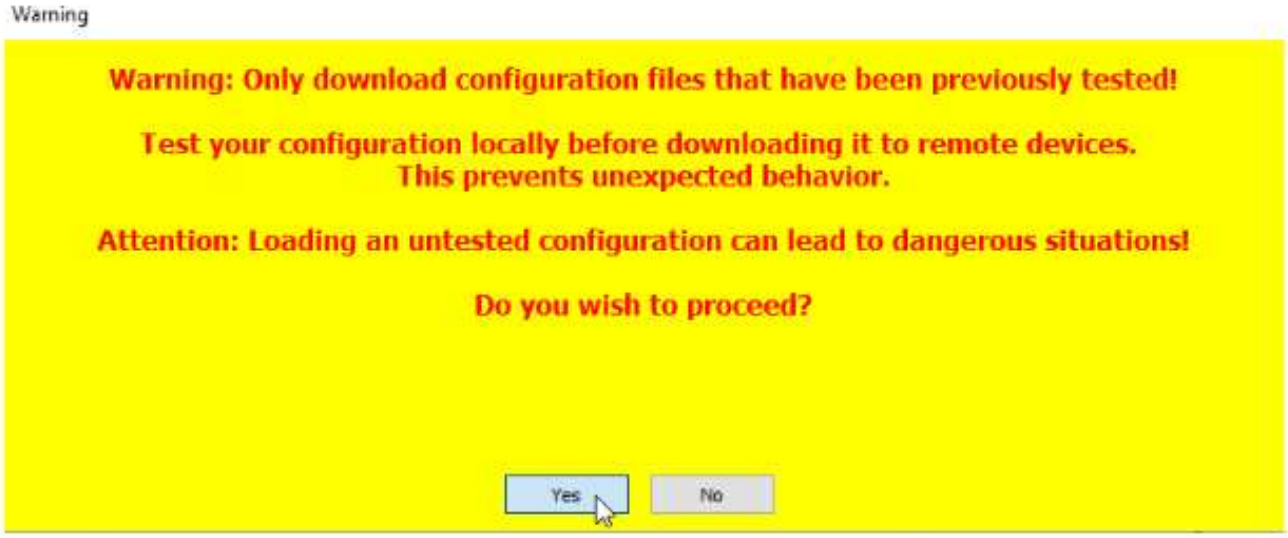


Figure 60. Configuration Update - Download Warning

10. Click on the YES button.

¬ The configuration update download starts automatically as soon as the device is online. The download can take several minutes.
¬ The device recognizes the configuration file and saves it to its internal memory.
¬ The device LEDs light up in a certain sequence.

INFORMATION
For more information on the LED status indications, see Indicator Elements.

11. Check the DOD version and the DOD activation time in the Communication unit details display of the DataPortal.

¬ The new Config Version with Timestamp will be displayed in the Communication unit details after the next connection of the device.
¬ An update log will appear in the file download section of the DataPlatform.

Example of an `UpdteLog.txt` *after a successful configuration update*

```
<LogFileVersion>: 1.0
<BEGIN>: 1607604003
<actSW>: Fw 7.3.0
<actBL>: Bl 9.2
<actDOD>: Proemion
File Size: 20763
Received configuration file
CONFIGURATION DOWNLOAD COMPLETE AFTER 1 ATTEMPT(s).
<newSW>: Fw 7.3.0
<newBL>: Bl 9.2
<newDOD>: CLM Demo Device V2.2.8
<END>: 1607604082
```

Example of an `UpdteLog.txt` *after a failed configuration update (e.g. due to an incompatible type)*

```
<LogFileVersion>: 1.0
<BEGIN>: 1607604996
<actSW>: Fw 7.3.0
<actBL>: Bl 9.2
<actDOD>: CLM Demo Device V2.2.8
File Size: 2497
Received configuration file
ERROR: Job 0 (0x1018:0x2) -0x3337 is not equal to 0x5301
ERROR: Job 0 (0x1018:0x2) -0x3337 is not equal to 0x5301
ERROR: Job 0 (0x1018:0x2) -0x3337 is not equal to 0x5301
ERROR: ABORT CONFIGURATION DOWNLOAD AFTER 3 ATTEMPTS!
<newSW>: Fw 7.3.0
<newBL>: Bl 9.2
<newDOD>: CLM Demo Device V2.2.8
<END>: 1607605139
```

6.10.2. CAN

You can perform a configuration update using the CAN interface.
To be able to load the configuration file to the device, the device must be connected via a CAN-USB port to a PC on which the configuration file is saved.

1. Connect the device to a PC. See Connecting the Device to the PC.
2. Load the configuration to the device. See Loading the Configuration to the Device via CAN Interface.
   ¬ You have completed the configuration update.

6.11. Firmware update

You can load a firmware update to the device by remote maintenance via the DataPlatform, the CAN interface or the micro-USB interface (Type A connector).

NOTICE

Carry out a node scan in Proemion Configurator to find the current firmware version. See Node Scan.

NOTICE

From firmware version 7.0.0, the file extension for the firmware files is <code>*.bin</code>. Devices with earlier firmware versions cannot detect these firmware files.

 * In the case of devices with earlier firmware versions, you must first install the adapter firmware 7.0.0 with file extension <code>*.FwBin</code>.

The firmware can be downloaded from our Document Library or Download Center

In case of problems, the Connectivity check utility can be used to check the connectivity of our software tools with our services from your site's network.

6.11.1. DataPlatform

To be able to load the firmware update (`*.bin`) on the device using the remote maintenance feature via the DataPlatform, the Proemion Firmware Programmer software must be installed on a PC and the firmware update stored.
The authorization to perform the remote firmware update must be enabled on the DataPlatform. Usually, users with administrator rights have this authorization.

INFORMATION

If you do not have authorization to perform a remote firmware update, contact the Proemion support. See Service and Support.

1. Start the Proemion Firmware Programmer software.
2. Click on FILE ¬ OPEN in the menu and navigate to the memory path for the firmware update (`*.bin`).

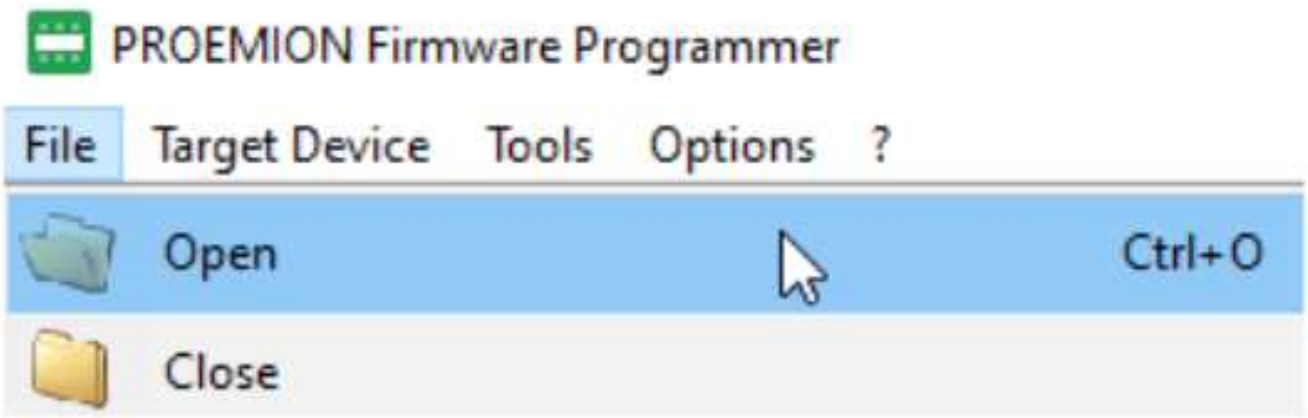


Figure 61. Firmware Update - Open Firmware File

3. Select the firmware update (*.BIN) and click on the OPEN button.
4. In the COMMUNICATION PATH field, select the CONNECTION VIA INTERNET (N DEVICES) interface from the list.
5. Click on the SELECT DEVICES button.

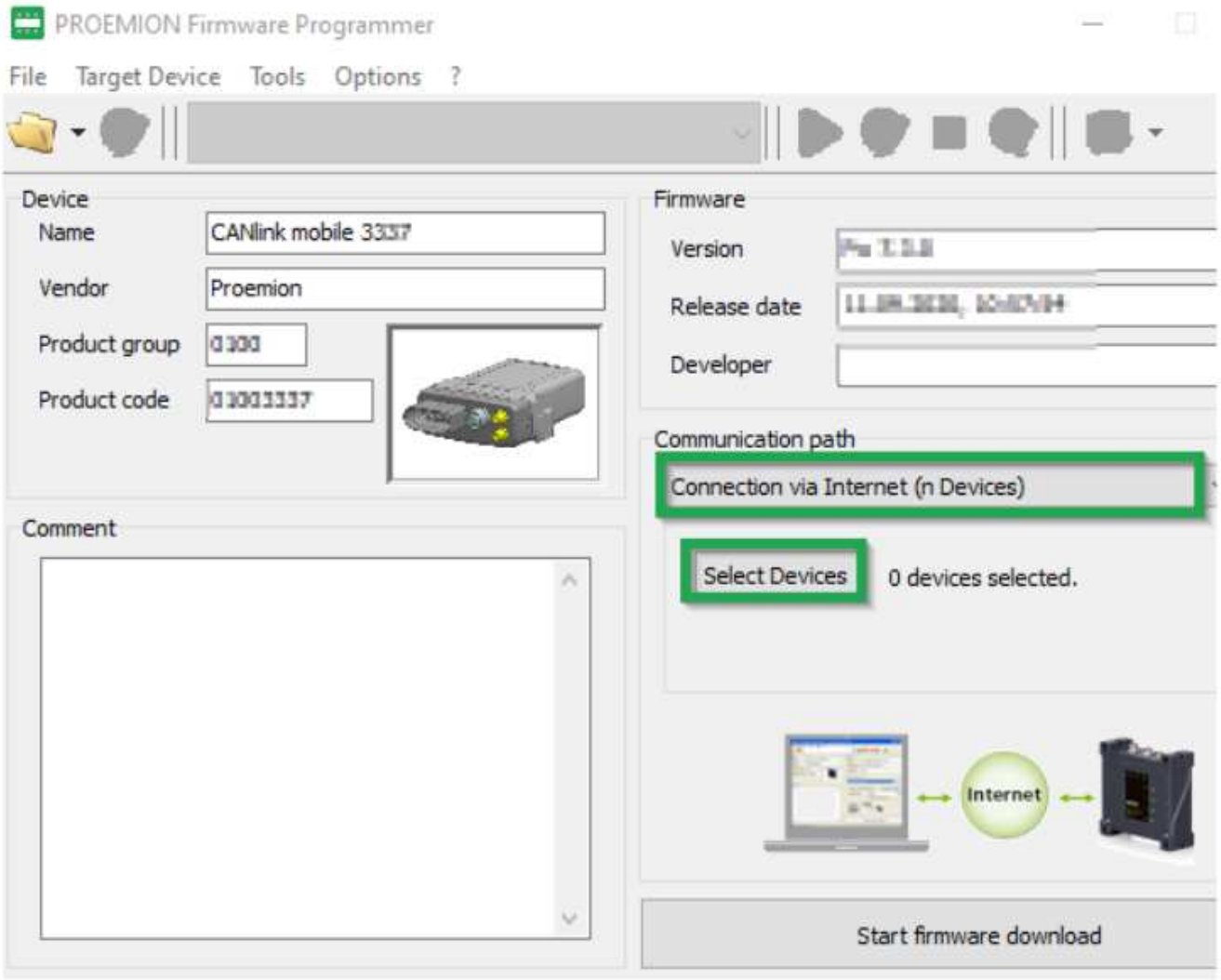


Figure 62. Firmware Update - Communication Path

¬ The SELECT DEVICES window opens.

6. If the list is empty, click on the SETTINGS button.

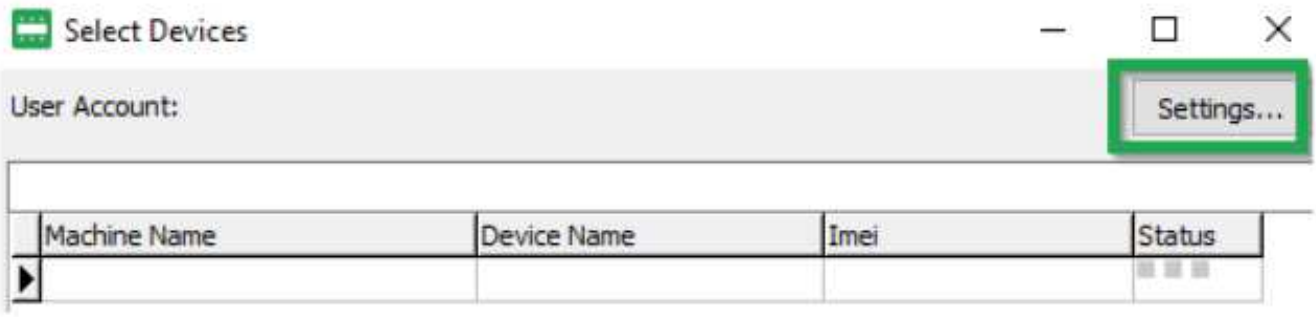


Figure 63. Firmware Update - Select Devices

¬ The COMMUNICATION SETTINGS window opens.

7. In the COMMUNICATION GATEWAY field, navigate to the GATEWAY DEVICE list and select the device CANLINK MOBILE.
8. Enter your DataPlatform user credentials in the SYSTEM ACCESS field.
9. Click on the OK button to save the settings.

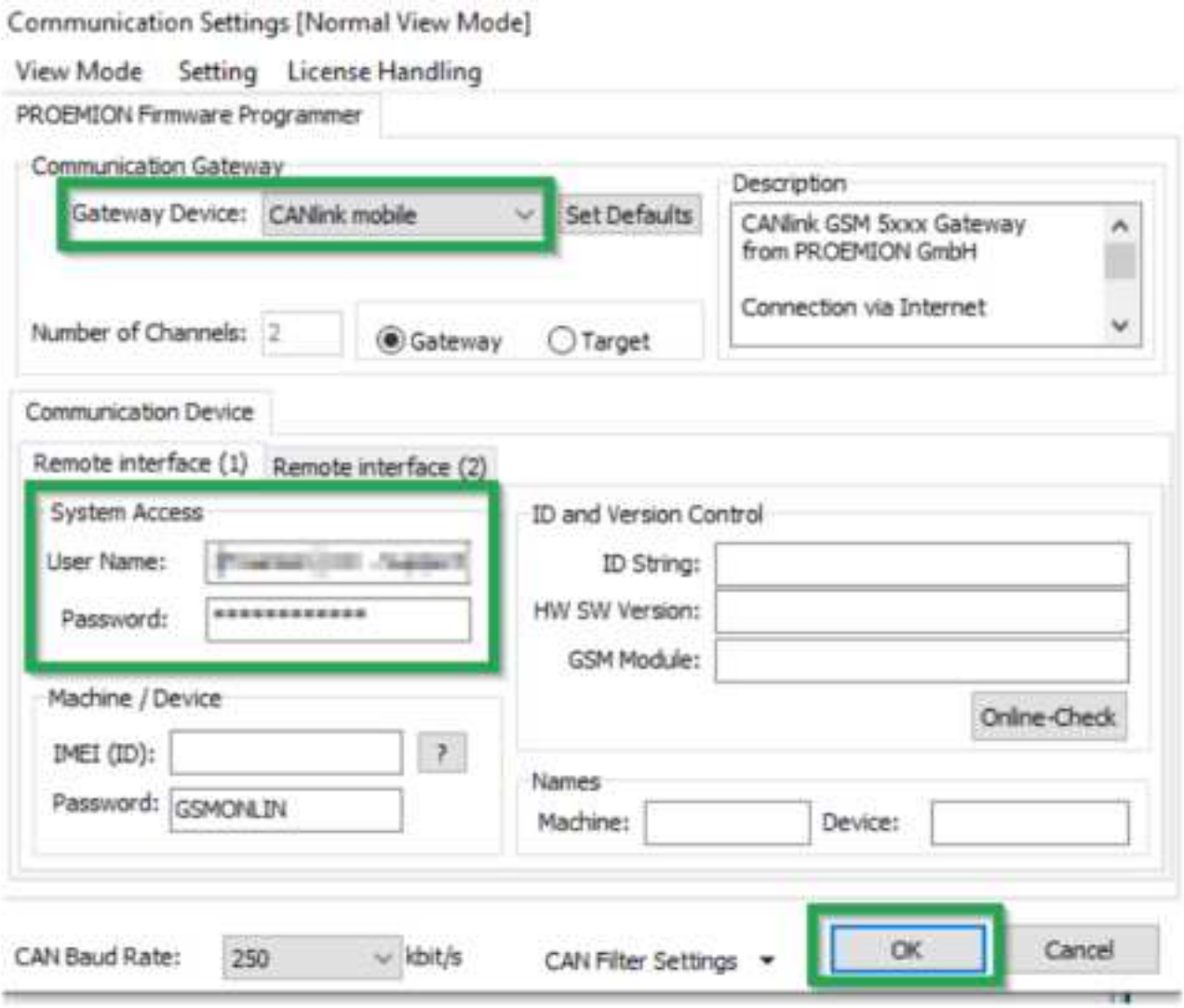


Figure 64. Firmware Update - Communications Settings

10. Select the device in the SELECT DEVICES window. By pressing <CTRL> while clicking, you can select several devices.
11. Click on the OK button.

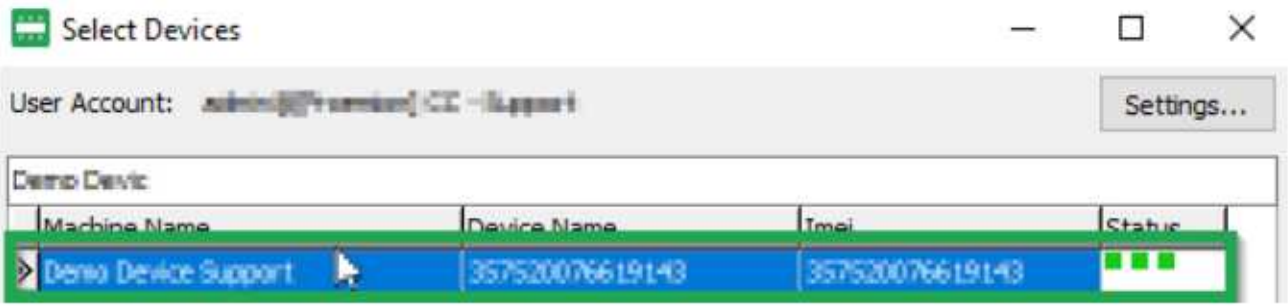


Figure 65. Firmware Update - Select Devices

12. The following warning appears.
    It points out that the device type and the firmware version will not be verified.

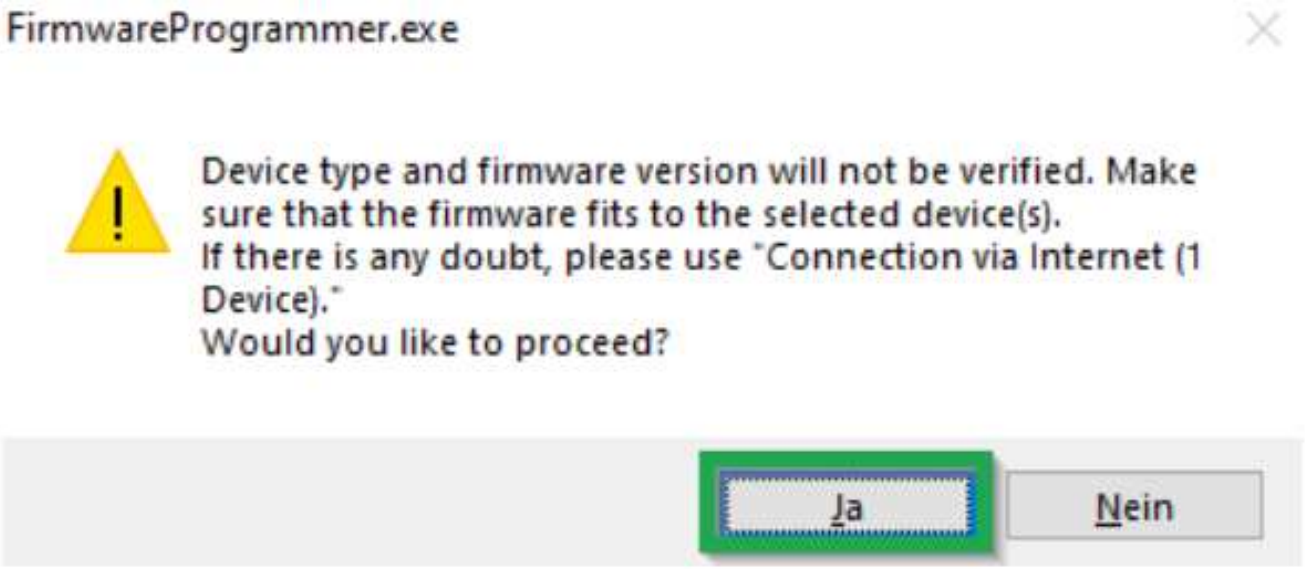


Figure 66. Firmware Update - Warning

13. Click on the YES button.
14. Click on the START FIRMWARE DOWNLOAD button.

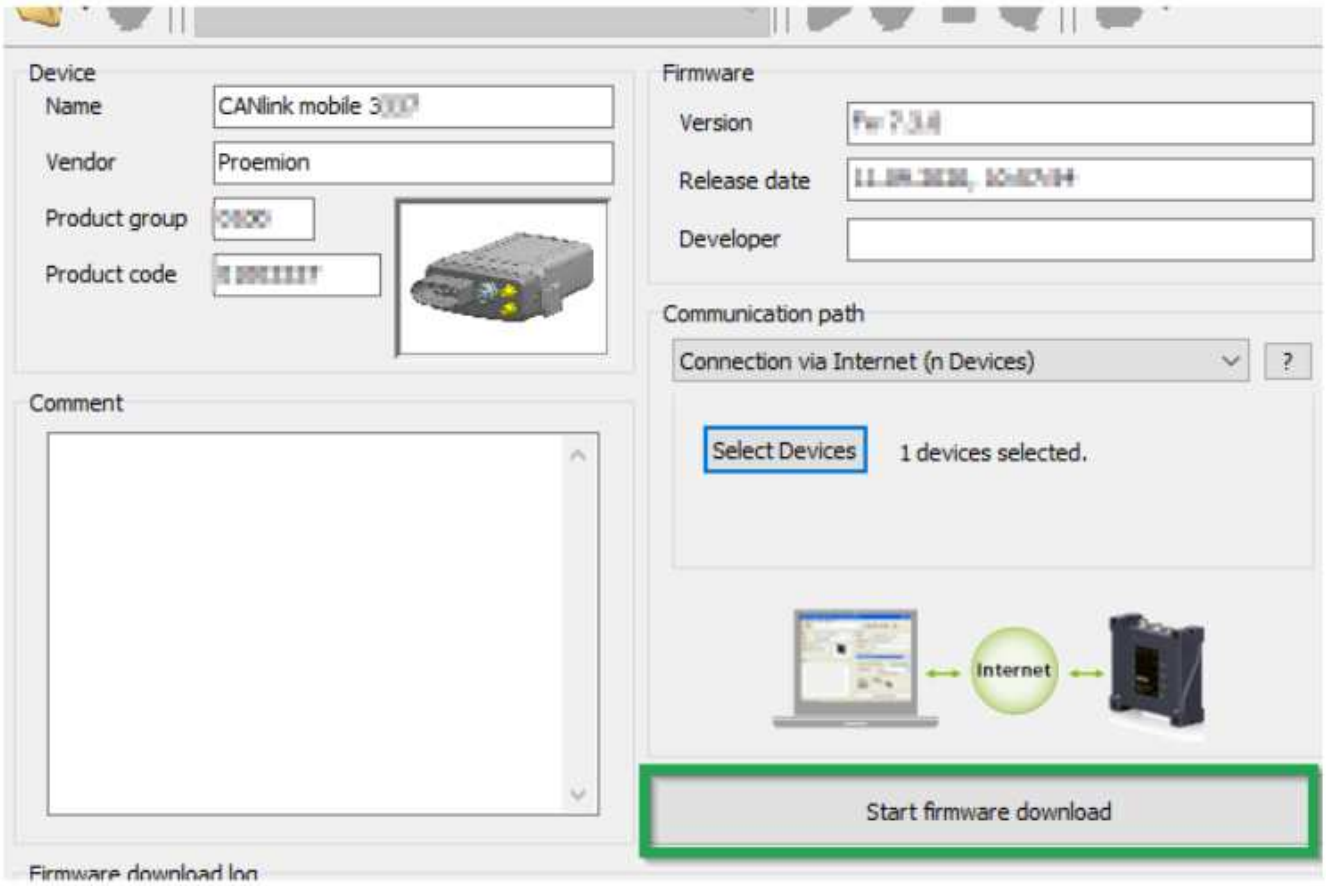


Figure 67. Firmware Update - Start

¬ The firmware files are uploaded to the DataPlatform.
¬ The following message will appear in Firmware download log when the update file has been transferred to the DataPlatform:

```
Connecting to webservice...
Preparing firmware...
[1/1] Uploading Firmware to machine xxxxxx...
[1/1] ...done
The firmware is available on remote server now. It will be transferred now, when
logging mode is active or the next time when the device(s) connect to the server
(There is no firmware update possible while realtime session or device offline).
```

¬ The download of the firmware files to the device memory starts automatically as soon as the device is online.
¬ During the firmware update, the LEDs light up in a certain sequence.

INFORMATION

For more information on the LED status indications, see Indicator Elements.

¬ The device is restarted.
¬ After the restart, the device uses the updated firmware version.
¬ An update log will appear in the file download section of the DataPlatform

Example of `UpdteLog.txt` *after a successful firmware update*

```
<BEGIN>: 1607594397
<actSW>: Fw 7.2.0
<actBL>: Bl 9.2
<actDOD>: CLM Demo Device V2.2.10
File Size: 477176
Received firmware file
Received bin file
Receiving Update for Controller 1
Received firmware file correct
<newSW>: Fw 7.3.0
<newBL>: Bl 9.2
<newDOD>: CLM Demo Device V2.2.10
<END>: 1607595030
```

Example of protocol content after a failed firmware update

```
<LogFileVersion>: 1.0
<BEGIN>: 1607598855
<actSW>: Fw 7.3.0
<actBL>: Bl 9.2
<actDOD>: Proemion
File Size: 301892
Received firmware file
ERROR: Update aborted: invalid file format.
<newSW>: Fw 7.3.0
<newBL>: Bl 9.2
<newDOD>: Proemion
<END>: 1607599393
```

	You can find a tutorial on how to install the firmware to the device in the download section of our website. See Service and Support.

6.11.2. CAN

In order to load the firmware update (`*.bin`) on the device via the CAN interface, the device must be connected to a PC via a CAN-USB connection. The Proemion Firmware Programmer software must be installed on the PC and the firmware update stored.

1. Connect the device to a PC. See Connecting the Device to the PC.
2. Start the Proemion Firmware Programmer software.
3. Click on FILE ¬ OPEN in the menu and navigate to the memory path for the firmware update (*.BIN).
4. Select the firmware update (`*.bin`) and click on the OPEN button.

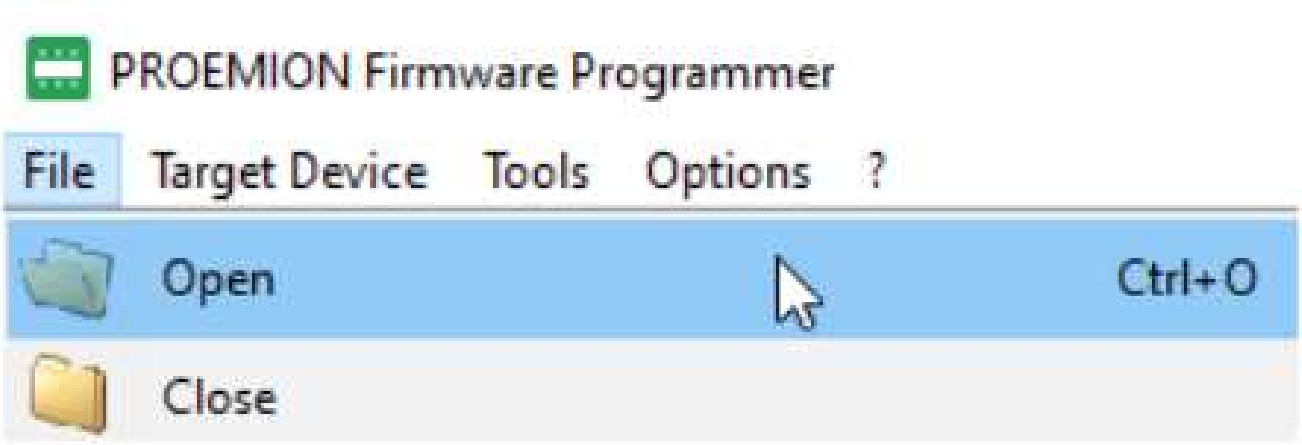


Figure 68. Firmware Update - Open Firmware File

5. Click on OPTIONS ¬ COMMUNICATION SETTINGS in the menu.

   ¬ The COMMUNICATION SETTINGS window opens

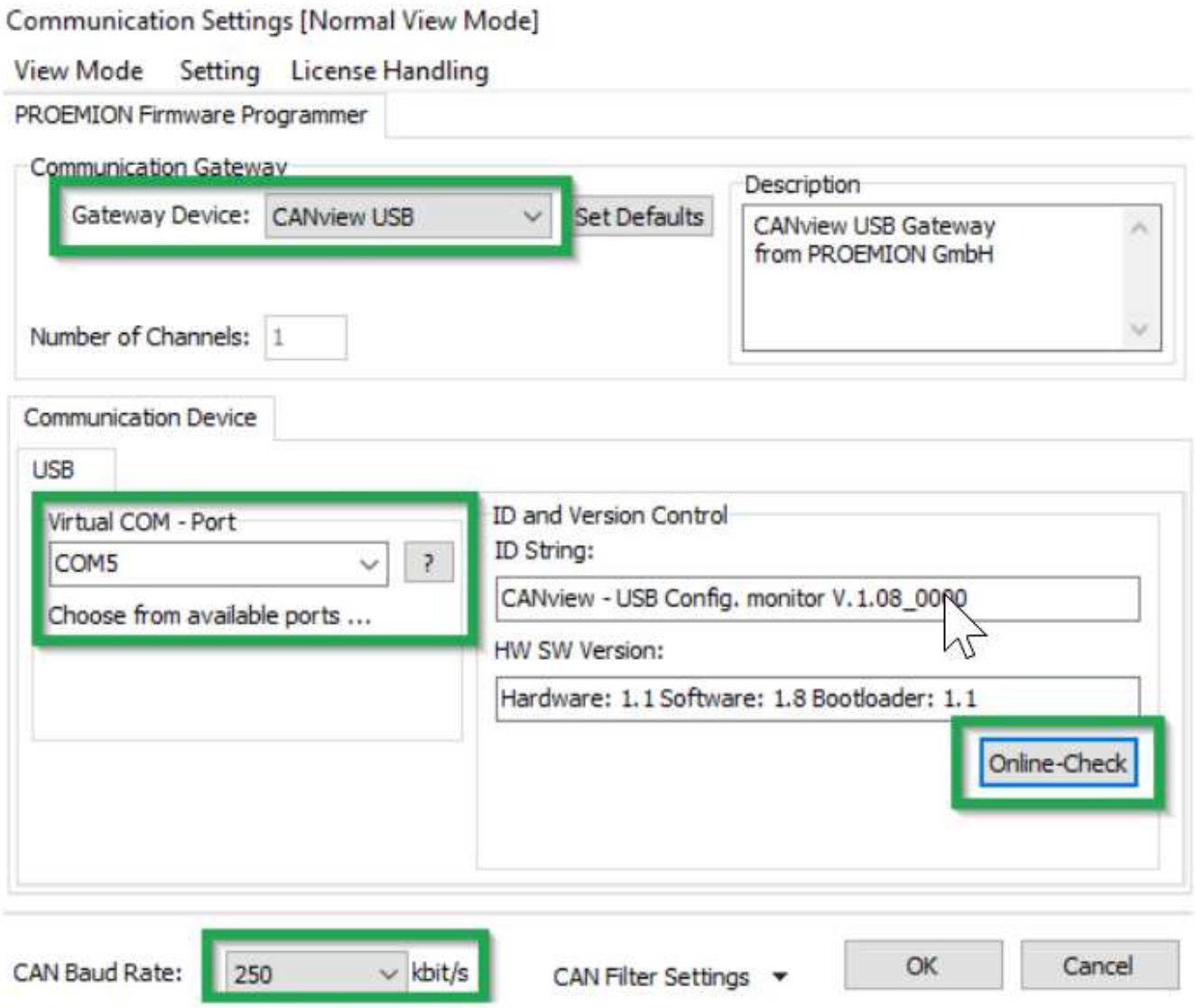


Figure 69. Firmware Update - Communication Settings

6. In the COMMUNICATION GATEWAY field, navigate to the GATEWAY DEVICE list and select the device CANVIEW USB.
7. In the USB field, navigate to the VIRTUAL COM-PORT list and select the port you require.
8. Click on the ONLINE-CHECK button.

   ¬ If a connection to the CANview USB already exists, the device name and software version appears in the corresponding fields.

9. Check the communication settings for the correct CAN baud rate. The default CAN baud rate is 250 kbit/s.
10. Click on the OK button to save the settings.
11. In the list in the COMMUNICATION PATH field, select the interface CONNECTION VIA CAN.
12. Click on the SEARCH FOR TARGETS button.

    ¬ The device's node ID is adopted.

13. The device's node ID is adopted.
14. Start firmware download.
15. Wait until the update is finished.

TIP

If you use a CANview USB as a communication gateway, activate the FAST PROGRAM MODE checkbox. This increases the speed of the update process.

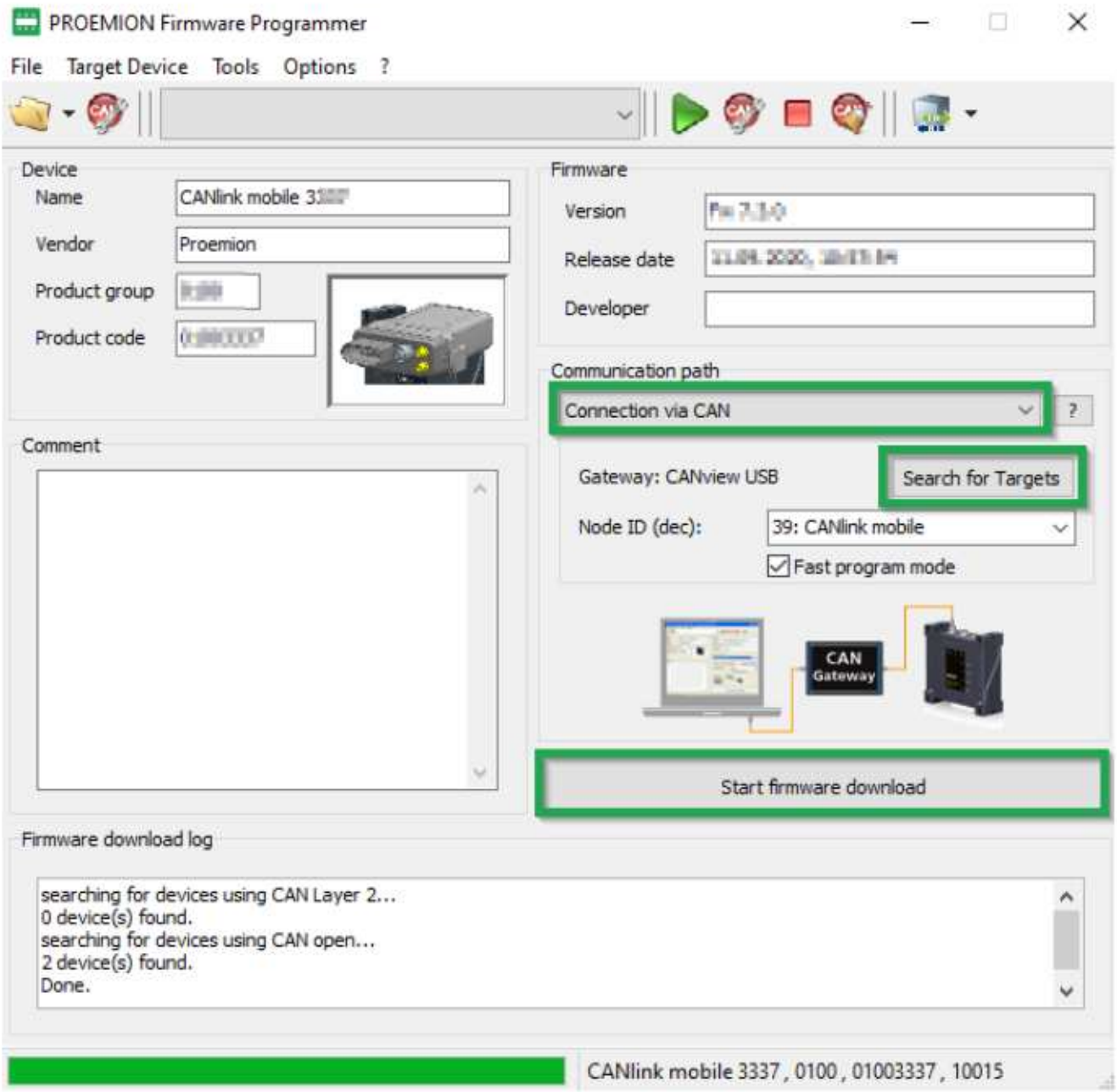


Figure 70. Firmware Update - Progress

NOTICE

Device defect due to power failure.

Destroyed file system on the device. Repairs necessary by Proemion.

* Do not disconnect the device from the power supply until the process has been completed.

¬ During the firmware update, the LEDs light up green in the same sequence.
¬ In the field FIRMWARE DOWNLOAD LOG, the message FIRMWARE DOWNLOADED SUCCESSFULLY appears when the firmware update is complete.
¬ The device restarts automatically.
¬ After the restart, the device uses the updated firmware version.

	You can find a tutorial on how to install the firmware to the device in the download section of our website. See Service and Support.

6.11.3. Micro-USB

In order to load the firmware update (`*.bin`) on the device via the micro-USB interface, the device must be connected to a PC via a USB connection. The Proemion Firmware Programmer software must be installed on the PC and the firmware update stored.
If you use the *USB cable USB A-Micro USB A, 1.8 -2 m* USB cable (part number 136000199), the device automatically starts in Bootloader mode.

NOTICE

Risk of property damage

Pay attention that the USB plug is connected according to the correct assignment and without the need for any excessive force. Improper connection or excessive force can damage the USB socket and render the device seal ineffective.

1. Connect the device to a PC with the cable USB cable, *USB A-Micro USB A, 1.8 –2m*.
2. Connect the device to the power supply grid with the cable *CLM3 start cable, 6 open, 2 dsub, 1 pw, 2 m* and the power supply unit from the launch kit.

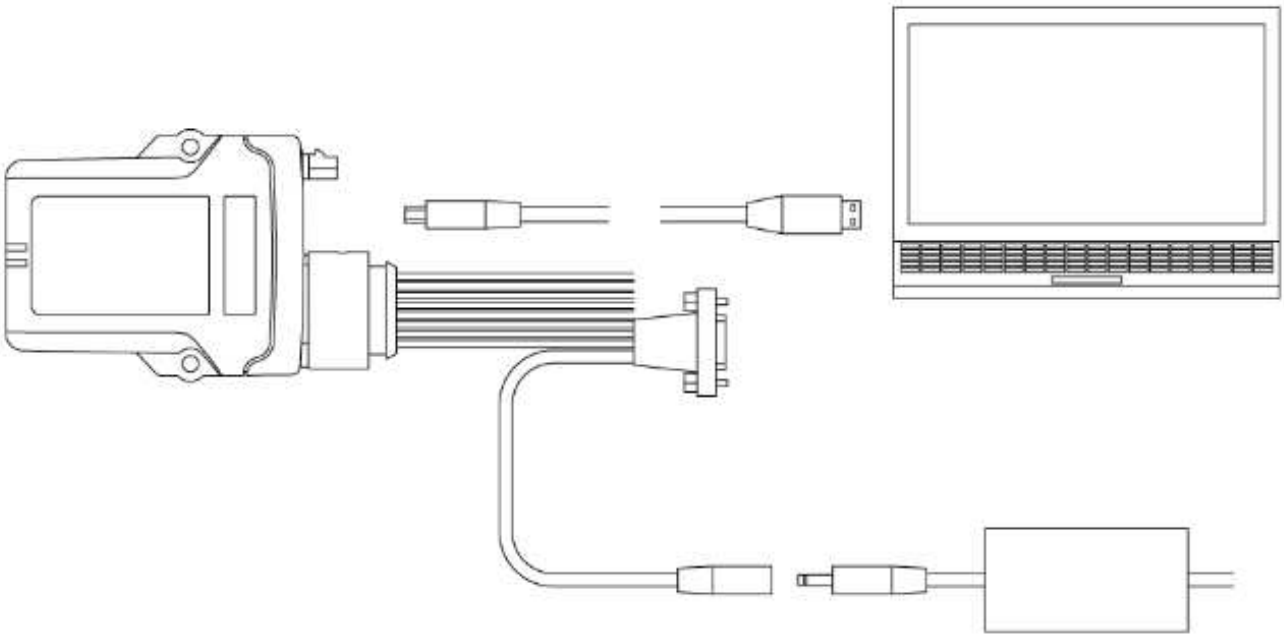


Figure 71. Connecting the CANlink mobile 3000 to a PC

NOTICE

If connected with a *USB cable, USB A-Micro USB A, 1.8 -2 m* cable, the device automatically starts in Bootloader mode. The LEDs do not light up. In the USB-Controller field in the Device Manager, the device is shown as "STM Device in DFU Mode".

3. Start the Proemion Firmware Programmer software.
4. Click on FILE ¬ OPEN in the menu and navigate to the memory path for the firmware update (`*.bin`).
5. Select the firmware update (`*.bin`) and click on the OPEN button.
6. In the list in the COMMUNICATION PATH field, select the interface CONNECTION VIA USB.
7. In the list in the DEVICE field, select RM DEVICE.
8. Click on the Start Firmware Download button.

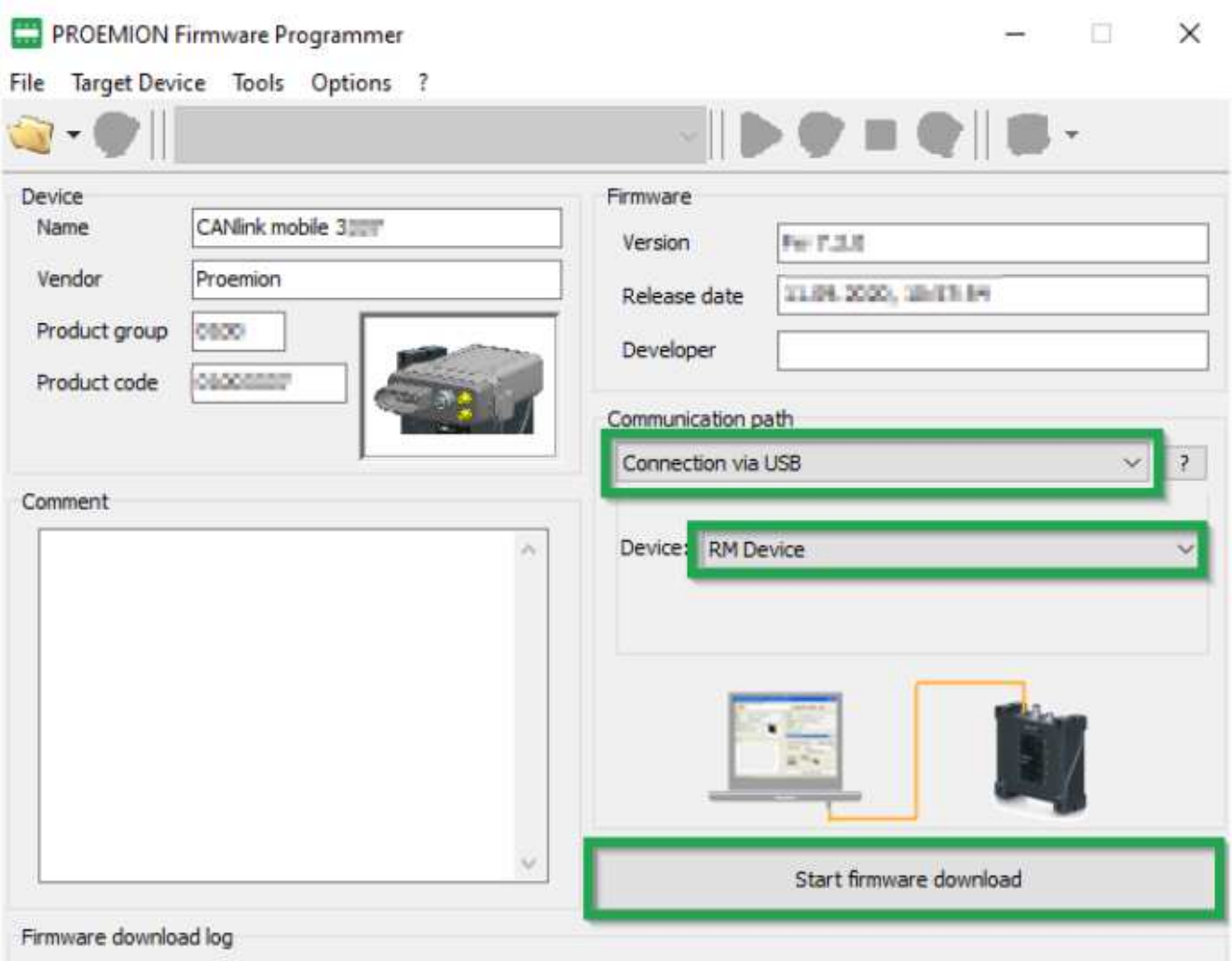


Figure 72. Start Firmware Download

9. Wait until the update is finished.

NOTICE
Device defect due to power failure. Destroyed file system on the device. Repairs necessary by Proemion. * Do not disconnect the device from the power supply until the process has been completed.

¬ During the firmware update, the LEDs light up green in the same sequence.
¬ In the field FIRMWARE DOWNLOAD LOG, the message FIRMWARE DOWNLOADED SUCCESSFULLY appears when the firmware update is complete.

10. Disconnect the device from the PC.
11. Disconnect from the power supply e.g., using the *main plug connector*.
12. For types with integrated Battery: Press the Reset button on the *main plug connector* using a suitable tool (1 mm diameter).

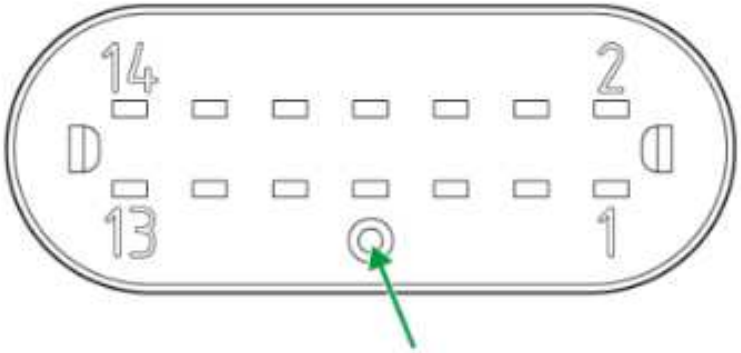


Figure 73. Connector Reset Button

NOTICE
Use of the Reset button on the *main plug connector* is only necessary for types with an integrated battery.

¬ The device is restarted.
¬ After the restart, the device uses the updated firmware version.

You can find a tutorial on how to install the firmware to the device in the download section of our website. See Service and Support.

6.12. Diagnosis via Micro-USB Port

For diagnosis purposes, you can connect the device to a PC directly via the micro-USB (type B) cable and record a debug log by using the CANlink mobile 3000 DeviceAnalyzer software.

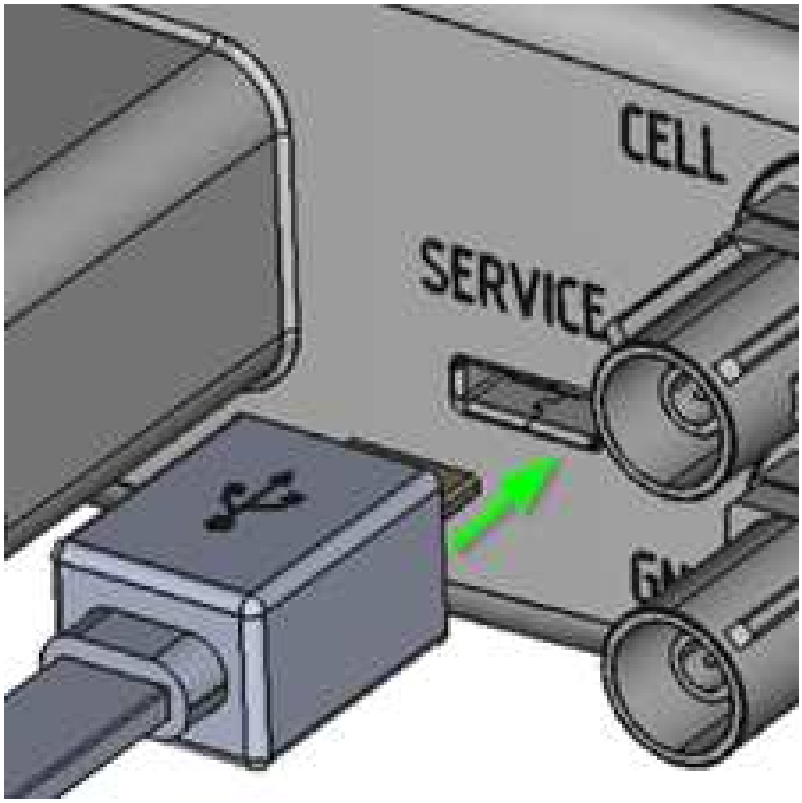


Figure 74. CANlink mobile 3000 Micro-USB Port

INFORMATION

The required USB – Micro USB type B cable is a standard cable which is available in every electronics store.

NOTICE

Risk of property damage

Pay attention that the USB plug is connected according to the correct assignment and without the need for any excessive force. Improper connection or excessive force can damage the USB port and render the device seal ineffective.

NOTICE

The connection via the micro-USB port is not suitable for carrying out a configuration update. For detailed information on how to carry out a configuration update, see Chapters Safe Remote Updates Guideline and Configuration update.

6.12.1. Recording the Debug Log

TIP

The software tool for further trouble shooting is the CANlink mobile 3000 DeviceAnalyzer software. This software can be downloaded from our Download Center.

The installation file for the software can be found in folder `03_Proemion Tools Software\01_Software\08_CANlink mobile 3000 DeviceAnalyzer`.

The manual for the software can be found in folder `03_Proemion Tools Software\01_Software\00_Documentation`.

1. Install the `CANlink mobile 3000 DeviceAnalyzer Setup.exe` software and the CANlink mobile 3000 USB driver from the Download Center.
2. Connect the device to a PC with the cable USB cable, USB-A on micro-USB-B, 1.6 m.
3. Connect the device to the power supply.
4. Follow the instruction from the CANlink mobile 3000 DeviceAnalyzer software manual in *Chapter 3.2 Debug Log*.
5. If necessary, you can send the logfile `*.glog` to the Support department for further evaluation.

INFORMATION

For any further diagnosis, contact the Proemion support.
See Chapter Service and Support.

6.13. Factory Reset

Performing a factory reset returns the device to the original settings.

NOTICE

Severely restricted functions due to factory reset.

Incomplete configuration on the device. Repairs necessary by Proemion.

- Only trained personnel may carry out a factory reset.

NOTICE

Complete data loss due to factory reset.

All logged data is deleted from the device memory.

- Back up your data before a factory reset.

INFORMATION

During the Factory Reset process, the **ON** LED flashes **orange**, and the **Status** LED lights up **orange**.

6.13.1. Factory Reset via CAN

The following table provides an overview of the various reset options available which can be triggered via the CAN interface:

Table 73. Available reset variants

Function	Index	Subindex	Description
Revert to **Factory Configuration**	`0x1011`	`0x01`	The factory configuration is restored. All logged data is deleted.
Delete All Log Files	`0x1011`	`0x62`	All logged data stored on the device is deleted.
Revert to Firmware Defaults Remote	`0x1011`	`0x63`	The standard configuration of the current firmware is restored. All logged data is deleted. **CAN, WLAN, Bluetooth and mobile radio parameters as well as the factory configuration are retained.**
Revert to Firmware Defaults plus Format Remote	`0x1011`	`0x64`	The standard configuration of the current firmware is restored. All logged data and the factory configuration are deleted. **CAN, WLAN, Bluetooth and mobile radio parameters are retained.**
Revert to Firmware Defaults Local	`0x1011`	`0x65`	The standard configuration of the current firmware is restored. All logged data and parameters are deleted. **The factory configuration is retained.**

INFORMATION

You can restore the factory configuration of the device using object `0x1011`, subindex `0x01`.

In order to complete a factory reset via the CAN interface, a CANopen software (e.g. RM CAN-Device Monitor) and a communication gateway (e.g. CANview USB) are required.
The CANopen software writes the value `0x64616F6C` to the CANopen object index `0x1011` to trigger a specific reset variant.

In the following example, the factory reset using the sub-index `0x65` (*Revert to Firmware Defaults Local*) is shown:

1. Connect the device to a PC. See Chapter Connecting the Device to the PC.
2. Start the selected CANopen software.
3. Perform the required steps in the CANopen software to write the value `0x64616F6C` to the object index, `0x1011` subindex `0x65`.
4. Write the value to the device's object directory.
5. Wait until the device sends the CANopen bootup message to the IDs `0x727` and `0x728`.

¬ The device reverts to the firmware defaults (object `0x1011; 0x65`).

¬ The ON LED lights up green.

¬ The STATUS LED lights up blue.

¬ The device has adopted the firmware defaults (CAN Baud Rate 250 kbit/s, CANopen Node ID 39 etc.).

INFORMATION

When a Factory Reset is being performed, the ON LED flashes in a magenta color and the Status LED orange. For more information on the LED status indications, see Chapter Indicator Elements.

	You can find a tutorial on how to perform a factory reset in the download section of our website. See also Chapter Service and Support.

6.13.2. Factory Reset via USB Connector Cable/Diagnosis

The factory reset via the USB connector cable (diagnosis) and the CANlink mobile 3000 DeviceAnalyzer software is another option to perform a reset of the CANlink mobile device. Since factory reset via the start cable is not possible in all cases, this option is most relevant for the CANlink mobile 3600 Variants. Please refer to the CANlink mobile 3000 DeviceAnalyzer software manual at the Download Center.

TIP

The software tool for further trouble shooting is the CANlink mobile 3000 Device Analyzer software. This software can be downloaded from here:
Download Center

The installation files for the software can be found in folder
`03_Proemion Tools Software\01_Software\08_CANlink mobile 3000 DeviceAnalyzer`.

The manual for the software can be found in folder
`03_Proemion Tools Software\01_Software\00_Documentation`.

Follow the instructions from *chapter 3.4 Resets* of the CANlink mobile 3000 DeviceAnalyzer software manual.

6.13.3. Factory Reset via the Start Cable

The factory reset via the start cable corresponds with the function *Revert to Firmware Default Local* index `0x1011` sub-index `0x65`.

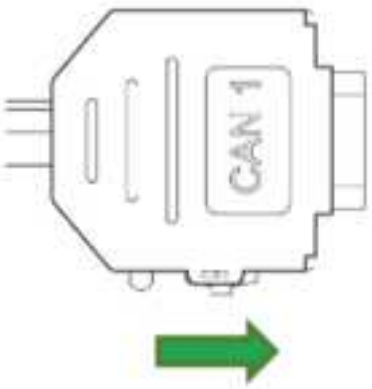
NOTICE

This procedure is not applicable for CANlink mobile 3600 variants.

NOTICE

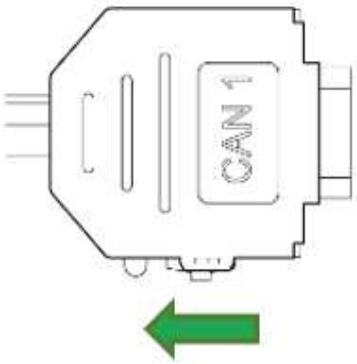
A factory reset via the start cable restores the standard configuration of the current firmware. All logged data and parameters are deleted. The factory configuration is retained.

1. Connect the device to the power supply grid with the cable CLM3 start cable, 6 open, 2 dsub, 1 pw, 2 m and the power supply unit from the launch kit.
2. Slide the switch on the D-Sub connector (CAN1) towards the SUB-D connection



¬ The LED on the D-Sub connector (CAN1) lights up red.

3. Wait until both LEDs on the device light up orange.
4. Slide the switch on the D-Sub connector (CAN1) toward the LED.



NOTICE

Device defect due to power failure.

Destroyed file system on the device. Repairs necessary by Proemion.

- Do not disconnect the device from the power supply until the process has been completed.

¬ The device reverts to the firmware defaults (object `0x1011; 0x65`).

¬ The ON LED lights up green.
¬ The STATUS LED lights up blue.
¬ The device has adopted the firmware defaults (CAN Baud Rate 250 kbit/s, CANopen Node ID 39 etc.).

INFORMATION

You can restore the factory configuration of the device using object `0x1011`, subindex `0x01`.

INFORMATION

When a Factory Reset is being performed, the ON LED flashes in a magenta color and the Status LED orange. For more information on the LED status indications, see Chapter Indicator Elements.

You can find a tutorial on how to perform a factory reset in the download section of our website. See also Chapter Service and Support.

7. Troubleshooting

This chapter contains information on solving problems and on maintenance.

WARNING

Risk of fatal injury due to electric shock!

Risk of severe or fatal injury.

- Never carry out repairs to the device yourself. Contact our support. The device does not contain any parts that can be repaired or maintained by the user.

NOTICE

Risk of property damage.

A defective device must be inspected and repaired by a trained Proemion service technician.

- Do not open the device housing yourself.

7.1. Remedies

Table 74. Remedies

Problem	Possible cause
Device does not function.	Check the power supply via the main plug connector (terminal 30, terminal 31, terminal 15).
Device does not receive CAN messages	Check the CAN connection and the configuration of the CAN messages. Check whether the bus terminating resistor is correctly mounted.
Device does not receive GNSS signals.	Check the antenna connection and cable for damage. Position the antenna or the device so that it directly points to the sky.
Device does not receive mobile radio signal.	Check the antenna connection and cable for damage. Check the eSIM configuration in the eSIM - Specials object dictionary. Position the antenna or the device so that it directly points to the sky.
Device does not log data.	Check the CAN baud rate in the configuration. Check in the configuration whether the device is in "Operational" mode. Check the logging configuration.
Device with integrated battery does not initialize after switching on or firmware update.	Use a suitable tool to press the reset button on the main plug connector to restart the device.

7.1.1. Support Request

TIP

The software tool for further trouble shooting is the CANlink mobile 3000 Device Analyzer software. This software can be downloaded from our Document Library.

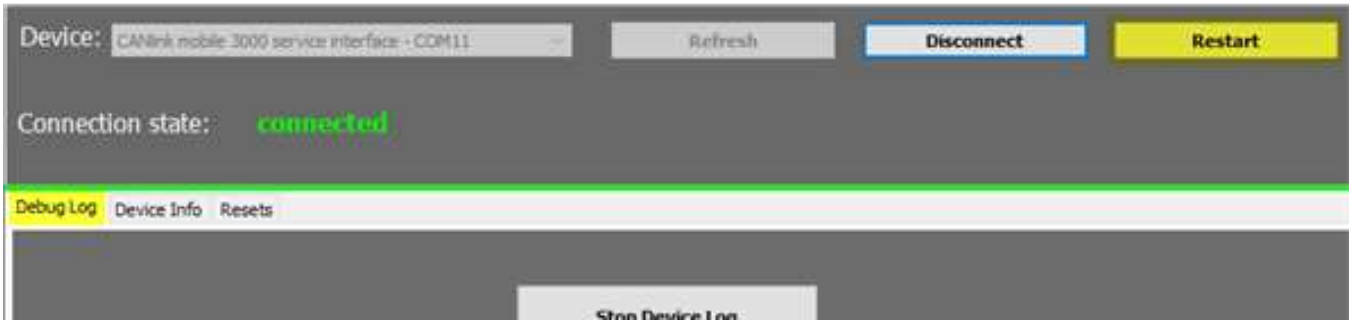
The `CANlink mobile 3000 DeviceAnalyzer Setup.exe` for the software can be found in folder 03_Proemion Tools Software\01_Software\08_CANlink mobile 3000 DeviceAnalyzer.

The manual for the software can be found in folder 03_Proemion Tools Software\01_Software\00_Documentation.

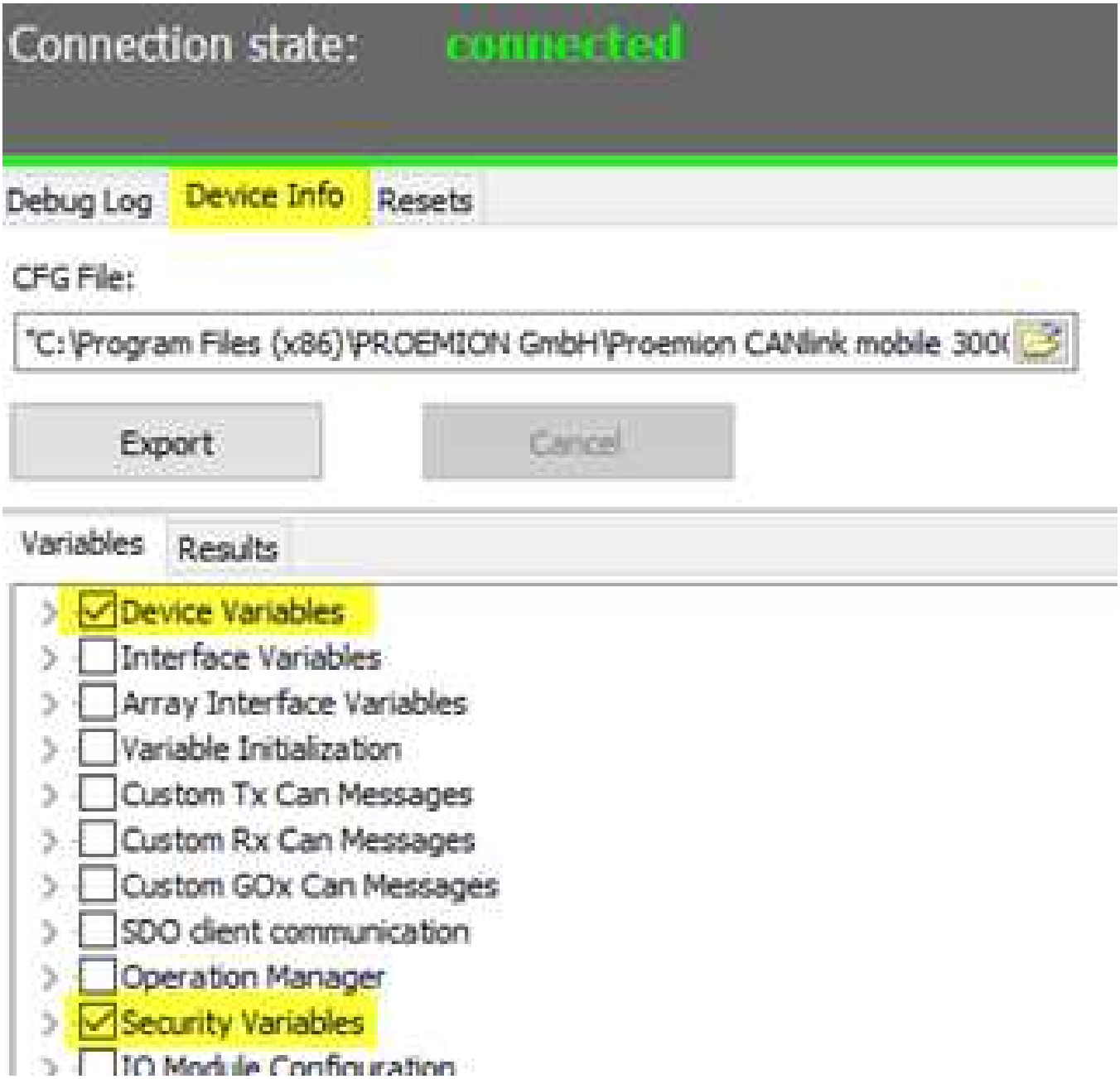
If you do not find the solution to your problem in this manual, please contact our support team. See chapter Service and Support.

The support team requires the following information to help you:

1. Connect the USB Connector Cable - Diagnostic to your PC and create a device log with the CANlink mobile 3000 DeviceAnalyzer software when the problem appears. While the device log is recorded, click on Restart. This will allow the support team to also evaluate the initialization phase of the device.



2. Read out all device and security variables with the CANlink mobile 3000 DeviceAnalyzer.



3. What is the condition of the status LED after the restart was triggered by the DeviceAnalyzer software? If possible, create a video of the status LEDs in addition to the device log including the restart.
4. Send the device log, the video of the status LEDs and the required output about the device and security variables to support@proemion.com.

7.1.2. Connection Problems to the DataPlatform

If the device cannot establish a connection to the DataPlatform, check the following:

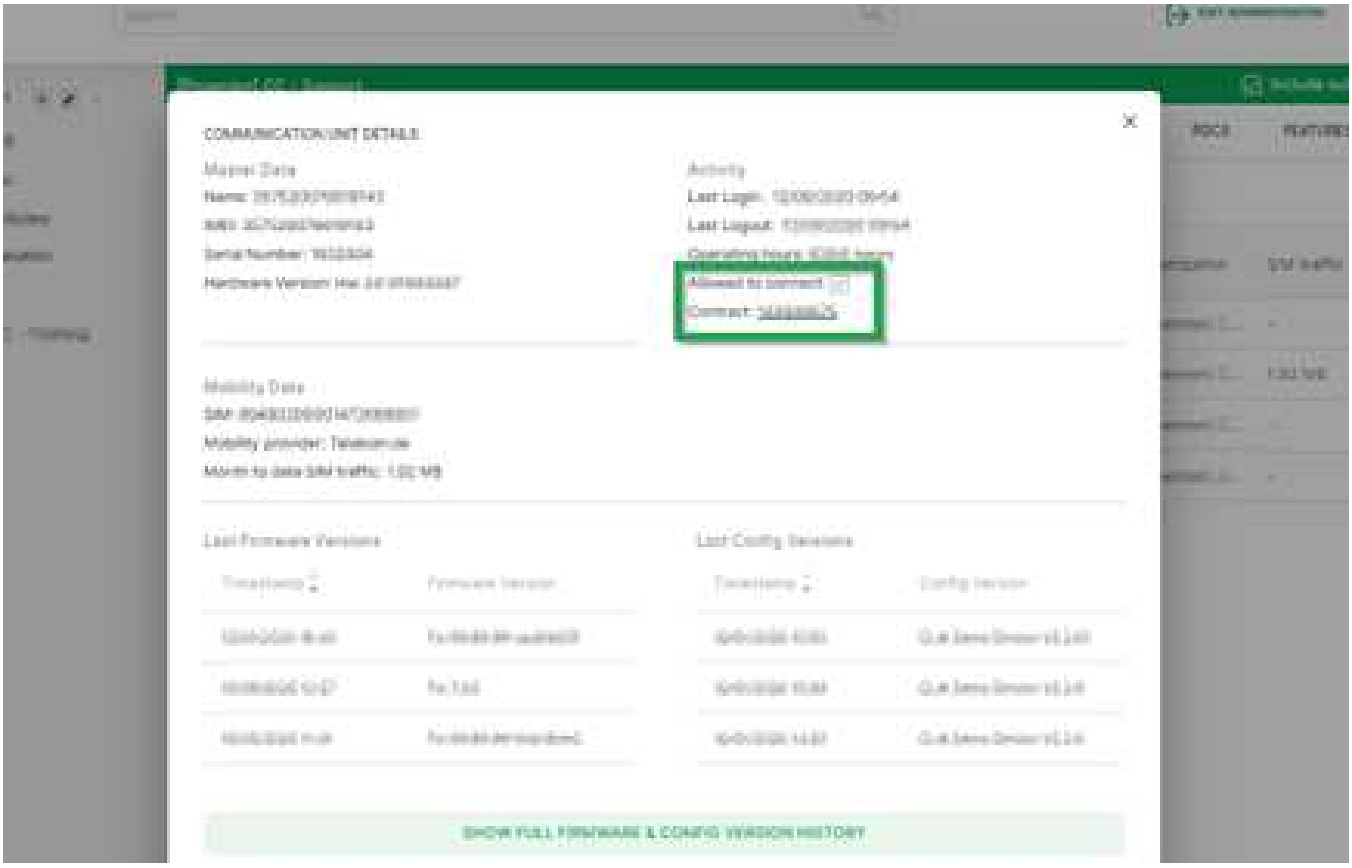
- Has the configuration been correctly loaded on the device? See chapter [Configuring].
- Are the device LEDs lighting up correctly? See Chapter Indicator elements (LED).
- Are the contract and device settings in the DataPortal correct?
- Are the configured mobile communication parameters within the device configuration correct?

You can find more information in the following chapter.

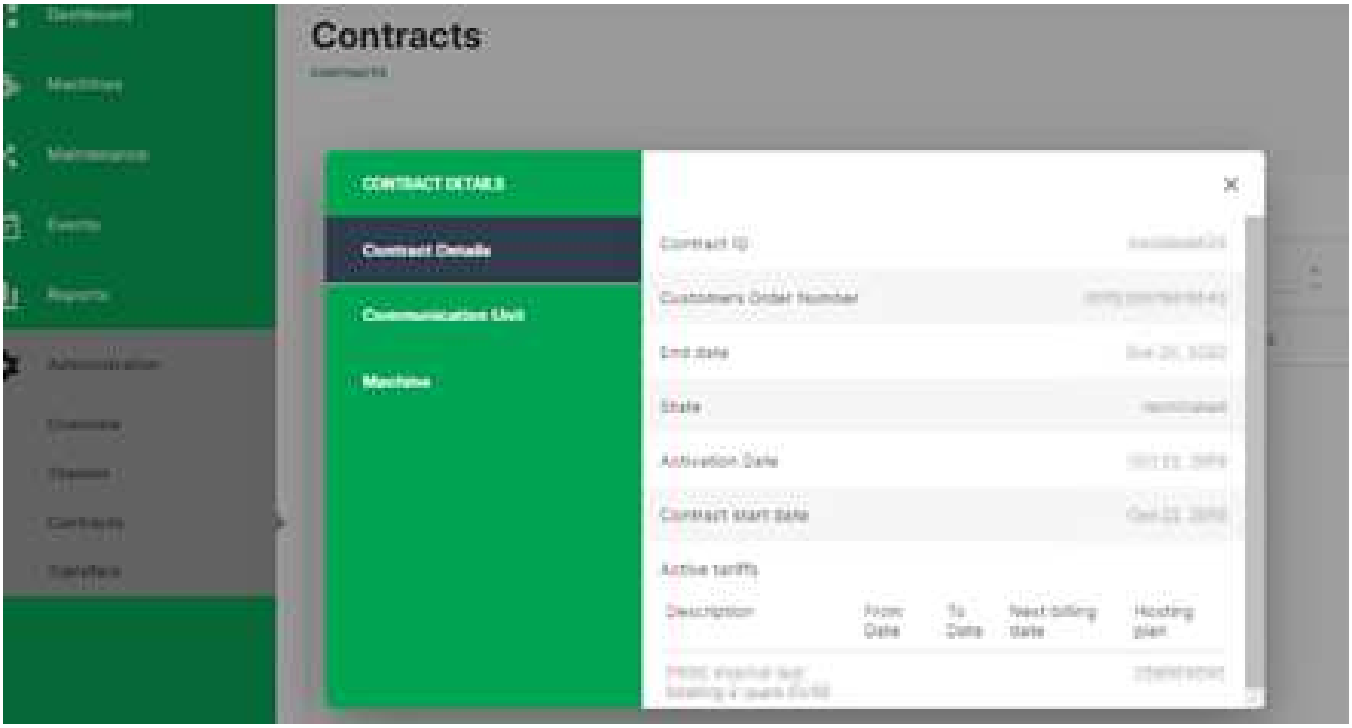
DataPortal

Check that the contract and device settings in the DataPortal are correct.

1. Login at the DataPortal.
2. Click on Administration.
3. Click on Overview.
4. Click on COMMUNICATION UNITS.
5. Enable the checkbox Include sub-organizations.
6. Enter the device name or machine name in the corresponding search box.
7. Check in the machine column if the correct/expected machine name is displayed.
8. Check the Organization column if the device is allocated to the correct organization unit.
9. Click on the DETAILS button of the corresponding communication unit.
   ¬ The detail view of the selected device is displayed.



10. Click on the contract number from the contract field to check in the contract overview if the device has a valid contract.
    ¬ The contracts view of the selected device is displayed.
11. Click on Details.
    ¬ The contract details of the selected contract are opened.



12. Check the contract details for the correct settings.
13. The settings for the communication unit and machine can also be checked in this window.

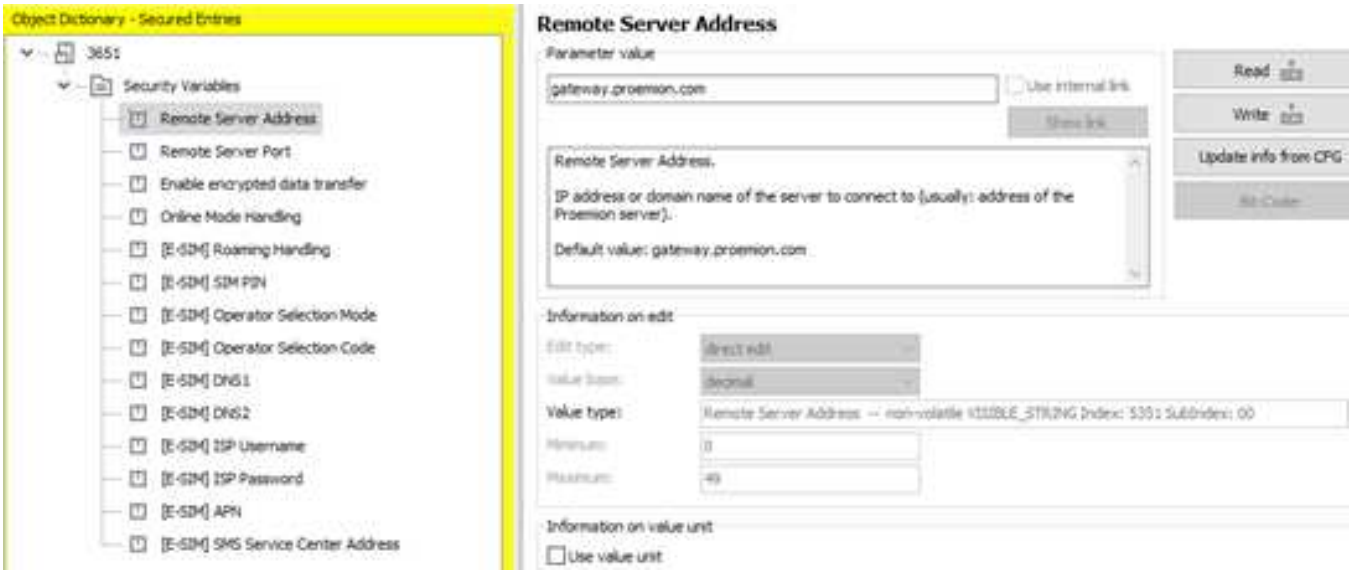
Device Configuration

Check if the mobile communication parameters in the Proemion Configurator are correct.
The variables belong to the Security Variables group.
You may use the tables below as a copy/paste template for the information to the support team.

1. Establish a physical CAN connection with a supported gateway device.
2. Start the Proemion Configurator software.
3. Select the correct gateway device and com port in the communication settings.
4. Open the corresponding device configuration file.
5. Open the tab Specials.
6. Read out the configured Security Variables according to the table below and make a note for later reference. If there are security variables missing in the used device configuration, they can be added with a right mouse click onto the tree element `Security Variables`.

Table 75. Security Variables

Security Variable	Default Value with Proemion eSIM card	Read value
Remote Server Address	`gateway.proemion.com`	
Remote Server Port	`61200`	
Enable encrypted data transfer	`1`	
Online Mode Handling	`1`	
[E-SIM] SIM PIN	empty	
[E-SIM] Roaming Handling	`1`	
[E-SIM] Operator Selection Mode	`0`	
[E-SIM] Operator Selection Code	`0`	
[E-SIM] DNS1	`[empty]`	
[E-SIM] DNS2	`[empty]`	
[E-SIM] ISP Username	`[empty]`	
[E-SIM] ISP Password	`[empty]`	
[E-SIM] APN	`internet.m2mportal.de`	
[E-SIM] SMS Service Center Address	`+491710760000`	

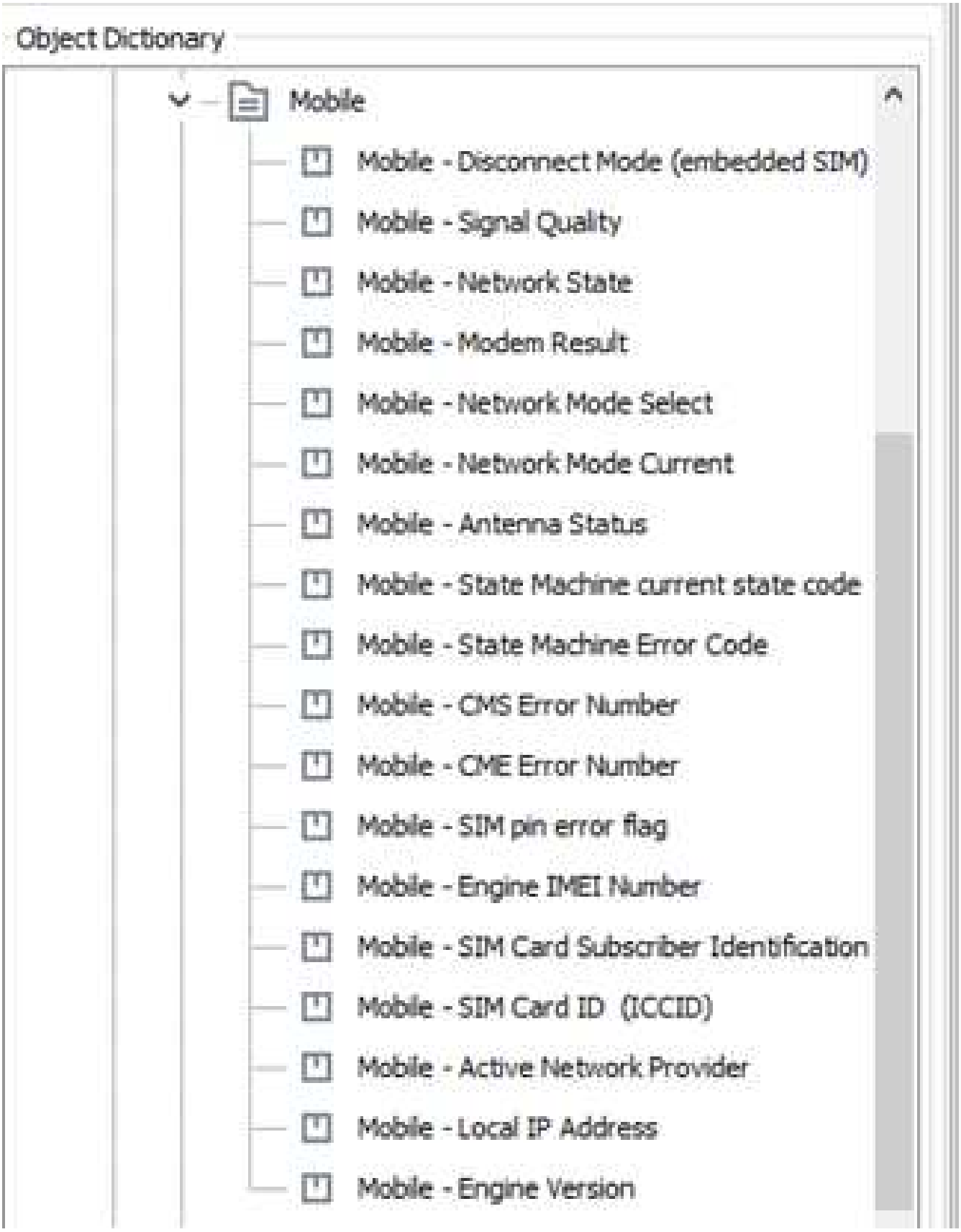


7. Open the Application tab in your configuration.

8. Read out the device variables according to the table below. If there are device variables missing in the used configuration, they can be added by right mouse click onto the object dictionary group Device Variables.

Table 76. Device Variables

Device Variable	Default Value	Read value
Mobile - Disconnect Mode (embedded SIM)	1	
Mobile - Signal Quality	(read-only)	
Mobile - Network State	(read-only)	
Mobile - Modem Result	(read-only)	
Mobile - Network Mode Select	0	
Mobile - Network Mode Current	(read-only)	
Mobile - Antenna Status	(read-only)	
Mobile - failure reconnect delay	30	
Mobile - State Machine current state code	(read-only)	
Mobile - State Machine Error Code	(read-only)	
Mobile - CMS Error Number	(read-only)	
Mobile - CME Error Number	(read-only)	
Mobile - SIM pin error flag	(read-only)	
Mobile - Engine IMEI Number	(read-only)	
Mobile - SIM Card ID (ICCID)	(read-only)	
Mobile - Active Network Provider	(read-only)	
Mobile - Local IP Address	(read-only)	
Mobile - Engine Version	(read-only)	
Mobile - Maximum Cellular Receive Delay	5000	



9. Provide the tables with the read-out values to the Proemion support.

TIP

The software tool for further trouble shooting is the CANlink mobile 3000 Device Analyzer software. For Further information on it, please refer to Diagnosis via Micro-USB Port and Support Request.

	If you do not find the solution to your problem in this manual, please contact our Proemion support. See also Chapter Service and Support.

7.2. Maintenance

Check all connectors for a firm connection regularly.

Check the state of the integrated battery. If the battery is totally discharged or has reached the maximum number of 500 charge cycles, please contact the Proemion support.
See chapter Service and Support.

WARNING

Risk of fatal injury due to electric shock!

Risk of severe or fatal injury.

- Never carry out repairs to the device yourself. Contact our support. The device does not contain any parts that can be repaired or maintained by the user.

NOTICE

Property damage

A defective device must be inspected and repaired by a trained Proemion service technician.

- Do not open the device housing yourself.

INFORMATION

For more information on the integrated battery, see Chapter Battery.

7.3. Cleaning

NOTICE

Risk of property damage

Damage to the device due to water penetration

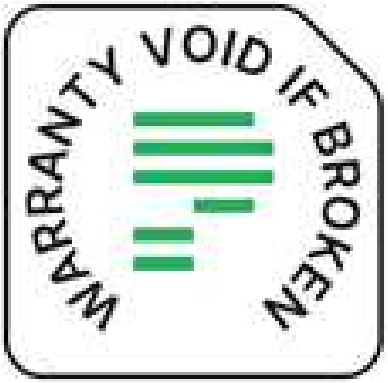
- The device was tested against water jets according to IPxK5 of ISO 20653 standard. Different loads, e.g., with a pressure washer or a higher flow rate, do not correspond to the intended use.

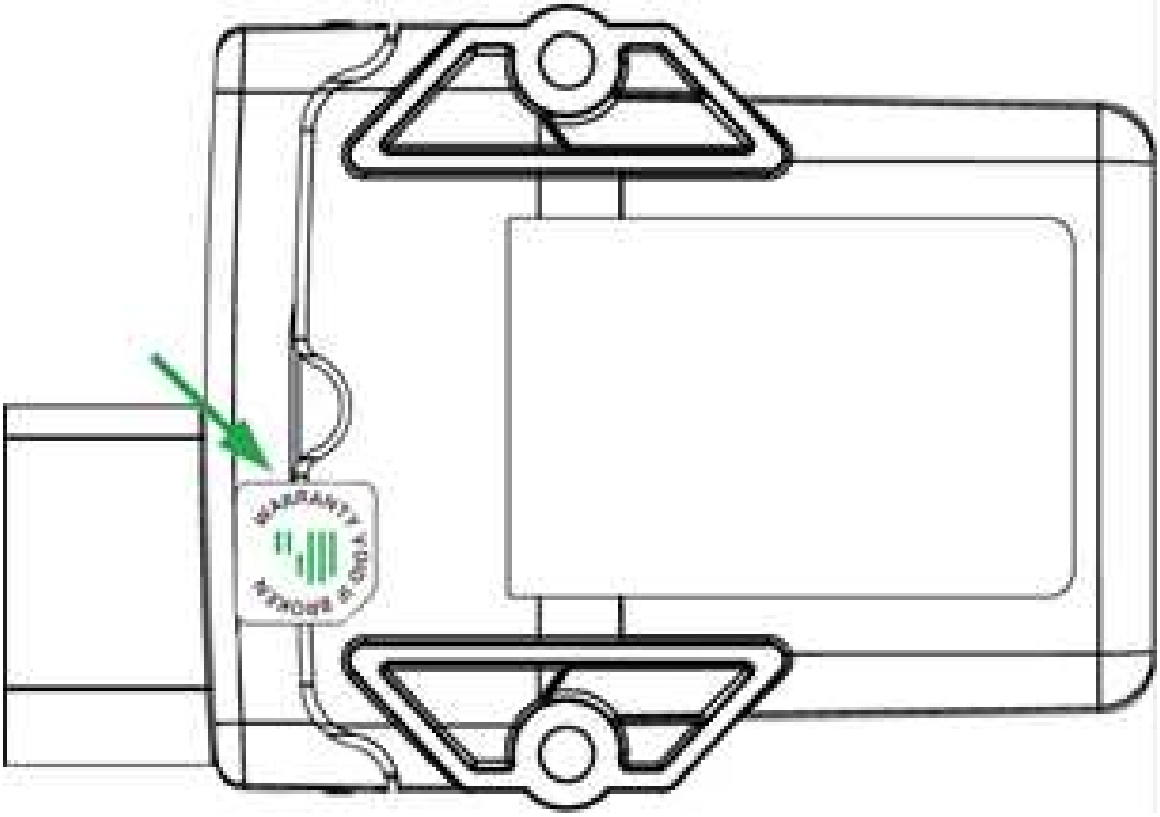
- Never clean the CANlink mobile device with a pressure washer or similar.

To avoid damage caused by penetrating liquids, no high-pressure cleaners may be used for cleaning. In order to remove contamination, you should also avoid using jet water if possible. Instead, use a damp cleaning cloth with a solvent-free and acid-free cleaning liquid.

7.4. Warranty Void Sticker

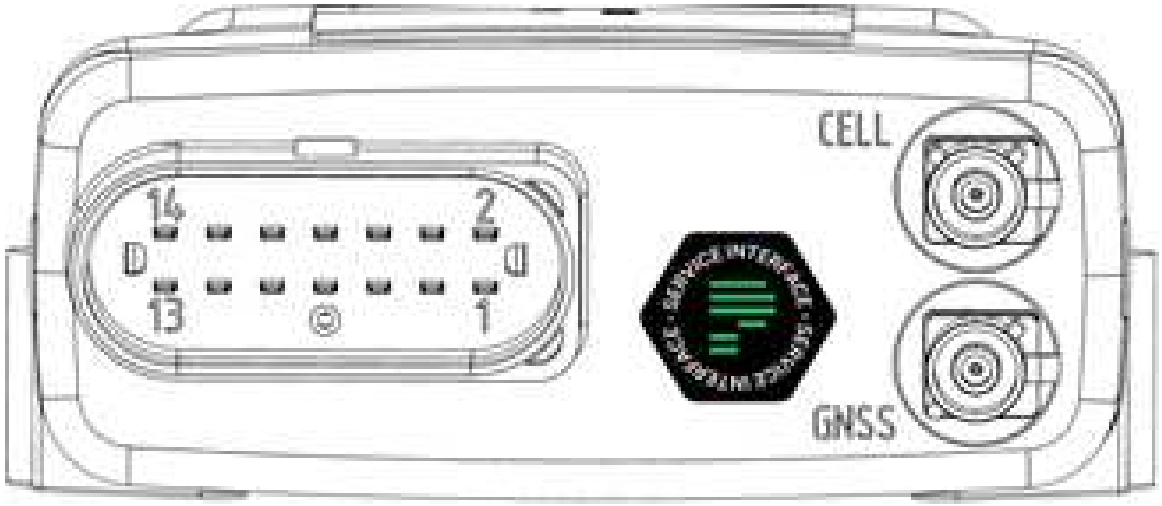
To verify if the device has been opened by unauthorized personnel, there is a warranty void sticker at the housing as shown in the figures below.





7.5. Service Sticker

The USB socket is covered by a service sticker to provide some additional protection from soiling and water penetration. Please note that this sticker has no additional relevance for the IP protection class.



8. Packaging and Transport

This chapter contains information on packing and transportation.

NOTICE

Risk of property damage.

- Only store and transport the device in a temperature range of **-40 °C … +85 °C** / **-40 °F … +185 °F**.

NOTICE

Risk of property damage.

Protection class IP6K7 is only ensured when all connectors except the micro-USB port are correctly fitted with protection caps.

- Close all connectors with protection caps.

NOTICE

Environmental damage due to lithium-polymer battery.

According to the valid transport regulations for lithium batteries, devices containing such batteries, or their transport packaging must be specially labeled.
Prior to shipping, please contact our support.

- Only ship the device in a packaging that is appropriately labeled on the outside.

9. Disposal

This chapter contains information on correct disposal.

NOTICE

Observe local regulations for disposal of the device, the accessories and the packaging material.

9.1. Regulations in the European Union

According to the Directive on Waste Electrical and Electronic Equipment (WEEE), the device must not be disposed of in household waste. The device contains a lithium-polymer battery which can contain toxic and polluting heavy metals. Take the device to a collection point for waste electrical and electronic equipment for correct disposal.

NOTICE

Environmental damage due to lithium-polymer battery.

According to the valid transport regulations for lithium batteries, devices containing such batteries, or their transport packaging must be specially labeled.
Prior to shipping, please contact our support.

- Only ship the device in a packaging that is appropriately labeled on the outside.

10. Annex

This chapter contains technical data and certificates.

10.1. Technical Drawings

INFORMATION

You can download the most relevant CAD files from our Document Library.

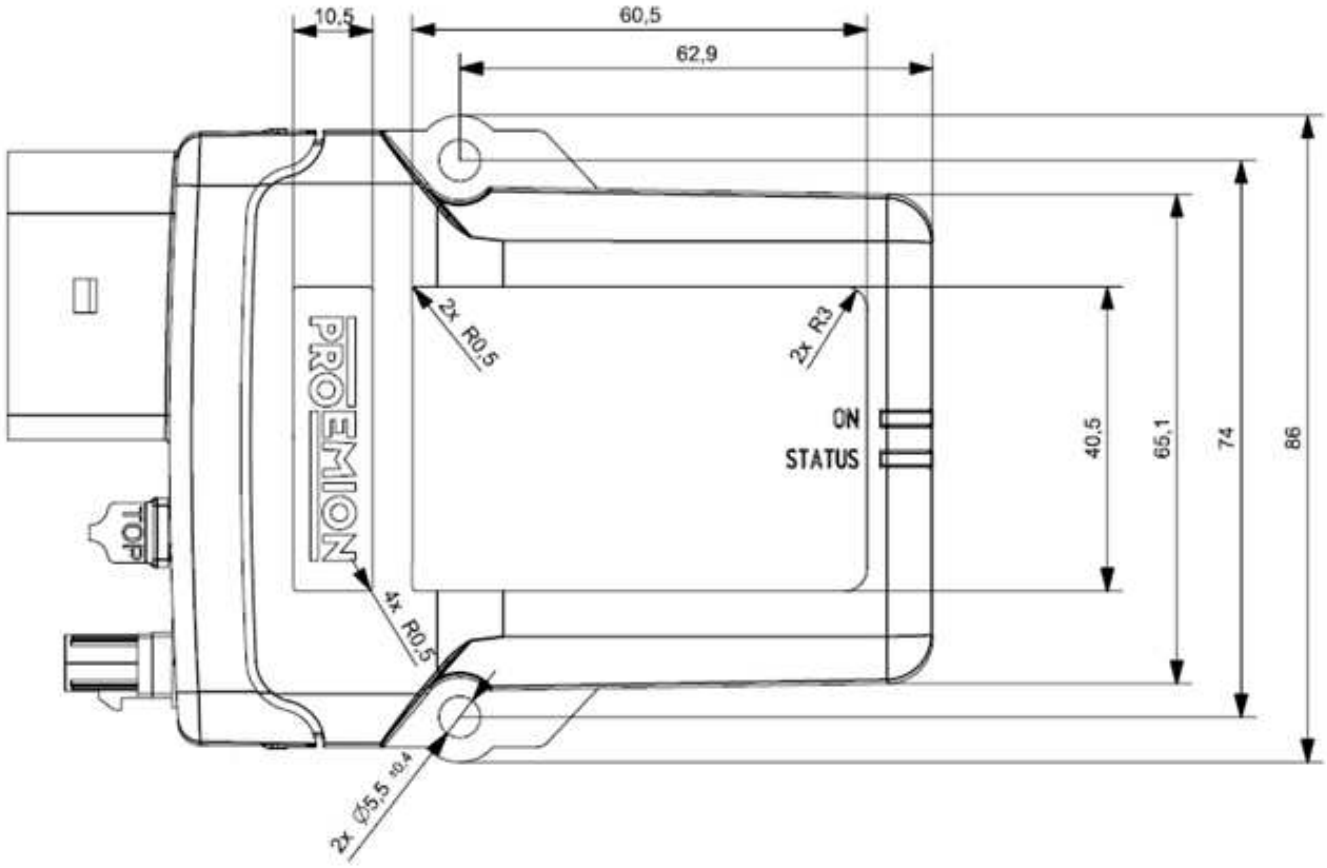


Figure 75. Dimensions of the CANlink mobile 3000 (here: variant with external antenna connectors)

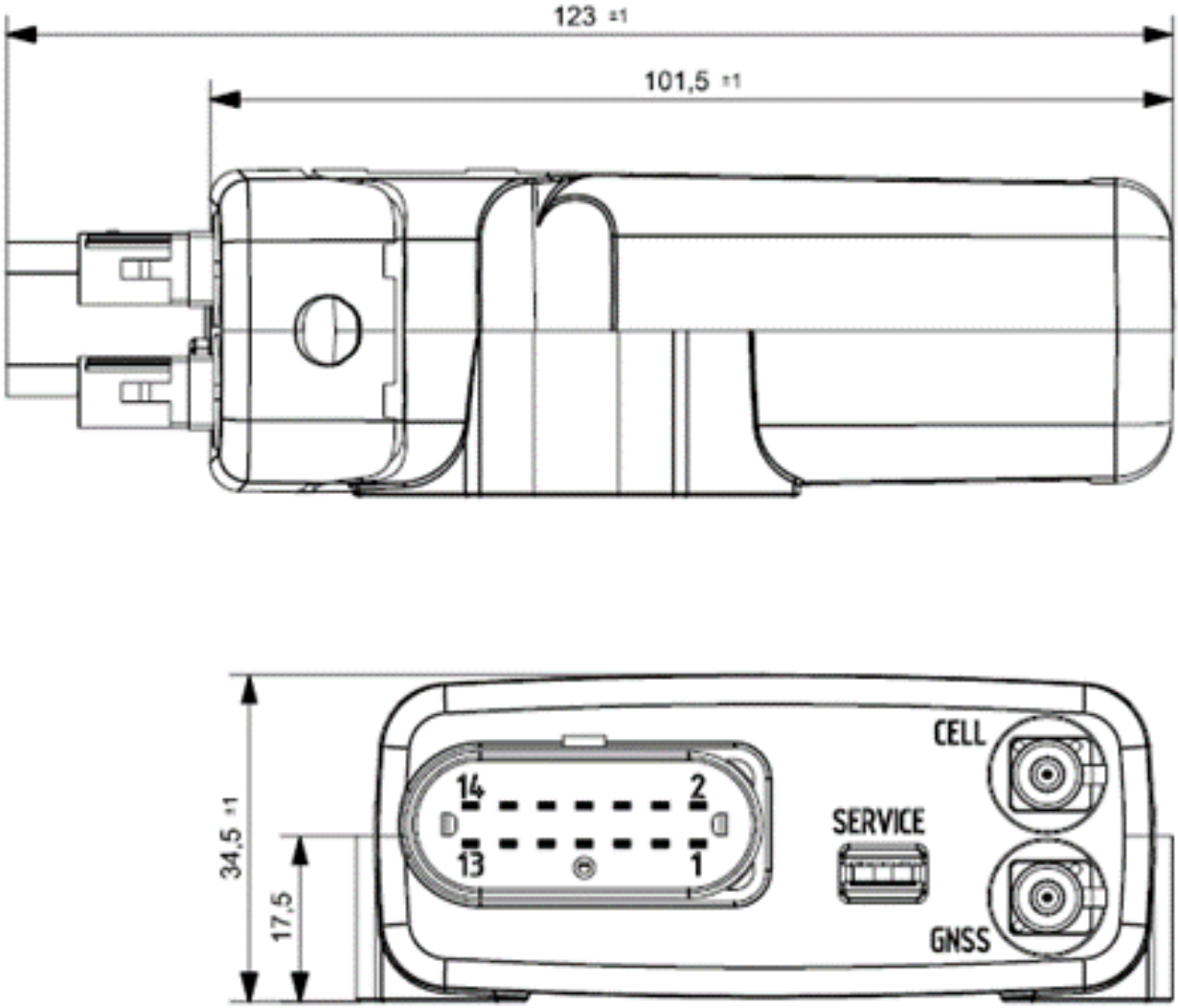
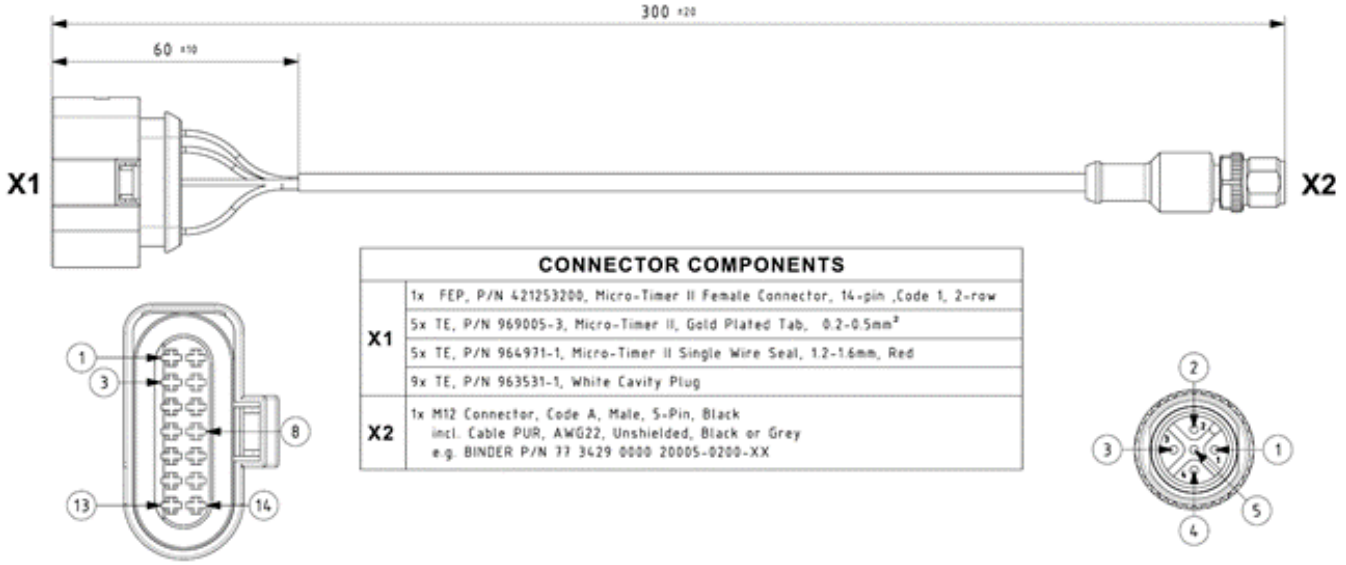


Figure 76. Dimensions of the CANlink mobile 3000 (here: variant with external antenna connectors)

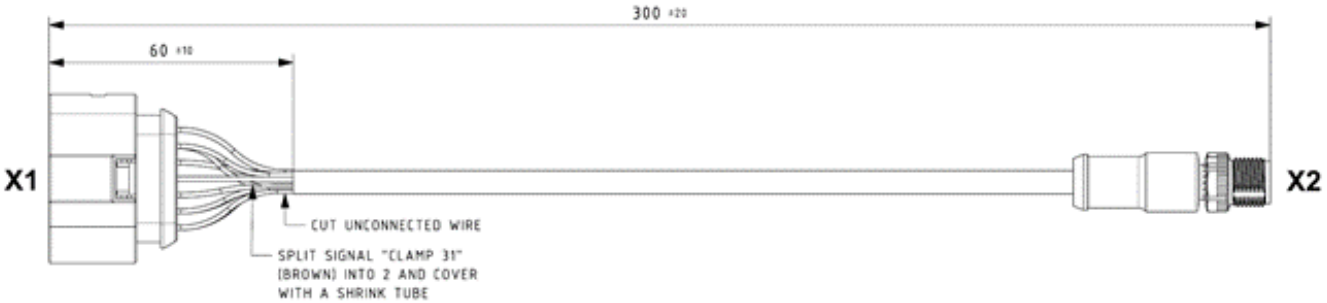


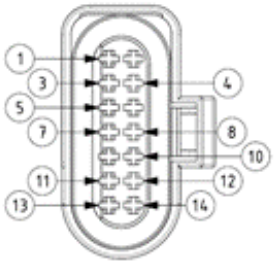
CONNECTOR COMPONENTS	
X1	1x FEP, P/N 421253200, Micro-Timer II Female Connector, 14-pin ,Code 1, 2-row
	5x TE, P/N 969005-3, Micro-Timer II, Gold Plated Tab, 0.2-0.5mm²
	5x TE, P/N 964971-1, Micro-Timer II Single Wire Seal, 1.2-1.6mm, Red
	9x TE, P/N 963531-1, White Cavity Plug
X2	1x M12 Connector, Code A, Male, 5-Pin, Black incl. Cable PUR, AWG22, Unshielded, Black or Grey e.g. BINDER P/N 77 3429 0000 20005-0200-XX

X1 - DEVICE CONNECTOR		
PIN	SIGNAL	COLOR
1	CLAMP 30 (VCC)	WHITE
2	n.a.	-
3	CLAMP 31 (GND)	BROWN
4	n.a.	-
5	n.a.	-
6	n.a.	-
7	n.a.	-
8	CLAMP 15	BLUE
9	n.a.	-
10	n.a.	-
11	n.a.	-
12	n.a.	-
13	CAN 1 - HIGH	BLACK
14	CAN 1 - LOW	GREY

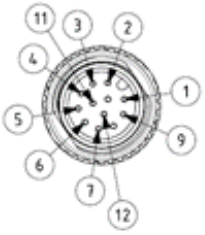
X2		
PIN	SIGNAL	COLOR
1	CLAMP 31 (GND)	BROWN
2	CLAMP 30 (VCC)	WHITE
3	CLAMP 15	BLUE
4	CAN 1 - HIGH	BLACK
5	CAN 1 - LOW	GREY

Figure 77. Adapter Cable CANlink 14p-M12 5p 0,3m (136200001)





CONNECTOR COMPONENTS	
X1	1x FEP, P/N 421253200, Micro-Timer II Female Connector, 14-pin ,Code 1, 2-row
	11x TE, P/N 969005-3, Micro-Timer II, Gold Plated Tab, 0.2-0.5mm²
	11x TE, P/N 964971-1, Micro-Timer II Single Wire Seal, 1.2-1.6mm, Red
	3x TE, P/N 963531-1, White Cavity Plug
X2	1x M12 Connector, Code A, Male, 12-Pin, Black incl. Cable PUR, AWG24, Unshielded, Black or Grey eg. BINDER P/N 77 3429 0000 20712-0200-XX



X1 - DEVICE CONNECTOR		
PIN	SIGNAL	COLOR
1	CLAMP 30 (VCC)	BLUE
2	na.	
3	CLAMP 31 (GND)	BROWN
4	ANALOG INPUT 1	YELLOW
5	ANALOG INPUT 2	BLACK
6	na.	
7	DIGITAL OUT	RED
8	CLAMP 15	WHITE
9	na.	
10	CLAMP 31 (GND)	BROWN
11	CAN 2 - HIGH	GREY-PINK
12	CAN 2 - LOW	RED-BLUE
13	CAN 1 - HIGH	GREEN
14	CAN 1 - LOW	PINK

X2		
PIN	SIGNAL	COLOR
1	CLAMP 31 (GND)	BROWN
2	CLAMP 30 (VCC)	BLUE
3	CLAMP 15	WHITE
4	CAN 1 - HIGH	GREEN
5	CAN 1 - LOW	PINK
6	ANALOG INPUT 1	YELLOW
7	ANALOG INPUT 2	BLACK
8	na.	
9	DIGITAL OUTPUT	RED
10	na.	
11	CAN 2 - HIGH	GREY-PINK
12	CAN 2 - LOW	RED-BLUE

Figure 78. Adapter Cable CANlink 14p-M12 12p 0,3m (136200002)

10.2. Technical Data

This chapter contains information on the technical data of the device.

10.2.1. Mechanical

Table 77. Mechanical data

Parameter	Value
Dimensions width/height/depth [mm]	86 / 123 / 35
Color	Black
Protection class	IP6K7 The protection class is only ensured if all connectors of the device are plugged in or covered with suitable protection caps.
Temperature range	Standard mode: -40 °C … +80 °C / -40 °F … +176 °F Battery operation: -20 °C … +60 °C / -4 °F … +140 °F Battery charging: 0 °C … +45 °C / 32 °F … +113 °F Please Note: With CANlink mobile 3600 variants, Bluetooth and WLAN could have delayed connection times up to 10 Minutes at ambient temperatures lower than -20°C / -4°F
Weight	3311: 160 g 3333: 160 g 3337: 190 g 3351: 140 g 3373: 140 g 3377: 170 g 3477: 170 g 3577: 170 g 36xx: 190 g
Standard housing material	PA 66/6 - FR
Pressure equalizing membrane	Yes
Resistance of the housing material to chemicals	The housing material of the device was successfully tested against the following liquids in accordance with the standard EN ISO 175. - Exposure time: 24h - Temperature: 20°C, for Substances No. 5, 6, 7: 80°C - Rel. Humidity < 40% - Operating mode: Off 1. Gasoline 2. Diesel 3. Fast cleaner spray Tetrachlorethen 4. Ethanol 5. Chain adhesive lubricant 6. Hydraulic oil HLVP68 7. Hydraulic oil biologic BP Bio SE 46 8. Coca Cola 9. Cement CEM 1 DIN EN 197-1 „Quickmix“ (Bauhaus) 10. Fertilizer NPK,Gardol Grünpflanzendünger 12-4-6 (Bauhaus) 11. Skin care Handsan Cream & Touch (dm) 12. Sunscreen "Sundance Sonnenmilch 20 mittel" (dm) 13. Cooler Antifreeze Type G12 14. Window cleaner concentrate 15. Suds Rivolta BWR 210, 10:1

10.2.2. Electrical

Table 78. Electrical data

Parameter	Value
Supply voltage range terminal 30 DC	12 / 24 V ¬ ±50 %
Battery voltage, battery operation	3.7 V (internal)
Power consumption, with terminal 30 supply (24 V)	< 250 mA (standard mode) < 500 µA (sleep mode)
Power consumption, battery operation (3.7 V)	< 600 mA (standard mode) < 100 µA (sleep mode)
Average power consumption	< 4 W
Controller	Arm Cortex M4 168 Mhz
Memory expansion Program Flash	1 MB
Data Flash memory expansion	16 MB (Types 33xx) 128 MB (Types 3477, 3577) 128 MB (Types 36xx)
Memory expansion FRAM	8 kB Types 36xx: 32 kB
Memory expansion SRAM	760 kB Types 36xx: 1.2 MB
LEDs	2 LEDs, RGB (red/green/blue)
Keys	Types 3337, 3377, 3477, 3577, 3637, 3677: power-reset button in main plug connector
Battery	Lithium-polymer, 3.7 V; 1.15 Ah; 4.225 Wh - Charge time: approx. 5 hours - Operating time: - approx. 1.5 h (standard mode) - approx. 14 days (24-hour cycle) - approx. 70 days (Sleep mode / Standby)
RTC with back-up capacitor	Back-up time: 48 h at 25 °C - Accuracy: ±2 s/day at 25 °C, -15 s/day at the lower and +2 s/day at upper temperature limit - Synchronization: GNSS/NTP/DataPlatform - Can be used as source for cyclic wakeup

10.2.3. Interfaces

Table 79. Interfaces

Parameter	Value
CAN (number, ISO)	CAN1: ISO 11898-2 CAN2: ISO 11898-2, galvanically isolated CAN3: ISO 11898-2 (CAN-FD ready)
CAN specification	2.0 A/B
Max. CAN baud rate	1000 kbit/s, 5 Mbit/s at CAN3 with firmware which supports CAN-FD
Mobile radio	33xx: GSM/UMTS 3477: GSM/LTE (Europe) 3577: UMTS/LTE (North America) 36xx: LTE/UMTS/GSM
Mobile radio frequency range	**Types 33xx:** - 2G/GSM/GPRS/Edge 850/900/1800/1900 MHz - 3G/UMTS/HSPA 850/900/1900/2100MHz **Type 3451, 3477:** - 2G/GSM/GPRS/EDGE 900/1800 MHz - 4G/LTE 800/1800/2600 MHz (Band 3, 7, 20) **Type 3577:** - 3G/UMTS/HSPA 850/1900 MHz - 4G/LTE 700/850/1700/1900 MHz (Band 2, 4, 5, 12) **Types 36xx** 3GPP Band Transmit Receive Unit - GSM850 824~849 869~894 MHz - EGSM900 880~915 925~960 MHz - DCS1800 1710~1785 1805~1880 MHz - PCS1900 1850~1910 1930~1990 MHz - WCDMA B1 1920~1980 2110~2170 MHz - WCDMA B2 1850~1910 1930~1990 MHz - WCDMA B4 1710~1755 2110~2155 MHz - WCDMA B5 824~849 869~894 MHz - WCDMA B8 880~915 925~960 MHz - LTE-FDD B1 1920~1980 2110~2170 MHz - LTE-FDD B2 1850~1910 1930~1990 MHz - LTE-FDD B3 1710~1785 1805~1880 MHz - LTE-FDD B4 1710~1755 2110~2155 MHz - LTE-FDD B5 824~849 869~894 MHz - LTE-FDD B7 2500~2570 2620~2690 MHz - LTE-FDD B8 880~915 925~960 MHz - LTE-FDD B12 699~716 729~746 MHz - LTE-FDD B13 777~787 746~756 MHz - LTE-FDD B18 815~830 860~875 MHz - LTE-FDD B19 830~845 875~890 MHz - LTE-FDD B20 832~862 791~821 MHz - LTE-FDD B25 1850~1915 1930~1995 MHz - LTE-FDD B26 814~849 859~894 MHz - LTE-FDD B28 703~748 758~803 MHz - LTE-TDD B38 2570~2620 2570~2620 MHz - LTE-TDD B39 1880~1920 1880~1920 MHz - LTE-TDD B40 2300~2400 2300~2400 MHz - LTE-TDD B41 2496~2690 2496~2690 MHz

Parameter	Value
Mobile radio transmission rate	- GPRS upload: 85.6 kbit/s - GPRS download: 85.6 kbit/s - Edge upload: 236 kbit/s - Edge download: 236 kbit/s - UMTS upload: 384 kbit/s - UMTS download: 384 kbit/s - HSUPA upload: 5.7 Mbit/s **CANlink mobile 33xx, 34xx, 3577** - HSDPA download: 7.2 Mbit/s - LTE upload: CAT1 5.2 Mbit/s - LTE download: CAT1 10.3 Mbit/s **CANlink mobile 36xx** - HSDPA download 42 Mbit/s - LTE-FDD CAT 4 upload: 50 Mbit/s - LTE-FDD CAT 4 download: 150 Mbit/s - LTE-TDD CAT 4 upload: 30 Mbit/s - LTE-TDD CAT 4 download: 130 Mbit/s
Maximum mobile radio transmission power	**CANlink mobile 33xx, 34xx, 3651, 3653, 3657, 3673, 3677:** - 33 dBm with GPRS **CANlink mobile 3610, 3611, 3613, 3617, 3633, 3637:** - 30 dBm with GPRS **CANlink mobile all variants:** - 27 dBm with Edge - 24 dBm with UMTS - 24 dBm with HSPA - 23 dBm with LTE
Satellite systems supported	GPS/QZSS L1 C/A, GLONASS L10F BeiDou B1I, Galileo E1B/C @ Frequency Band 1559 – 1608 MHz - GNSS fix: cold start ¬30 s / warm start ¬1 s - Update rate: 1 Hz - Accuracy: ¬5 m (CEP, 50 %, 24 h static, -130 dBm, > 6 satellites in visual range)
Bluetooth Standard	**Types 3333, 3337, 3373, 3377, 3477, 3577:** - Bluetooth classic (2.1+ EDR) - Bluetooth LE 4.0 **Types 3630, 3633, 3673, 3637, 3677** - Bluetooth classic (2.1+ EDR) - Bluetooth 5.0
Bluetooth frequency range	Bluetooth Classic: 2.402 - 2.480 GHz in 79 channels Bluetooth LE: 2.402 - 2.480 GHz in 40 channels
Bluetooth transmission rate	Bluetooth Classic: up to 3 Mbit/s Bluetooth LE 4.0: up to 1 Mbit/s Bluetooth 5.0: up to 2 Mbit/s
WLAN Standard	**Types 3333, 3337, 3373, 3377, 3477, 3577, 3630, 3633, 3673, 3637, 3677** IEEE 802.11 abgn
WLAN frequency range	- 2.400 - 2.4835 GHz (IEEE 802.11 b/g/n) in 13 channels - 5.150 - 5.725 GHz (IEEE 802.11 a/n) in 24 channels
WLAN transmission rate	IEEE 802.11a: to 54 Mbit/s IEEE 802.11b: to 11 Mbit/s IEEE 802.11g: to 54 Mbit/s IEEE 802.11n: to 65 Mbit/s (planned)

Parameter	Value
WLAN encryption	**Types 3333, 3337, 3373, 3377, 3477, 3577** WPA, WPA2, WEP64/128, PEAP **Types 3630, 3633, 3673, 3637, 3677** WPA/WPA2-Personal, WPA/WPA2 Enterprise for Client, EAP-TLS, EAP-FAST, EAP-TTLS, EAP-LEAP, PEAP-MSCHAP-v2
USB	1 micro-USB type A/B (12 MBit/s), 2.0 full speed, self-powered device
Digital OUT	1 digital output - Terminal 30 switching 6 VDC … 36 VDC - max. output current: 500 mA - max. switch frequency: 10 Hz - Surge-proof up to 36 VDC - Reverse voltage protection up to -36 VDC
Analog IN	3 analog inputs - Measurement range: 0 VDC to 15 VDC - Input resistance: 20 k¬ - Resolution: 12 bit - Sampling rate: 20 Hz - Surge-proof up to 53 VDC - Reverse voltage protection up to -53 VDC - Tolerance: ± 1 % of measurement range end value (at 25 °C)
Terminal 15	1 digital / analog input - Measurement range: 0 VDC to 78 VDC - Input resistance: 103 k¬ - Resolution: 12 bit - Sampling rate: 20 Hz - Digital switching threshold: 5.5 VDC (hysteresis 2.3 VDC) - Surge-proof up to 100 VDC - Reverse voltage protection up to -100 VDC - Tolerance: ± 1 % of measurement range end value (at 25 °C)
Analog IN (reset)	2 analog factory setting inputs* - Measurement range: 0 VDC to 78 VDC - Input resistance: 103 k¬ - Resolution: 12 bit - Surge-proof up to 53 VDC - Reverse voltage protection up to -53 VDC - Tolerance: ± 1 % of measurement range end value (at 25 °C) - Factory setting 1 = 66 % voltage value of terminal 30, tolerance 5 % - Factory setting 2 = 33 % voltage value of terminal 30, tolerance 5 % *not available at CANlink mobile 36xx variants
Terminal 30	1 analog input - Measurement range: 0 VDC to 78 VDC - Input resistance: 103 k¬ - Resolution: 12 bit - Sampling rate: 20 Hz - Surge-proof up to 36 VDC - Reverse voltage protection up to -36 VDC - Tolerance: ± 1 % of measurement range end value (at 25 °C)
Acceleration sensor	Measurement range: ±16 g - Resolution: 16 bit - Sampling rate: <10 Hz - Tolerance: ¬2 % of measurement range end value and offset ±0.15 g (at 25 °C) *(Sensor is not calibrated)*

Parameter	Value
Gyro sensor / Rate of rotation sensor	Measurement range: ±250 °/s - Resolution: 16 bit - Sampling rate: <10 Hz - Tolerance: ¬3 % of measurement range end value and offset ±3 °/s (at 25 °C and 1 g) *(Sensor is not calibrated)*
Temperature sensor	Measurement range: -40 °C … +85 °C / -40 °F … +185 °F - Resolution: 0.1 °C - Sampling rate: 20 Hz - Tolerance: ±3 °C / ±5.6 °F *(Sensor is not calibrated)*

10.2.4. Protocols

Table 80. Protocols

Protocol	Available
Layer 2	Yes
CANopen	Yes
J1939, OBDII	Yes
Customer-specific	On request
TCP	Yes
SDO client	Yes

10.2.5. Status Indicators

Table 81. Status indicators

Available	Status indicator
All types	2 RGB LEDs (ON / STATUS)

10.3. Certification and Qualification

The device has been certified and qualified according to the valid standards and regulations.

For more information on the corresponding approval tests, please contact Support.

INFORMATION
We will send you an overview of national approvals on request. Please contact our support. See Chapter Service and Support.

Proemion GmbH hereby declares that the CANlink mobile 3000 wireless communication system complies with the provisions in Directive 2014/53/EU.

	The full text of the declaration of conformity is available at our website Declaration of Conformity. Further certificates, such as FCC and Bluetooth SIG certification, are also available at our website Declaration of Conformity.

E1

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