



**DKV EURO SERVICE
(OBU)**

User Manual



Intended use

The On Board Unit (OBU) is intended to be used for electronic toll collection and other telematic services, and may only be used for this purpose, unless explicitly stated otherwise. Any other use is considered to be a prohibited misuse and results in the denial of any claims.

Safety Instructions



General instructions:

Do not operate the OBU with pointed or sharp-edged objects. For cleaning use only, a damp cloth, no solvents or abrasive cleaners. Replace damaged power supply cables immediately to avoid any risk of short circuit or fire.



Usage in potential explosive atmosphere:

The usage of the EETS OBU in potential explosive atmosphere in general is not permitted.



Destruction caused by over-voltage:

The OBU is designed for a voltage range of 8 V – 32 V DC and must therefore be used inside this voltage range. If your on-board network can generate higher voltages (e.g. jump-starting from an external power source or from additional stronger power generators in the vehicle), then you must disconnect the unit from the on-board network for the duration of the over-voltage.



Danger caused by (rechargeable) battery:

Protect the battery from mechanical strain (shock, drop, vibration) as well as from temperatures $>+85^{\circ}\text{C}$ as this may create a potential Fire hazard! For further safety precautions and directives, please, follow the detailed user manual.



Danger of explosion:

For ADR vehicles (European Agreement concerning the International Carriage of Dangerous Goods by Road) only a fixed installation is permitted. This must be performed by authorized staff. If you wish to install the device into an ADR vehicle contact your Customer Service.



Danger of obstructed line-of-sight:

Always mount the OBU in such a way that the driver's field of vision is not impaired! If in doubt, please contact Customer Service.



Risk of accident:

Handling of the OBU while driving is not permitted! The navigation button is locked to prevent any operation during vehicle movement.



Environmental pollution:

Do not remove the batteries from the OBU. Return the OBU completely to your Service Partner. Contact your Customer Service to get further information.

For any support needed, please, take down the telephone number of your Customer Service:

0049-800-32682931

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1 Toll Charging in EETS Domains

Service Provider DKV Euro Service GmbH & Co. KG offers its EETS Service to users of toll liable vehicles in Europe. EETS stands for European Electronic Toll Service. The aim of DKV's EETS-enabled On Board Unit (OBU) is to empower and simplify the use of toll roads throughout Europe by offering a comprehensive toll collection and payment service enabled by one device, offered by one provider.

1.1 EETS in general

Depending on the regulations of the different European toll domains, the OBU can be used by heavy goods vehicles with a Gross Vehicle Weight (GVW) of more than 3.5 tons (i.e. in Belgium) or 7.5 tons (i.e. in Germany) for tolling on motorways, and/or a number of national and regional roads, and/or tunnels and bridges. The OBU:

- is used for detecting the relevant toll amount based on driven kilometers in a toll domain. A toll domain is either the entire toll network of a country or a certain part of the tolled road network within a country (roads, tunnels, bridges).
- may cover many toll domains throughout Europe and thus collects toll relevant information across borders.
- is installed in the vehicle to detect whether a toll road or a non-toll road is used.
- collects the information relevant for toll charging and transmits it to the data center where the data is processed for billing purposes.
- will be linked to a vehicle which can be subscribed for one or several toll services (e.g. Belgium, Germany, France, Spain, Austria, etc.).

If a certain toll service is not yet covered by the EETS Service, the user may also operate additional national toll devices. However, if a user changes from the national toll service provider(s) to the EETS Service, he must switch off or remove the national OBU before using the EETS OBU.

1.2 EETS with DKV Euro Service

The OBU complies with the toll regulations of the national/regional authorities. Furthermore, a OBU enables the user to cross borders without interruption as it is interoperable among different technologies used in various tolling systems (GNSS and/or DSRC).

The EETS Service can be booked for one or more toll domains (as a "toll service" for dedicated tolling systems). The coverage of DKV's bookable toll services is continuously expanding. However, for each tolling system, only one device must be used to avoid the risk of over paying.

It is the obligation of the road user to check whether his vehicle is subject to tolling and which terms or exceptions apply to each tolling system.

When registering for the EETS Service, the user or logistics company must select the desired toll services for the toll systems it intends to use. The registration is done beforehand via dedicated DKV Euro Service. The user or logistics company must provide the relevant customer and vehicle data during registration. The Service Partner takes care of the registration and assigns a OBU to each vehicle. As soon as all relevant data is transferred to the system, the OBU can be personalized with the desired toll services for individual use. The personalization process includes the update of the OBU with the needed software, user and vehicle parameters, and tariff data.

The personalization of the OBU is done via mobile network “over the air” when the OBU is mounted in the vehicle, is connected to the power supply and the engine is turned on.

For some toll services, the driver is obliged to first check (additional) specific information which might be subject to change such as the number of axles and the current gross train weight before using the toll domain’s road network. The current gross train weight (GTW) is the maximum permissible combined weight of the tractor and the currently attached trailer.

In the following chapters the usage of the OBU and how to enter toll service specific input parameters are described in detail.

The following EETS Services can be booked, and more toll services will be available in the future. On the OBU they will be indicated as following:

- Austria (ASFINAG): ATasf
- Belgium (Viapass): BEvia
- Belgium (Tunnel Liefkenshoek): BELiT
- Bulgaria (RIA): BGria
- Denmark (Storebælt bridge): DKbri
- France (ASFA): FRTis
- Germany (BAG): DEbag
- Germany (Tunnels Warnowquerung and Herrentunnel): DEtun
- Hungary (NUSZ): HUgo
- Italy (AISCAT): ITsit
- Poland (KAS – state-owned toll roads): PLeto
- Portugal (APCAP): PTvve
- Slovakia (NDS): SKmyt
- Spain (SEOPAN): ESvia
- Sweden (Øresund bridge): DKbri
- Switzerland (EZV): CHlsv

2 Quick Start

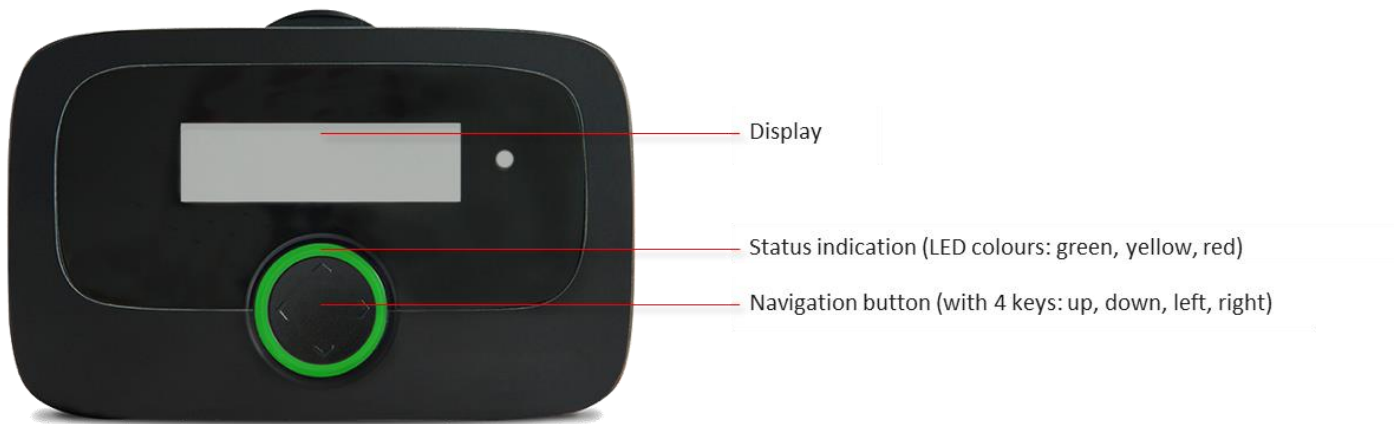


Figure 1: OBU

2.1 Start Display of an OBU driving in Germany (DEbag)

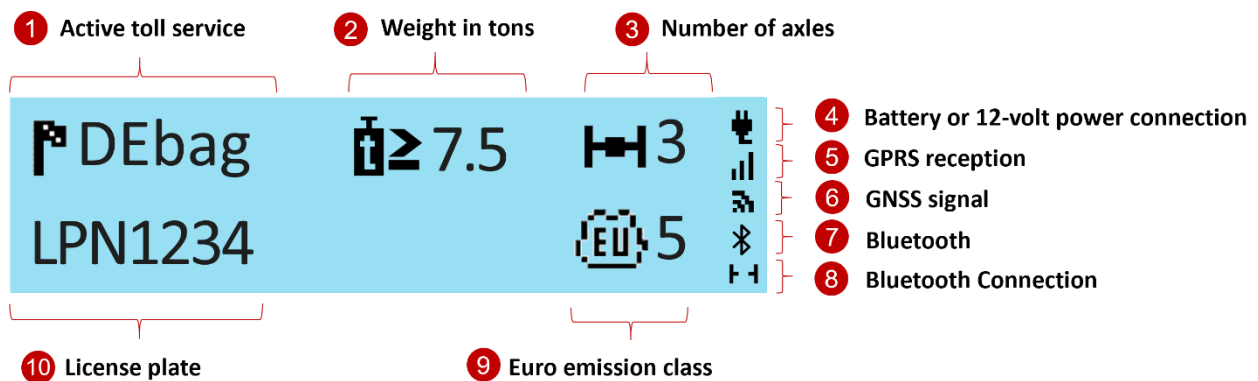


Figure 2: Start Display of an OBU driving in Germany

When you drive in an area/country where the OBU is activated, then you can always see the active toll service (1) and your license plate (10) on the display. Weight (2)*, number of axles (3) and Euro emission class (9) are shown if this information is used in the active toll service, mainly applies:

- The weight is shown in Germany, Belgium, Switzerland and Poland only.
- Number of axles is the sum of tractor and trailer axles, not shown in Belgium.

Symbols for the type of power connection (4), the GPRS reception level (5), and the GNSS signal (6) are always visible. In case it has been activated, the Bluetooth symbol (7) is displayed. An active Bluetooth connection between OBU and a mobile device is indicated in the lower right corner of the display (8).

* For Germany and Poland, the currently selected weight range is shown. For Switzerland, this value shows the calculated train weight depending on trailer-presence. For all other services, the maximum permissible total weight of the train is shown if relevant for tolling, in other cases this value is empty.

2.2 Status Indication (LED)



Green LED: The OBU is active and toll charging for the current location and valid. You can drive.



Yellow LED: The OBU is not yet personalized, or the toll service for the location (in which the vehicle is currently located) is not (yet) booked/active, or there is no electronic tolling system in this area (e.g. Netherlands), or the toll service is not available for this OBU.



Red LED: Critical problem. Do not drive. Contact your customer service.

Exception: The OBU goes red after 30 minutes without GPS reception.

-> If you find yourself e.g. in a tunnel or garage, drive to a location with GPS reception.



LED off: OBU is not active (e.g. sleeping. It will wake up with electricity or movement).

2.3 First time usage of OBU

Connect the OBU to power to activate it!

- The LED stays **red** until the system start is finished.
- It will then change to **yellow** while the vehicle data (license plate, weight) and the booked services are loaded (OBU personalization) via mobile telephone network ("over-the-air").
- Finally, it will turn **green**, if the toll service of the area you are in is booked.



➔ Make sure OBU has a good GPRS signal for personalization (mobile telephone network)



➔ Make sure you have a good GNSS/GPS connection so that the OBU knows, in which country it is. (Go/drive outside. If needed, move OBU around some meters).

The OBU receives also software updates over the air.

- ➔ If you cannot follow instructions or e.g. menu is not as described, call your help desk for further information. Be sure to have always the latest version of the OBU Manual provided by your Service Partner.

Before first drive: Check if license plate on OBU display is correct!










Choose your language:

- 1) Press **>** (or any other key) on Navigation button more than **2 seconds** to open the main menu.
- 2) Choose with **↓/↑** *language* and confirm with **>**
- 3) Choose with **↓/↑** your language (*Deutsch, English, ...*) and confirm with **>**
- 4) The OBU beeps to confirm and changes the language.

The driver is responsible to configure the number of axles according to the attached trailer. This can always be done (at any location), also when the number of axles are not shown in the „Start Display“.

- 1) Press **>** (or any other key) on Navigation button more than **2 seconds** to open the main menu.
- 2) Choose with **↓/↑** *Axles Trailer* and confirm with **>**
- 3) Choose with **↓/↑** the correct number of trailer axles and confirm with **>**
- 4) The OBU beeps to confirm. Leave the menu by pressing **<<**

In Germany as well as in other countries like Austria, Bulgaria, France the driver is responsible to configure the weight of the trailer. This can always be done, also when the product, here example toll service Germany, is not (yet) activated on the OBU.

- 1) Press  (or any other key) on Navigation button more than **2 seconds** to open the main menu.
- 2) Choose with / *Current weight* and confirm with .
- 3) Choose with / the correct value and confirm with .
- 4) The OBU beeps to confirm. Leave the menu by pressing  .

The weight to be configured before using the toll domain's road network is the current gross train weight (GTW). The current gross train weight is the maximum permissible combined weight of the tractor and the currently attached trailer.

2.4 Requirements during driving

- OBU must be fixed in the foreseen holder.
- The OBU has to be visible from the outside and must not be covered.
- The chosen position should not be close to any other devices (e.g. other OBUs/ navigation/ airbag).
- Keep the OBU connected to power.
- Do not manipulate OBU when driving.
- Respect traffic rules.

For an optimal detection of the OBU in dedicated toll lanes (DSRC):

- Keep 4m distance to the car in front
- Respect the signage in the toll lane
- Only pass the toll barrier when the light shows green

2.5 Emergency procedure in case of malfunctions / defects at dedicated toll lanes

In case of persistent malfunctions at an entry or exit gate, eventually the driver needs to pay with an alternative means of payment. Please note that the driver should have (and in France must have) always an alternative means of payment with him (fuel card, credit card, or cash).

3 On Board Unit (OBU)

3.1 Package content

Unpack the OBU. Please, check if the package content is complete and undamaged.

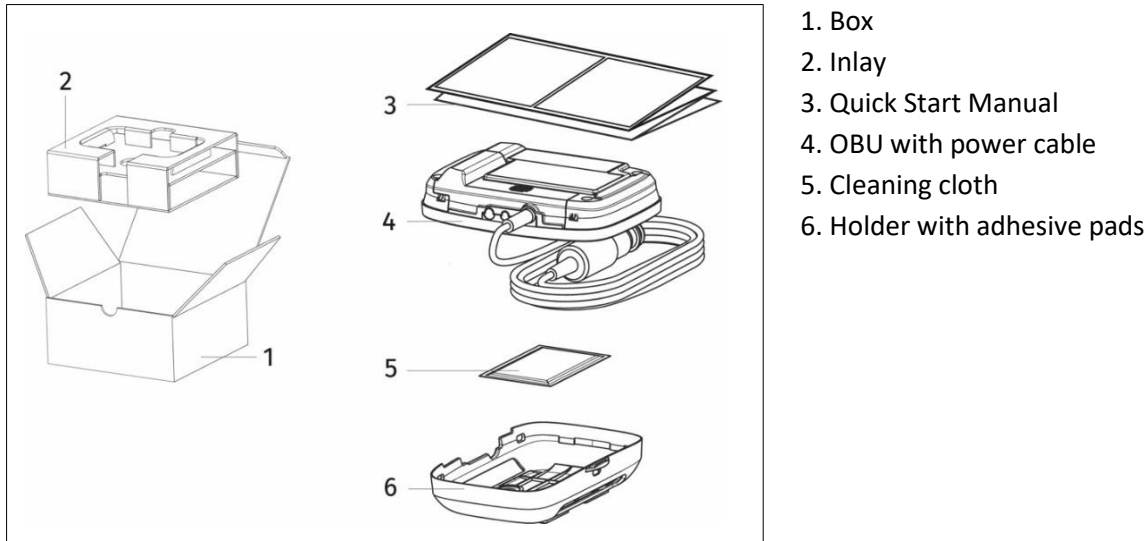
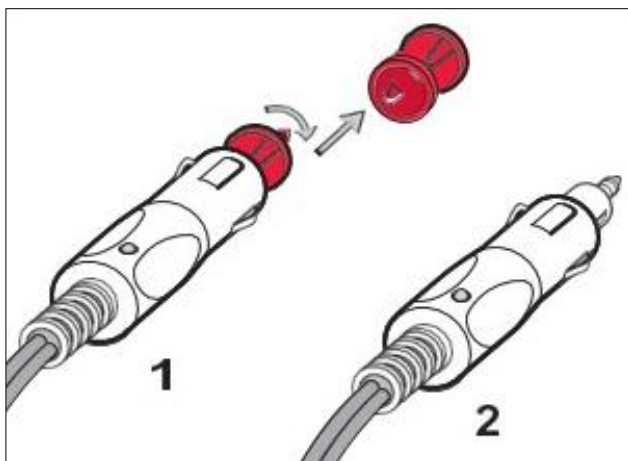


Figure 3: Package content OBU

The OBU contains all batteries and the power cable is prepared for flexible installation. The adhesive pads are already fixed on the holder to position the OBU on the windshield.



The adapter is necessary to connect the OBU with the power connection depending on the socket in your vehicle. Flexible power connection for:

1. DIN standard socket
2. Cigarette lighter socket

Figure 4: Adapter for flexible power connection



If you find something missing or damaged do not use the OBU and contact your Customer Service immediately.

3.2 OBU Design

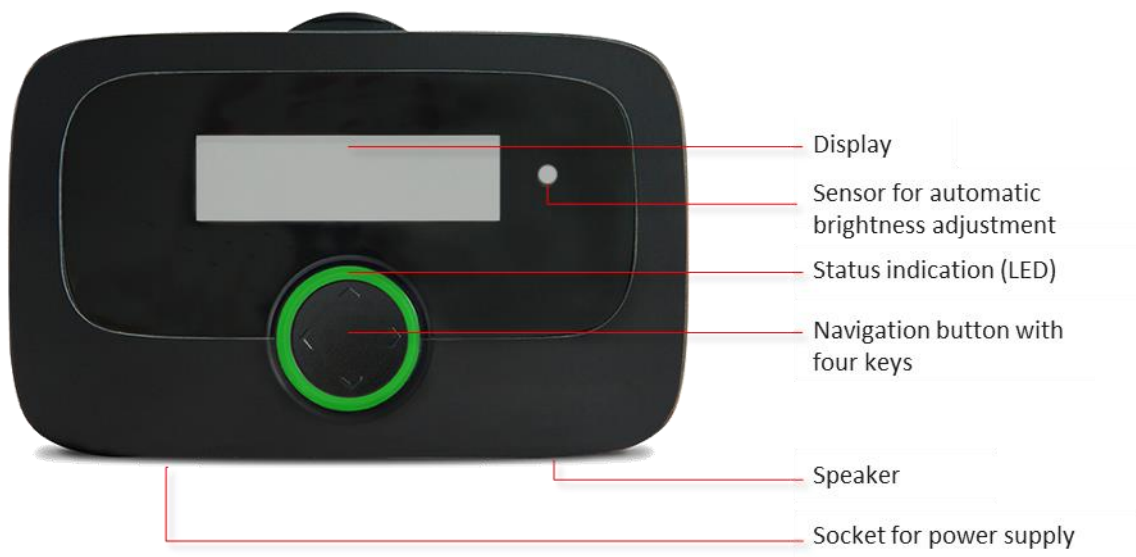


Figure 5: OBU design

3.3 Start Display

The OBU is prepared for the prompt use. After connecting to the power, the OBU boots immediately. The OBU will be personalized with the vehicle data that was transmitted with the registration of the vehicle by your Service Partner. Also, the data for the selected EETS Service are stored and personalized on the OBU.

The Start Display is shown when the vehicle is located within an area or country with an activated toll service. For example, when the vehicle is within Germany and the German toll service (short “DEbag”) is activated, then the following Start Display is visible.

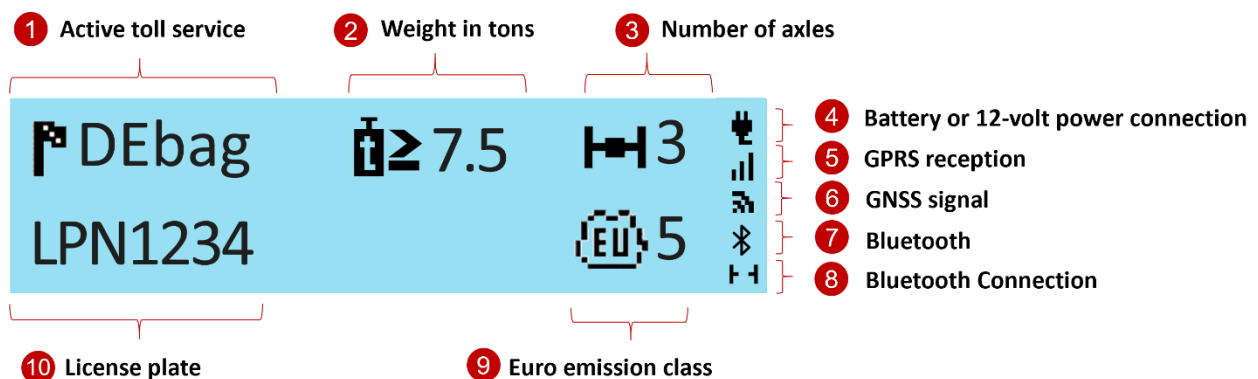


Figure 6: Start Display of the OBU for German toll service

The number of axles shown at the Start Display is the total number of axles for the entire vehicle (train + trailer) consisting of the (static) number of tractor unit axles (as stated by the Service Partner during registration) plus the actual declared trailer axles. The actual trailer axles are set according to the current status by the driver on the OBU, see chapter 5.2.

Note: The personalization of the OBU requires a GNSS signal and GPRS connection. Please ensure a free view to the sky (GNSS satellites).

Detailed information about the installation of the OBU is given in chapter 4 Installing the OBU.

You can find additional information and hints about the displayed information in chapter 7 Troubleshooting.

3.4 Navigation through the Menu

After the OBU has booted the start display is shown.

To retrieve the stored information use the navigation button to select various menu items and to scroll through the different menus.

Opening the main menu     (press key **more than 2 seconds**)

To enter the menu, press one of the four keys of the navigation button more than 2 seconds.

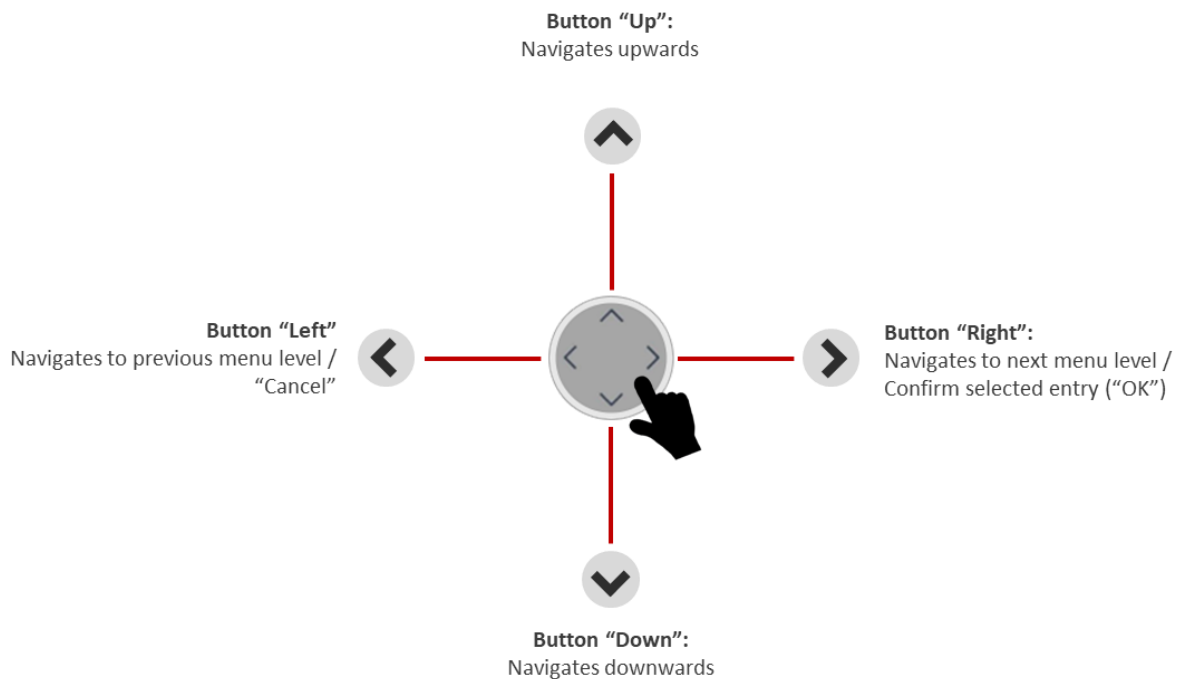


Figure 7: Menu navigation

3.5 Status Indicator and Signaling

The status indicator is the LED ring around the navigation button. Additionally, a buzzer signals the status of the OBU acoustically. The status indicator supports the user while driving the vehicle and gives feedback on different statuses.



OBU is not active.

The OBU is switched off, or is in sleep mode (see chapter 6.2).



The OBU is active and ready for operation.

You can drive. Please note the indicated information in the display.



Attention! If yellow light appears, check the message on the OBU display. OBU is either

- not yet personalized, or
- the toll service for the area in which the vehicle is currently located, is not activated, or not available in the OBU, or
- there is no electronic tolling system (e.g. Netherlands).

Please check (via the display-menu) which toll services are activated. In case of an obligation to pay toll, use tolling equipment of local toll provider.



Critical problem, tolling impacted, not ok to drive. The OBU is activated but not ready for operation. A red status indicator and an error message appear in case of

- a technical defect
- or if the toll service was blocked (by the Service Partner or the Toll Charger),
- or when the OBU does not receive any GPS signal for more than 30 min
- or when in transport mode (CHIsv).

In these cases, do not drive with the OBU and contact your Customer Service. If, for obvious reasons, you do not have any GPS reception, e.g. if you find yourself in a tunnel or garage, drive to a location with GPS reception.

Whenever the status indicator is red, it also will be flashing (by default) to signal a problem. You can find further information on checking the OBU in chapter 7 Troubleshooting.



Buzzer - for acoustic signalization:

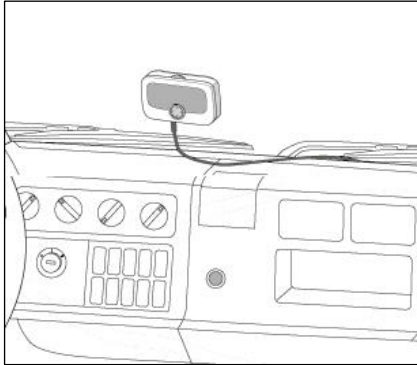
- signaling of performed actions or warnings, e.g. no GPS signal,
- feedback to user interactions, e.g. changes in the menu,
- signalling of additional information during driving.

4 Installing the OBU



The OBU is designed for a voltage range of 8 V – 32 V DC and must therefore be used inside this voltage range. If your on-board network can generate higher voltages (e.g. jump-starting from an external power source or from additional stronger power generators in the vehicle), the OBU must be disconnected from the on-board network for the duration of the over-voltage.

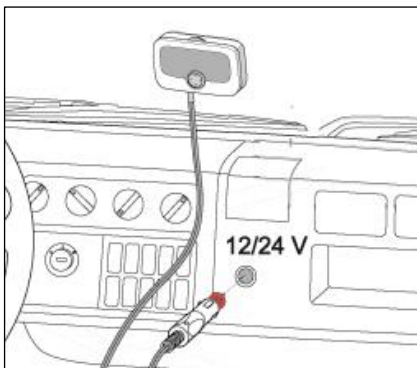
The OBU can be installed in two ways:



Permanent installation:

The OBU is connected permanently to the vehicle electrical system.

Figure 8: Permanent installation on the windshield



Flexible installation:

The OBU is connected to the cigarette lighter socket.

Figure 9: Flexible installation on the windshield

The status of the power supply is visible on the display:



Power supply via connection to the vehicle electric system.



Power supply via rechargeable battery. Please, consider the battery loading status during driving.

4.1 Positioning the OBU on the windshield



All times mount the OBU in such a way that the driver's field of vision is not impaired!



Please, consider different windshield characteristics, e.g. metalized, unmetallized areas, depending on the kind of windshield in your vehicle. Check the windshield characteristic in the

documentation of your vehicle. Some windshield coating might hinder the communication between the OBU and the GPS and GPRS systems.

Position the OBU on the inside of the windshield in a way that:

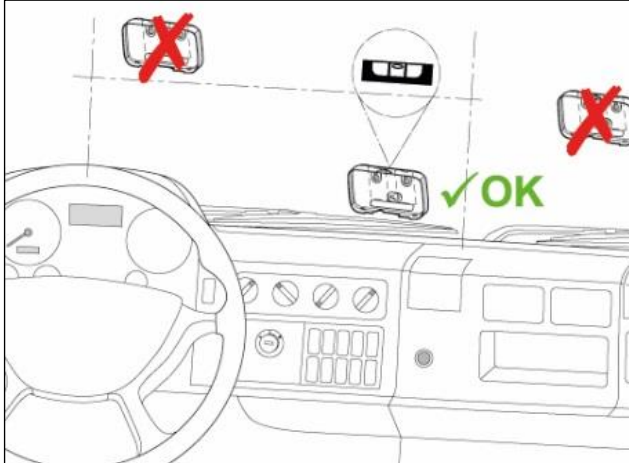


Figure 10: Right OBU position on windshield

- The driver's field of vision is not impaired while driving,
- the chosen position is not be close any moving parts e.g. air bag covers,
- the OBU is visible from the outside and is not hidden by other elements such as windshield wipers while these are switched off,
- the OBU does not constrain the function of the dashboard vents,
- the OBU is not positioned on metalized windscreens section but only on non-metalized segments of the windshield,
- local laws and regulations as well as recommendations of the vehicle manufacturer are complied with.

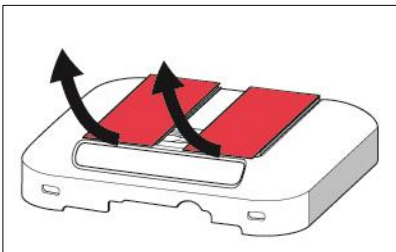
4.2 Mounting the OBU on the windshield



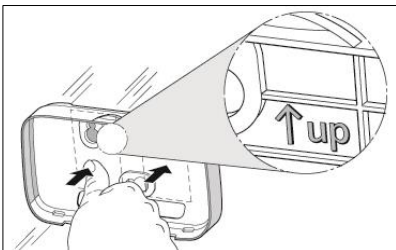
Attach the adhesive pads to the windshield at temperatures above 20 °C. The glue of the adhesive pads reaches its final strength only after 72 h and if applied at temperatures of 20 °C or above. If applicable, heat the windshield and the holder's adherend to appropriate temperatures.



Clean the selected location on the windshield carefully with a cleaning cloth. Wait until the surface is dry.



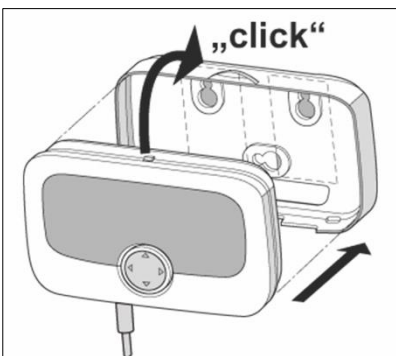
Remove the protection films from the adhesive pads.
Attach the holder at the chosen position with the adhesive pads.



Consider the sign ↑ up for the correct direction of the holder.
Position the holder and firmly press where the adhesive pads are located.

Figure 11: Mounting the holder on the windshield

4.3 Assemble the OBU to the holder



Place the OBU in front of the holder and click it into the holder.
Check the right position of the OBU.
You cannot move the OBU in the holder. Check this carefully.

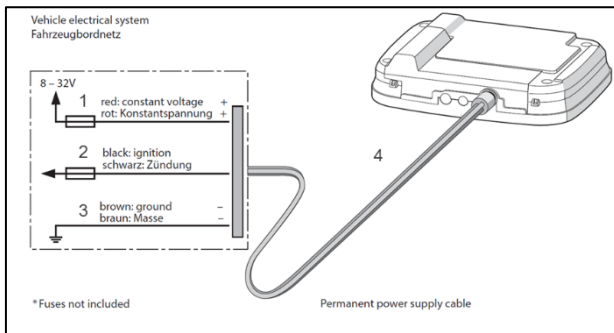
Figure 12: Assembling the OBU to the holder

4.4 Permanent installation



Installation in an ADR vehicle is permitted only for fixed installation and must be performed by authorized staff. If you wish to install the device into an ADR vehicle contact your Customer Service.

The fix installation of the OBU must be relied to the provided circuit diagram. Use the respective fuses.



Vehicle electrical system:

1. Red: constant voltage (+)
2. Black: ignition
3. Brown: ground (-)
4. Permanent Power Supply cable

Figure 13: Circuit diagram for fix installation

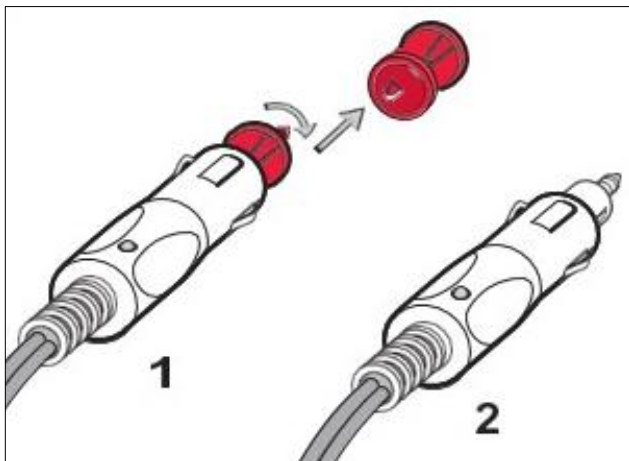
For any further information needed, please, contact your Customer Service.

4.5 Flexible installation



Fixate the power supply cable in such a way that it cannot disconnect while driving the vehicle or impair a safe operation of the vehicle.

Use the adapter to connect the OBU with the power connection depending on the socket in your vehicle.



Flexible power connection for

- 1 DIN standard sockets
- 2 Cigarette lighter sockets

Figure 14: Power connection for flexible installation



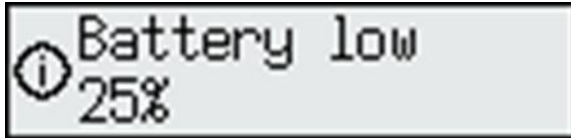
With the ignition switched on / during driving the rechargeable battery will be charged. In battery mode (connection to the cigarette lighter disconnected) the OBU will be supplied by the battery for 4 hours.



The battery charge will be shown on the display.



The OBU emits a warning beep, when the user removes the power supply.
Please, consider the battery loading status during driving.



If the battery level goes below 25%: The OBU beeps and shows a warning message. The user has to press OK to come back to the normal screen.

If battery level goes below 10%: The OBU beeps and shows a warning message. The user has to press OK to come back to the normal screen.

5 OBU Settings and Toll Domain Specifics

5.1 OBU Menu Structure

The figures in the menu chart below are only examples and might diverge.

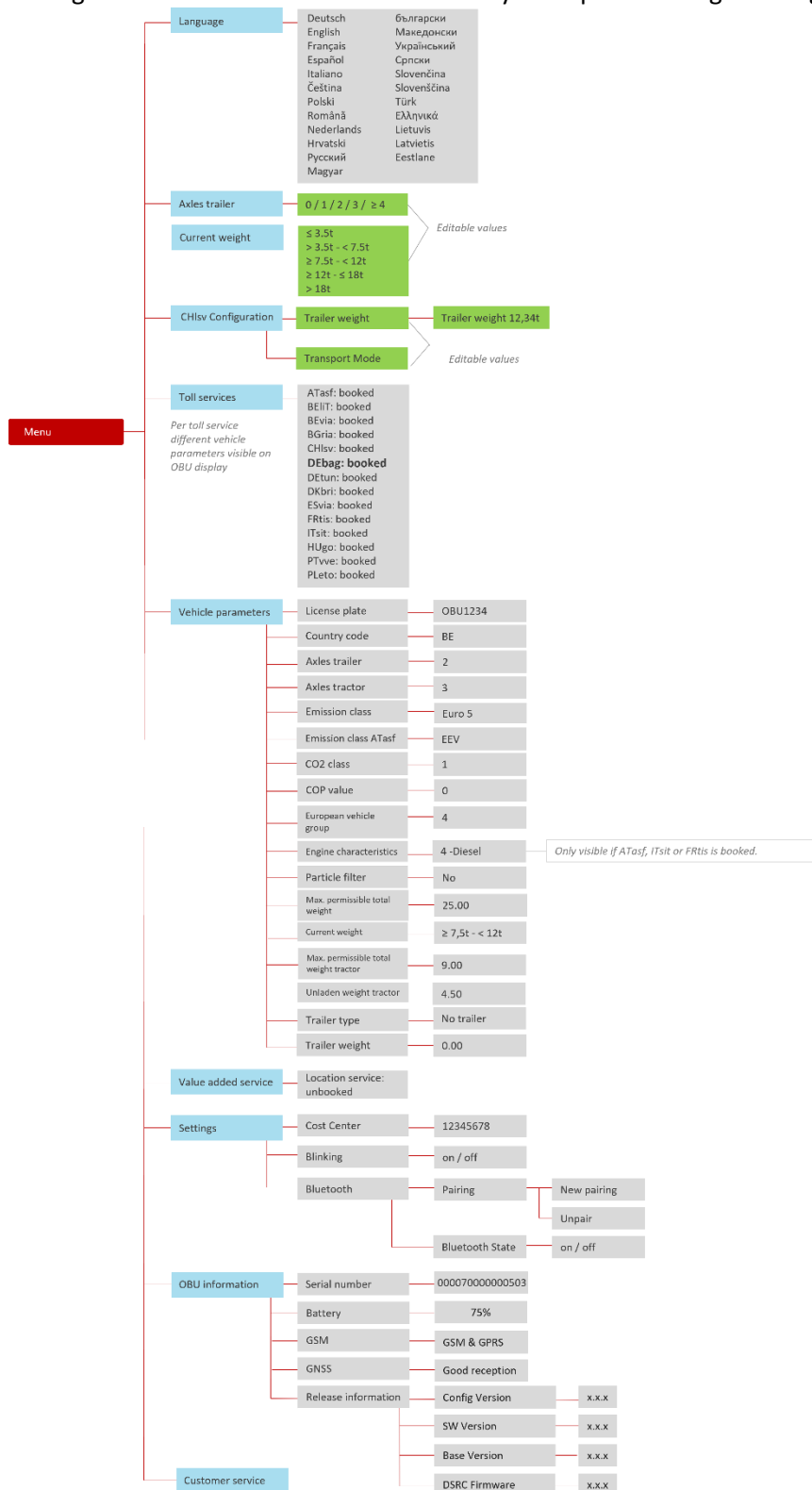


Figure 15: Overview menu structure

5.2 OBU Settings

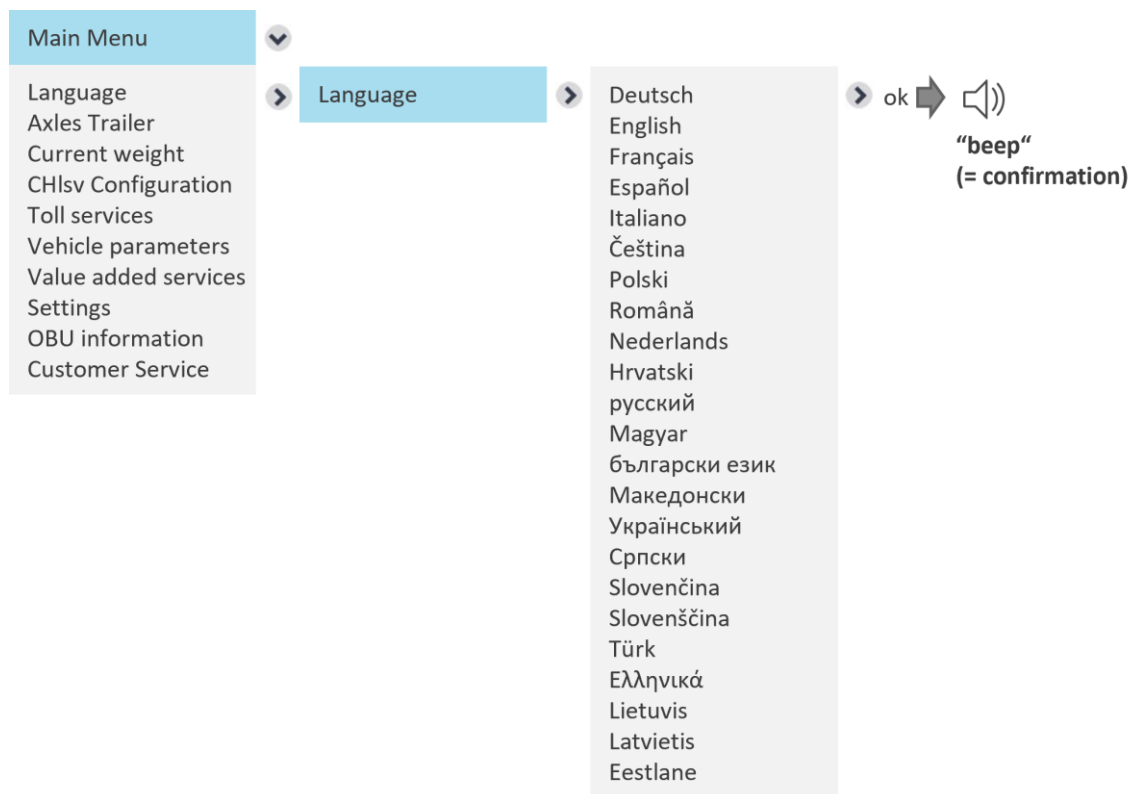
For the use of the EETS service dedicated vehicle parameters must be transmitted. They serve as the basis for identification of the vehicle and the calculation of the toll amount. These include for example license plate number, gross vehicle weight, emission class.

The initial customer registration for the EETS service is done by the Service Partner. The transmission of the necessary data to the OBU takes place automatically during the personalization of the OBU. In some cases, domain specific OBU parameters have to be updated by the driver during his trip. These will be explained in the following.

The examples below show how the driver can browse through the OBU menu in order to find relevant information and how he can enter and update information. Only the tariff relevant parameters are shown in each sub menu per toll service.

5.2.1 *SELECT LANGUAGE*

The OBU is available in 23 languages.

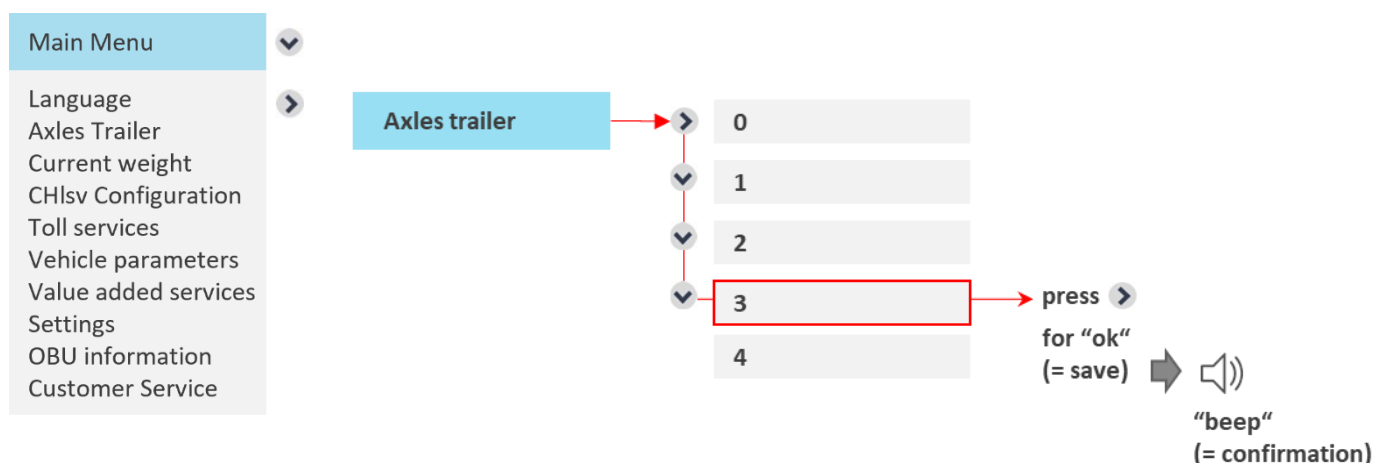


After choosing the desired language, press right key for “ok” (= save value). A signal will confirm the correct saving and the language will change.

5.2.2 *CHANGE NUMBER OF TRAILER AXLES*

The driver must **always check and/or update** the number of **trailer axles** when entering a new toll domain, especially in case of **coupling or uncoupling the trailer**.

Example change number of trailer axles:



Here the number of trailer axles is changed from zero (no trailer) to three. After updating the value, press right key for "ok" to save your change. Leave the menu by pressing two times the left key ◀◀ to come back to the start display.

You can also use this menu to only check the currently set number of axles. If you do not want to change them, leave the menu by pressing the left key without pressing "ok". If you press left key without saving and the number of axles has been modified, an information screen will be displayed for some seconds: "Value not changed" and the old value is kept.

5.2.3 CHANGE CURRENT WEIGHT FOR TOLL SERVICE GERMANY (DEbag) AND POLAND (PLEto)

For DEbag the user always needs to check and/or update the value to the current gross train weight before entering Germany **especially when a trailer was coupled or uncoupled**. The current gross train weight (GTW) is the combined maximum permissible weight (F.1) of the tractor and the maximum permissible weight (F.1) of currently attached trailer.

For PLEto the current gross train weight can be set by the driver before entering Poland but this is not required.

Example for "Change current weight":

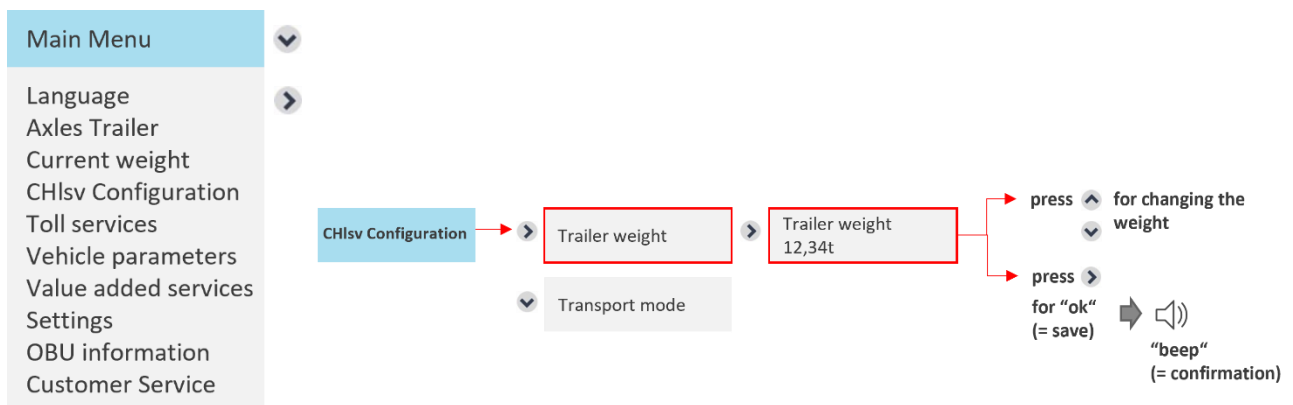


After updating the value, press right key for "ok". Leave the menu by pressing two times the left key ◀◀ to come back to the start display.

You can also use this menu to only check the currently set weight. If you do not want to change it, leave the menu by pressing the left key without pressing "ok". If you press left key without saving and the weight has been modified, an information screen will be displayed for some seconds: "Value not changed" and the old value is kept.

5.2.4 CONFIGURATION CHlsv

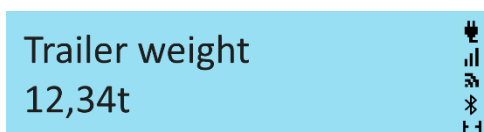
5.2.4.1 Trailer weight entry for toll service Switzerland



For CHlsv the user always needs to check and/or update the entry of the trailer weight before entering Switzerland **especially when a trailer was coupled or uncoupled**. The current gross trailer weight is the maximum permissible weight of the attached trailer.

When the service Switzerland is personalized on the OBU the expected gross trailer weight is configured on the OBU. If a trailer with a different weight is used the road user should modify the trailer weight declaration, accordingly.

The weight can be changed in the "Trailer weight" submenu, which is part of the main menu "Configuration CHlsv". The digit that can be changed is highlighted with a grey cursor. It can be changed with the "Up" or "Down" key. Long press on ◀ or ▶ moves the position of the changeable digit one position to the right or left.



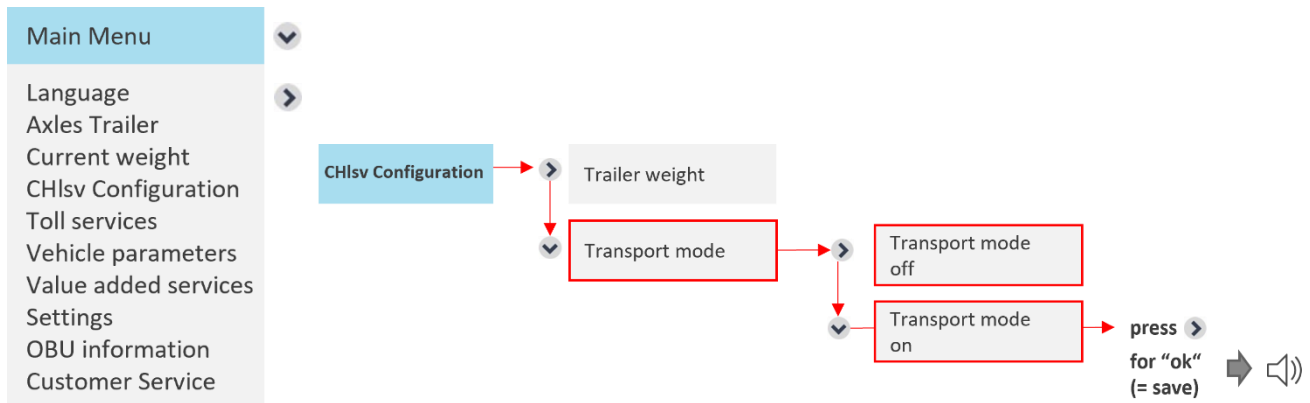
After updating the value, briefly press the right button ▶ for "ok". Leave the menu by pressing the left button several times ◀ ◀ ◀ to return to the start display. The trailer weight is only relevant if a trailer is used (trailer axles >0). It does not need to be set to zero if no trailer is used (the value zero cannot be entered by the driver as a permissible weight).

You can also use this menu to check the currently set weight. If you do not want to change the weight, leave the menu without saving by pressing the left button without "ok". If you leave the menu without saving and the weight has been changed before, a message "Value not changed" will be displayed for a few seconds and the old value will be kept.

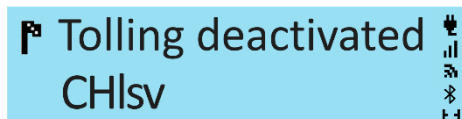
5.2.4.2 Non-self-driven mode for toll service Switzerland

If the vehicle is non-self-driven (e.g. the vehicle is loaded on a train) the road user can activate the transport mode (only relevant for travelling inside of Switzerland). This is done via the sub menu "Transport mode" which is part of the main menu "Configuration CHlsv".

To activate the transport mode the road user selects "on", then he presses the right key for "ok". This activates the transport mode.



When travelling in transport mode the OBU turns red and showing the below screen. Kilometers which are travelled in transport mode will not be counted for the charge calculation.



The transport mode can already be set outside of Switzerland. In this case the OBU will automatically turn to transport mode when passing the Swiss border. The transport mode is active until de-activated or until the OBU crossed the Swiss border and leaves Switzerland. The setting of the transport mode remains unchanged, when leaving Switzerland.

5.2.5 SHOW ACTIVATED TOLL SERVICES

Main Menu

Language

Axles Trailer

Current weight

CHLsv Configuration

Toll services

Vehicle parameters

Value added services

Settings

OBU information

Customer Service

Toll services

➤

ATasf:	booked
BElit:	booked
BEvia:	booked
DEbag:	booked
DEtun:	booked
ESvia:	booked
FRtis:	booked
ITSit:	booked
...	booked

The OBU display shows all booked toll services. If the OBU is not personalized for a toll service, then the name of the toll service will not be listed. In the example above the toll services Bulgaria (BGria), Portugal (PTvve), Hungary (HUgo), Switzerland (CHLsv), Poland (PLEto), Denmark (DKbri) and Sweden (DKbri) are not booked and therefore not listed.

5.2.6 VEHICLE PARAMETERS

All vehicle parameters can be looked up in the list of parameters as shown below.

Main Menu

Language

Axles Trailer

Current weight

CHLsv Configuration

Toll services

Vehicle parameters

Value added services

Settings

OBU information

Customer Service

Vehicle parameters

➤

License plate	OBU1234
Country code	BE
Axles trailer	2
Axles tractor	3
Emission class	Euro 5
Emission class ATasf	EEV
CO2 class	1
COP value	0
European vehicle group	4
Engine characteristics	4 -Diesel
Particle filter	No
Max. permissible total weight	25.00
Current weight	≥ 7,5t - < 12t
Max. permissible total weight tractor	9.00
Unladen weight tractor	4.50
Trailer type	No trailer
Trailer weight	0.00

Only visible if ATasf, ITSit or FRtis is booked.

Info: For the values not set by the user as emission class, number of axles tractor or particle filter the entry of the values is done initially by the Service Partner and cannot be adjusted via the OBU.

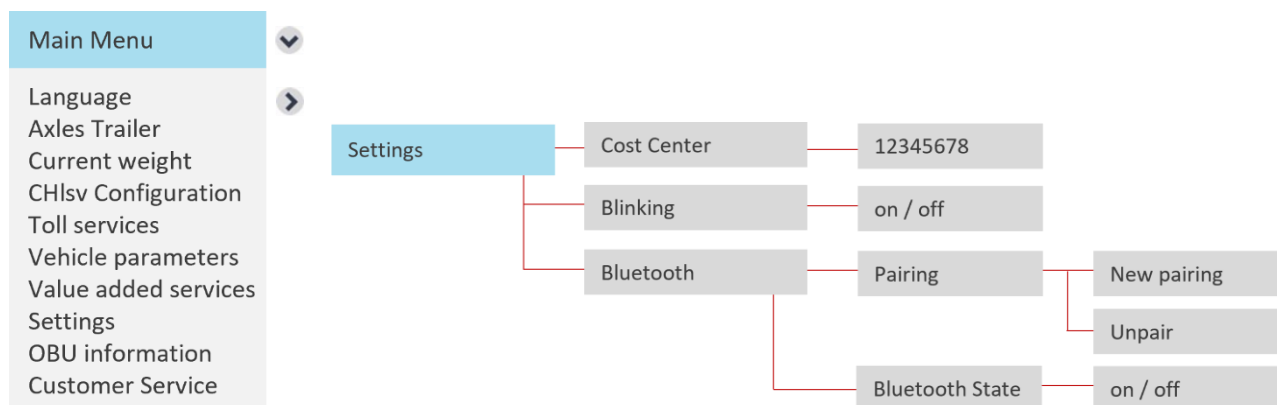
Details of the particle filter are displayed with yes / no. A "yes" is displayed, if the specified particle filter is toll-relevant. A "No" is displayed if the registered particle filter has no effect on the toll calculation.

The CoP value stands for "Co2 in g/km". It is optionally personalized for Austria and Italy for the OBU. The attribute is filled with "0" if the parameter was not specified by the customer.

5.2.7 VALUE ADDED SERVICES

Accessing this menu entry, all activated value added services are shown.

5.2.8 SETTINGS



The menu item "Settings" lets the user configure all of the following:

- Cost Center,
- Blinking, and
- Bluetooth.

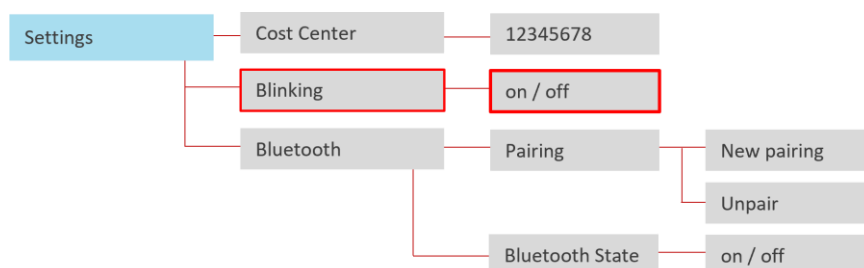
5.2.8.1 Enter cost center



The entry for the cost center is an optional feature. If you wish, you can enter your cost center number here. Use the following characters (up to 8): Characters A-Z, digits 0-9, special characters (-) minus, (,) comma, (.) dot, and spaces.

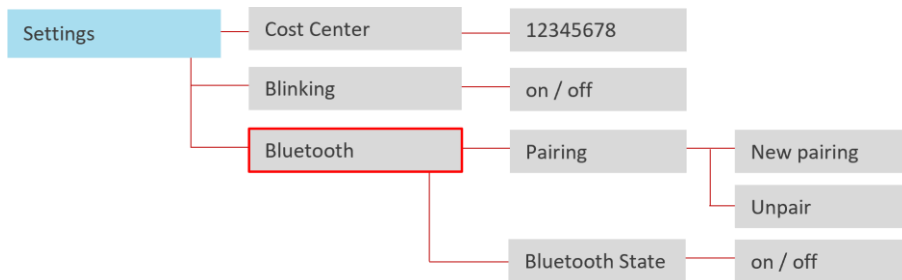
You can choose the characters via the keys of the navigation button up, down and right. Save your entry by holding down the right key.

5.2.8.2 Configure Blinking



In the menu you can find an option to configure the blinking of the LED, which appears usually in case of a red or yellow LED. Blinking in “active” mode is set as default, via the menu you can switch the mode to “inactive”. Press right key for selection (“ok”).

5.2.8.3 Configure Bluetooth



Accessing the Bluetooth menu item offers the user the options (1: Pairing) to connect/disconnect to a mobile device (i.e. smartphone) or (2: Bluetooth State) to change the current Bluetooth module status (on/off). Press right key for selection (“ok”); press left key to go back.

Pairing

Starting the Bluetooth pairing process will generate a new Bluetooth PIN which is temporarily displayed on the HMI. Upon entering and confirming the PIN on a smartphone a connection between OBU and smartphone is established. (Note: The Bluetooth pairing process will terminate upon inactivity). On the contrary, “Unpairing” will remove all existing pairings (previous connections) from the OBU Bluetooth module. The OBU may re-connect to known devices - no new pairing is necessary.

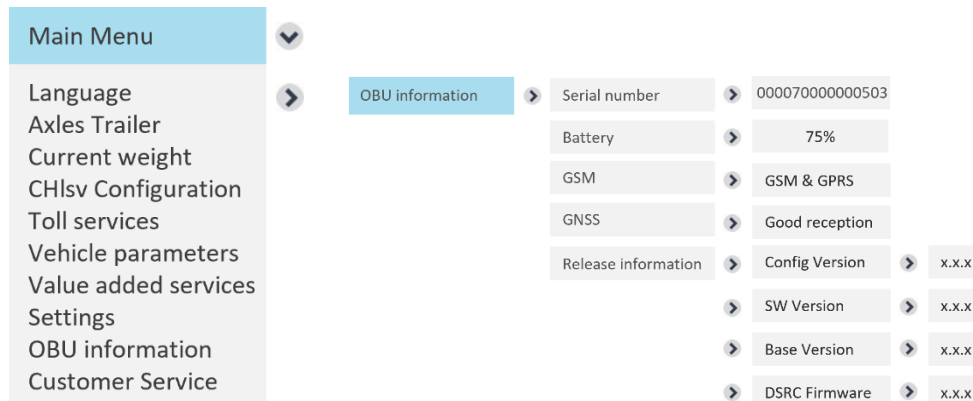
Bluetooth state

The user may activate/deactivate the Bluetooth module to allow/disallow any kind of (existing/new) connection with another device. The Bluetooth module is deactivated per default.

To unveil all Bluetooth features, a OBU companion smartphone application is available for Android smartphones in the Google Play Store:



5.2.9 SHOW OBU INFORMATION AND SOFTWARE VERSIONS



5.2.10 SHOW NUMBER OF CUSTOMER SERVICE

Please note the telephone number of your Customer Service here:



This feature will be available in the future.


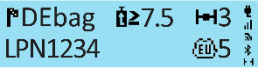



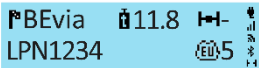

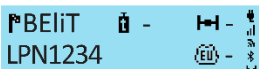


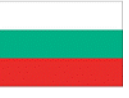
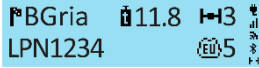
Then, there is only a number displayed, if the Service Partner has one central customer service phone number. In the case that there is not a single Service Partner number, or many different country specific numbers, the display shows “NA” and the Service Partner informs the client directly.








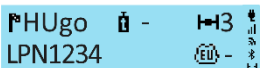

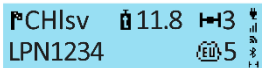



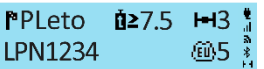
5.3 Toll service specific changeable OBU parameters (Overview)






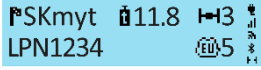
Toll charger and toll service specific requests require to enter and update certain data on the OBU. This might lead to differing OBU displays. Depending on special regulations of a tolling system, the number of axles and the current gross train weight (GTW) must be entered separately by the driver with regards to the current vehicle train. As part of the self-declaration obligation, the driver is responsible for the correctness of this information.

Before start of a drive, the driver has to verify the conformity of OBU and vehicle. The driver always has to update the number of trailer axles on the OBU after coupling or uncoupling a trailer.

The following table shows which data and toll services are concerned, and which OBU startup screens will appear depending on the chosen toll service:

Toll Service	OBU start-up screen	Changeable parameters to be updated by the driver	Explanation
Germany – DEbag 		Number of trailer axles ➤ Menu => Axles trailer Current gross train weight (GTW) ➤ Menu => Current weight	<p>Axles: the current, actual total number of axles for the vehicle combination (tractor unit + trailer) is displayed (here: “3”), which may differ depending on the attached trailer. Therefore the trailer axles must be specified separately by the driver via the OBU.</p> <p>Weight: The new, gross train weight must be updated, when attaching a trailer to the tractor unit. The current gross train weight (GTW) is the maximum permissible combined weight of the tractor and the currently attached trailer. When selecting the weight range via the OBU menu, e. g. $\geq 7.5t$ and $<12t$, the lower value will be displayed on the OBU screen.</p>
German Tunnels - Warnow crossing + Herren tunnel 		-	No specific driver input necessary.
Belgium - BEvia 		-	No specific driver input necessary. For Belgium, the maximum permissible gross weight for the vehicle combination according to the vehicle certificate is already stored in the system during vehicle registration and is automatically displayed on the OBU screen, e. g. 11.8t.
Belgian tunnel - Liefkenshoek 		-	No specific driver input necessary.
Austria ATasf 		Number of trailer axles ➤ Menu => Axles trailer	The OBU display shows the sum of tractor unit axles + trailer axles. Number of trailer axles must be updated if a trailer is coupled or uncoupled to the tractor unit.
Bulgaria BGria 		Number of trailer axles ➤ Menu => Axles trailer	The OBU display shows the sum of tractor unit axles + trailer axles. Number of trailer axles must be updated if a trailer is coupled or uncoupled to the tractor unit. For Bulgaria, the maximum permissible gross weight for the vehicle combination according to the vehicle certificate is already stored in the system during vehicle registration and is automatically displayed on the OBU screen, e. g. 11.8t.

<p>France FRtis</p> 		<p>Number of trailer axles</p> <ul style="list-style-type: none"> ➤ Menu => Axles trailer 	<p>Number of trailer axles must be updated after coupling or uncoupling a trailer to the tractor unit. Number of axles is controlled in parallel by the Toll Charger's roadside equipment.</p>
<p>Spain ESvia</p> 		<p>Number of trailer axles</p> <ul style="list-style-type: none"> ➤ Menu => Axles trailer 	<p>Number of trailer axles should be updated after coupling or uncoupling a trailer to the tractor unit. Number of axles is determined in parallel by the Toll Charger's roadside equipment.</p>
<p>Portugal PTvve</p> 		<p>Number of trailer axles</p> <ul style="list-style-type: none"> ➤ Menu => Axles trailer 	<p>Number of trailer axles should be updated after coupling or uncoupling a trailer to the tractor unit. Number of axles is determined in parallel by the Toll Charger's roadside equipment.</p>
<p>Hungary Hugo</p> 		<p>Number of trailer axles</p> <ul style="list-style-type: none"> ➤ Menu => Axles trailer 	<p>The OBU display shows the sum of tractor unit axles + trailer axles. Number of trailer axles must be updated if a trailer is coupled or uncoupled to the tractor unit.</p>
<p>Switzerland CHLsv</p> 		<p>Number of trailer axles</p> <ul style="list-style-type: none"> ➤ Menu => Axles trailer <p>Current gross trailer weight (GTW)</p> <ul style="list-style-type: none"> ➤ Menu => Configuration CHLsv => Trailer Weight 	<p>Axles: the current, actual total number of axles for the vehicle combination (tractor unit + trailer) is displayed (here: "3"), which may differ depending on the attached trailer. Therefore the trailer axles must be specified separately by the driver via the OBU.</p> <p>Trailer Weight: The current gross trailer weight must be updated, when attaching a trailer to the tractor unit. The current gross trailer weight (GTW) is the maximum permissible weight of the currently attached trailer. The start screen shows the total weight.</p>
<p>Italy ITsit</p> 		<p>Number of trailer axles</p> <ul style="list-style-type: none"> ➤ Menu => Axles trailer 	<p>Axles: Number of trailer axles must be updated after coupling or uncoupling a trailer to the tractor unit.</p> <p>In Italy only the axles on the ground, not the total axles of the trailer are relevant (e.g. in case of swivel axles are folded up).</p>
<p>Poland PLeto</p> 		<p>Current gross train weight (GTW)</p> <ul style="list-style-type: none"> ➤ Menu => Current weight 	<p>Weight: The new, gross train weight must be updated, when attaching a trailer to the tractor unit. The current gross train weight (GTW) is the maximum permissible combined weight of the tractor and the currently attached trailer. When selecting the weight range via the OBU menu, e. g. $\geq 7.5t$ and $<12t$, the lower value will be displayed on the OBU screen.</p>

			For PLEto the current gross train weight <u>can</u> be set by the driver before entering Poland but this is not required.
Denmark (Storebælt) DKbri 		-	No specific driver input necessary.
Sweden (Øresund) DKbri 		-	No specific driver input necessary.
Slovakia SKmyt 		Number of trailer axles ➤ Menu => Axles trailer	Number of trailer axles must be updated after coupling or uncoupling a trailer to the tractor unit. Number of axles is controlled in parallel by the Toll Charger's roadside equipment.

5.4 Service specific Toll Lanes

General information

While entering a toll road, the OBU has to be fixed in his holder. In the toll lane the OBU must not be manipulated.

For an optimal detection of the OBU in the toll lanes:

- The driver needs to ensure to keep 4m to the car in front of him
- Respect the signage in the toll lane
- Only pass the toll barrier when the light shows green

If the OBU is detected successfully, it will make a sound, the light at the lane will turn green and the barrier will open.





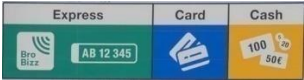
Emergency procedure in case of malfunctions / defects

In case of persistent malfunctions at an entry gate, eventually the driver needs to take a ticket when entering the toll road, then return this ticket and pay with an alternative means of payment. Please note that the driver should have (and in France must have) always an alternative means of payment with him (fuel card, credit card, or cash). The list of accepted payment methods can be found on the website of the respective toll operator. If necessary, the driver can push the emergency button and then follow instructions of the toll staff. If the OBU is defective, the service partner needs to be contacted.

The following signs are used to direct the driver to the correct toll lane:

France	Spain	Portugal	Toll lanes - recommended driver behavior
			
			If you wish automatic toll collection via your OBU, please use lanes with these signs.
			If you wish to have automatic toll collection via your OBU and your vehicle is Category 4, please use lanes with these signs.
			If you want to drive faster through the gantry, please use lanes with the sign "Tempo 30". Pay attention to a minimum distance of 4 meters to the vehicle in front and only drive through at green light.
			If you wish a manual toll collection or your OBU is defective and you have to pay the toll by cash or by card, please use the lanes with these signs.

Italy	Belgium	Germany	Toll lanes - recommended driver behavior
			
			If you wish automatic toll collection via your OBU, please use lanes with these signs.
			If you wish automatic toll collection via your OBU, where payment with cash and/or approved cards is accepted.
			If you wish a manual toll collection or your OBU is defective and you have to pay the toll by cash or by card, please use the lanes with these signs.

<p>Denmark</p>  <p>Storebælt</p>	<p>Sweden</p>  <p>Øresund</p>	<p>Toll lanes - recommended driver behavior</p>
	 <p>All vehicle categories</p>  <p>Buses and lorries</p>	<p>If you wish automatic toll collection via your OBU, please use lanes with one of these two symbols.</p> <p>Basically, the lane for "Buses and lorries" is recommended.</p>
		<p>Use the lanes with green signs whenever possible.</p> <p>Customers with an OBU should use the GREEN lanes. It is also possible to use the BLUE lanes. In this case, the driver must select "Payment with OBU" at the self-service kiosk.</p>

5.5 Alternative payment methods

Toll Charger	Explanation	Link	Alternative payment options			
			Cash	Credit / Fuel Card	Manual ticket	Online booking
Austria (ASFINAG)	Get a local pre-pay OBU (GO-Box) issued by ASFINAG. There are many point of sales close to the toll roads before crossing the border into Austria. In case the vehicle drove already some kilometers on the toll road network, the driver can pay the missing toll (retroactive payment) at the next point of sale, where he also gets a local OBU.	Link AT	Yes (at POS)	Yes (Credit cards and fleet cards at POS)	n/a	n/a
Belgium (VIAPASS)	Get a local pre-pay OBU issued by the national provider Satellic. The customer can obtain an OBU at one of the 120 distribution points (Satellomats) at the border and in Belgium and can return it when leaving Belgium to get the deposit back. There is no extra charge for this.	Link BE	Yes	Yes	n/a	No
Belgium Liefkenshoek tunnel	Use the local service provider for manual payment via cash or card.	Liefkens-shoek	Yes	Yes	No	No
Bulgaria (RIA)	Buy a road ticket / vignette via the internet and at a point of sales.	Link BG	Yes	Yes (Debit / Credit)	Yes	Yes
Czech Republic (CzechToll)	Post-Payments possible via debit or fuel cards, see national provider . Here the accepted fuels and bank cards are displayed.	Link CZ	No	Yes	No	No
Germany (BALM)	Book your trip via the online portal of German national toll provider Toll Collect . This is possible up to 24 hours in advance of the trip.	Link DE	No	Yes	No	Yes
German tunnels (Herrentunnel and Warnowquerung)	Use the local service provider for manual payment via cash or card.	Warnow crossing Herrentunnel	Yes	Yes (Herrentunnel just Fleet cards)	No	No
France (ASFA)	Use the alternative lane on motorways for manual toll collection. The toll can be paid by cash or by card.		Yes	Yes	Yes	No
Hungary (NUSZ)	Buy a road ticket / vignette via the internet and at a point of sales.	Link HU	Yes (at POS)	Yes	n/a	Yes
Italy (AISCAT)	Use the alternative lane on motorways for manual toll collection. The toll can be paid by cash or by card.		Yes	Yes	Yes	No
Poland (KAS)	Download the "e-TOLL PL" mobile app. The app will transform your mobile device into an OBE which can be used for tolling purposes in Poland. Be aware that the mobile app must be paired with your own private e-TOLL account.	Link PL	Yes (Pre-paid account top-up at POS)	Yes (Linked to private account of end-customer)	No	Yes
Portugal (APCAP)	Use the alternative lane on motorways for manual toll collection. The toll can be paid by cash or by card.		Yes	Yes	Yes	No

Skandinavian bridges (Øresund and Storebælt)	Pay manually at the Toll Plaza. This is valid both at Øresund and at Storebælt bridge.		Yes (Yellow lanes)	Yes (Blue and yellow lanes)	Yes (Yellow lanes)	n/a
Slovakia (NDS)	Get a local OBU from Skytoll (prepay and postpay available). A registration upfront is recommended but not necessary. The OBU can be picked up at a POS.	Link SK Link POS	Yes	Yes	No	No
Switzerland (BAZG)	The vehicle must be registered by the driver at a customs office when entering Switzerland or the Principality of Liechtenstein for the first time. The registration form must be completed on the basis of the vehicle documents. The driver is then issued with a vehicle-specific identification card (ID card), which enables simple and quick clearance at the border. At the next entry, the driver must register the entry using the ID card and stating the mileage and trailer condition. The following means of payment are possible: fuel card, cash payment incl. debit and credit cards (e.g. Maestro or VISA card), <i>Note: A payment method processing fee of CHF 10.00 will be charged for the immediate issue of the receipt.</i> The printed receipt must be carried in the vehicle during the entire journey and presented at controls. On exit, the receipt must be filled in by hand with the exit mileage and signed by the driver.	Link CH	Yes	Yes	Yes	No
Spain (SEOPAN)	Use the alternative lane on motorways for manual toll collection. The toll can be paid by cash or by card.		Yes	Yes	n/a	n/a

5.6 Toll service specifics Germany



INFORMATION ON THE TOLL SERVICE GERMANY-BALM

Specifications for the toll service Germany-BAG (DEbag) and information about exemptions from the toll:
https://www.balm.bund.de/EN/Home/home_node.html;jsessionid=348A91D055499A265AB98BF8C8EC41FC.11ve11311

Service specific changeable parameters

For the toll service Germany (DEbag) the driver must update the following parameters on the OBU according actual state:

- Number of trailer axles
- Current gross train weight. The current gross train weight (GTW) is the maximum permissible combined weight of the tractor and the currently attached trailer.

CO2 class:

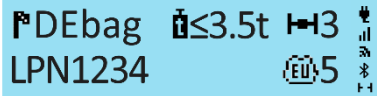
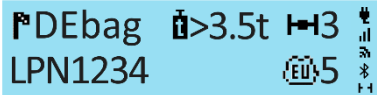
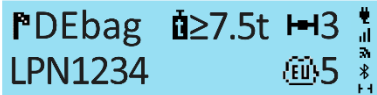
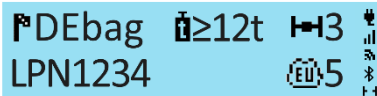
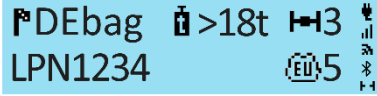
The CO2 emission class of a vehicle between 1 and 5 according 1999/62/EC Article 7ga as stated in vehicle papers or calculated based on defined parameters. If the value is unknown, the CO2-class is set to "0" and price calculation is done based on the worst and most expensive class "1".

Axles: the current, actual total number of axles for the vehicle combination (tractor unit + trailer) is displayed, which may change depending on the attached trailer and therefore the trailer axles must be configured separately by the driver via the OBU.

Weight: The new, current gross train weight must be updated, when attaching a trailer to the tractor unit. The current gross train weight (GTW) is the maximum permissible combined weight of the tractor and the currently attached trailer.

When selecting the weight range via the OBU menu, e. g. $\geq 7.5t$ and $< 12t$, the lower value will be displayed on the OBU screen.

Examples for displayed weight on the OBU for DEbag:

DEbag, weight less / equal 3.5t → $\leq 3.5t$	
DEbag, weight between 3.5t and 7.5t → $> 3.5t$	
DEbag, weight between 7.5 and 12t → $\geq 7.5t$	
DEbag, weight between 12t and 18t → $\geq 12t$	
DEbag, weight more than 18t → $> 18t$	

5.7 Toll service specifics Belgium



INFORMATION ON THE TOLL SERVICE BELGIUM-VIAPASS

Specifications for the toll service Belgium-Viapass (BEvia) can be found under: www.viapass.be/en/downloads/

Information about exemptions from the toll

Certain vehicles are exempted from the toll. The exemption must be requested from the relevant regional services. Please refer to:

www.viapass.be/en/downloads/exemptions-clarified/

Service specific changeable parameters

For the service domain Belgium (BEvia) the driver does not have to change any specific parameters on the OBU.

Note on classification for missing parameters

If the vehicle parameters "maximum permissible gross vehicle weight" and "Euro emission class" are not available for a vehicle or if they are not adequately documented, the vehicle is classified as follows:

- Vehicle weight as „gross vehicle weight over 32 t“
and
- Vehicle category „other Euro emission class“.

Subsequent evidence, e. g. to the emission class of the vehicle, cannot be considered retroactively for already driven kilometers.

5.8 Toll service specifics Bulgaria



INFORMATION ON THE TOLL SERVICE BULGARIA-BGRIA

The use of motorways and some 1st - 3rd class roads is subject to toll charges for vehicles in Bulgaria as well as crossing some bridges and transport vehicles using the ferry. Toll is collected for road vehicles for the carriage of goods or passengers of a total technical permissible maximum mass exceeding 3.5t by the satellite-based toll system (GNSS).

Specifications for the toll service Bulgaria (BGria) can be found under: <https://www.bgtoll.bg/en/toll-en>

Bulgarian language

In the event that the customer requires information on the Bulgarian tollcharger in Bulgarian the customer can contact:

e-mail: support@tollpass.bg and
Telephone: (call center) +359884005500.

Service specific changeable parameters

In the toll service Bulgaria (BGria) the driver has to update the following parameters on the OBU according actual state:

- Trailer axles

5.9 Toll service specifics France



INFORMATION ON THE TOLL SERVICE FRANCE

Toll Service France includes all tolling in France (which is part of the TIS-PL system) and selected truck parking lots. Specifications for the toll service France TIS PL „Télépéage Inter-Sociétés Poids Lourds“ (FRTis) can be found under: www.autoroutes.fr/index.htm?lang=en



Service specific changeable parameters

In the toll service France TIS PL the driver must update the following parameters on the OBU according actual state:

- Trailer axles

The OBU displays also the gross combination weight (maximum permissible gross vehicle weight of both, tractor and trailer together) and the emission class, they are not changeable on the OBU.

Different types of toll lanes

Take the lane  or, if there is none, take the lane  when leaving or joining the motorway.

If the lane has a height restriction bar, then the lane is exclusively for light vehicles with a height less than 2 metres (Category 1, light vehicle). If the lane does not have a bar, it can be used by any vehicle.

There are also some toll booths with “Tempo 30 lanes”, which allow a faster passage. This lane can be driven through at a speed of up to 30 km/h and the OBU will automatically be recognized when you drive up to the toll lane if the OBU is properly positioned in the vehicle.

Correct use of the toll lane

Drive at walking pace to ensure the OBU can be successfully recognized (it beeps). Keep a minimum distance of 4 metres from the vehicle ahead of you. Look for the green light, which signals a successful drive through. If the barrier is already open as you approach it, do not proceed until the green light shows. Look out for motorway personnel who may cross the toll lane.

Correct use of the Free Flow Toll lane

The free flow station is a station without barriers, where the driver do not have to stop. Please follow the instructions given by the toll charger to use correctly the free flow lane.

5.10 Toll service specifics Austria



INFORMATION ON THE TOLL SERVICE AUSTRIA

Specifications for the toll in the toll service Austria Asfinag (ATasf) can be found under:
www.asfinag.at/toll/go-box-for-hgv-and-bus/european-electronic-toll-service/

Service specific changeable parameters

For the toll domain Austria (ATasf) the driver must update the following parameters on the OBU according actual state:

- Number of trailer axles

Verification

The driver takes care for the correct installation of the OBU and observes the signalisation of the OBU. In case of disturbances (sign of malfunction when passing a toll station) the driver must contact the Service Partner.

Beep

Each successful transaction is reflected by one beep of the OBU when passing a toll station. If the signalisation does not emit one beep, the driver is obliged to go to the next Go Maut Sales Point.

Vehicle declaration

In Austria the driver is obliged to carry a vehicle declaration similar to the following example and to show it in case of enforcement for identification. He receives this declaration via his Service Partner.

The vehicle declaration must be verified by the user before the usage of the OBU. For each change of vehicle characteristics (e.g. license plate number, Euro class, engine characteristics) a new vehicle declaration must be delivered by the Service Partner.



<u>Nur zur Verwendung im österreichischen Mautgebiet!</u> <u>Use in the Austrian toll system only!</u>	
EETS On Board Unit	
Vertragspartner / contract partner: Sales Partner GmbH Road 3 12345 City Germany	
FAHRZEUGDEKLARATION VEHICLE DECLARATION	
Ausstellungsdatum / Issuing Date	23/09/21 14:39:22
Kfz-Kennzeichen / License Plate	LPN123LPN
Nationalität / Nationality	CZ
PAN	608711523424523454235234
OBU S/N	000070001026996
OBU ID	9400070007000FABB4
Antriebsart / Engine Characteristics	4 - Diesel
Emissionsklasse / Euro Emission Class	6
Achsanzahl (Zugfahrzeug) / Number of Axles (Tractor)	2
Europäische Fahrzeugklasse / European Vehicle Class	5
Service Provider	Toll4Europe GmbH Nymphenburger Str. 3c 80335 München Germany

Nutzungshinweise

Bitte überprüfen Sie vor Fahrtantritt, ob die oben angeführte EETS On Board Unit in dem oben angeführten Kfz ordnungsgemäß montiert wurde. Die Fahrzeugdeklaration ist vom Fahrzeuglenker während der Fahrt mitzuführen. Durch jedwede Änderungen der oben angeführten, registrierten Daten verliert diese Fahrzeugdeklaration ihre Gültigkeit. Änderungen sind umgehend bekanntzugeben. Auskunft zur EETS On Board Unit erteilt ihr Vertragspartner. **Diese Fahrzeugdeklaration ist ausschließlich zur Verwendung mit dem österreichischen Mautsystem der ASFINAG vorgesehen.**

OBU ID

Advice for usage

Before starting your trip, please check if the above mentioned EETS On Board Unit has been mounted properly in the vehicle referred above. The vehicle driver must carry the vehicle declaration on the board during the trip. With any change of the above data this vehicle declaration loses its validity. Any changes have to be reported immediately. Information about your EETS On Board Unit will be delivered by your contract partner only. **This vehicle declaration shall only be used in the Austrian toll collection system ASFINAG.**

PAN

Figure 16: Vehicle declaration Austria

5.11 Toll service specifics Spain and Portugal



INFORMATION ON THE TOLL SERVICES PORTUGAL AND SPAIN

Specifications for the toll in the toll service Spain (ESvia) can be found under:

www.viat.es

Specifications for the toll in the toll service Portugal (PTvve) can be found under:

www.viaverde.pt

Toll lanes: In Portugal, the "ViaVerde" lane must be used, on which the vehicle is recognized and the toll calculation is automatically transmitted to the Service Partner.

Service specific changeable parameters

For the toll services Portugal (PTvve) and Spain (ESvia) the driver should update the following parameters on the OBU according actual state:

- Number of trailer axles

Correct use of the toll lanes (Spain)

Drive at walking pace to ensure the OBU can be successfully recognized (it beeps). Keep a minimum distance of 4 meters from the vehicle ahead of you. Look for the green light, which signals a successful drive through. If the barrier is already open as you approach it, do not proceed until the green light is shown. Look out for motorway personnel who may cross the toll lane.

Correct use of the toll lanes (Portugal)

Via Verde lanes have no barriers and the vehicles are allowed to drive with a maximum speed of 60 km per hour. Keep a minimum distance of 4 meters from the vehicle ahead of you. Look for the green light, which signals a successful drive through. Look out for motorway personnel who may cross the toll lane.

Correct use of the Free Flow Motorways

These motorways are equipped with toll gantries. When you approach a toll gantry it is not necessary to decelerate, please respect the maximum speed of motorway.

5.12 Toll service specifics Hungary



INFORMATION ON THE TOLL SERVICES HUNGARY

In the distance-based HU-GO electronic toll system in Hungary toll is required to be paid for all cargo vehicles and towing vehicles with a maximum permissible gross weight exceeding 3.5 tonnes, tractors (including semi-trailer towing vehicles), and all articulated vehicle combinations consisting of such a motor vehicle and a towed trailer or semi-trailer. The toll must be paid on expressways and some main roads. The electronic HU-GO system is a satellite-based toll system (GNSS).

Specifications for the toll service Hungary (HUgo) can be found under:

<https://www.hu-go.hu/articles/category/news>

Service specific changeable parameters

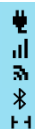
In the toll service Hungary (HUgo) the driver has to update the following parameters on the OBU according actual state:

- Trailer axles

Please note the following when axles changing:

After an axle change in Hungary (and only in Hungary) the OBU transmits the change to the backend. Normally the answer from the backend will arrive quickly. But if it takes longer than 15 seconds (e.g. due to bad GPRS connection) the OBU will turn red and shows the warning message "Axles changed. Transmission running.". In this case the driver has to wait until the OBU turns green and the warning message disappears before he can continue his drive.

Axles changed.
Transmission running.



5.13 Toll service specifics Switzerland



INFORMATION ON THE TOLL SERVICES SWITZERLAND

Specifications for the toll service Switzerland (CHlsv) can be found under:

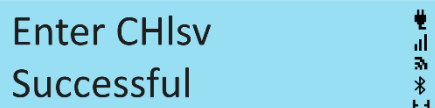
<https://www.ezv.admin.ch/ezv/en/home/information-companies/transport--travel-documents--road-taxes/heavy-vehicle-charges--performance-related-and-lump-sum-.html>

- The Swiss toll (LSVA = leistungsabhängige Schwerverkehrsabgabe = performance-related heavy vehicle charge) is a federal tax levied on the basis of total **weight**, **emission** level and the **kilometers** driven.
- DKV BOX EUROPE can be used for the performance-related heavy vehicle charge **for non-Swiss and non-Liechtenstein registered** vehicles.
- The toll is charged in the entire public road network of
 - Switzerland
 - the Principality of Liechtenstein
 - the German enclave of Büsingen
 - the Italian enclave of Campione d'Italia
 - on the Basel-Mulhouse airport customs road
- Not included is the tunnel "Great St. Bernard"

Please note the following in Switzerland:

Once you enter Switzerland, every driven kilometre is counted and invoiced. Toll is charged on all road types.

After the OBU crossed the entry gate in Switzerland and the entry was confirmed by the gate the screen displays "Enter CHlsv Successful" for 10 seconds. For more information please read chapter 6.3 "Specific OBU display messages while driving in Switzerland".



Service specific changeable parameters

For the toll service Switzerland (CHlsv) the driver should update the following parameters on the OBU according actual state:

- Trailer weight
- Axles trailer
- Transport mode

Please refer to chapter 5.2.

Trailer weight declaration

Depending on the weight and the type of trailer used, the trailer declaration leads to different tariff calculations. The so-called "decisive weight" is calculated as follows:

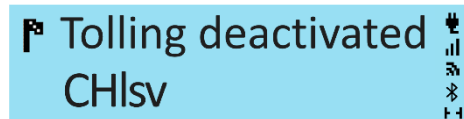
- In case of a truck with trailer:
 - Total weight of the tractor (F2) plus total weight of the trailer (F2) or
- In the case of a semi-tractor with semi-trailer:

Unladen weight (tare weight) of the tractor (G) plus total weight of the semi-trailer (F2).

- If the combination of tractor and trailer exceeds the national weight limit (max. 40 tons), 40 tons will be used as the governing weight.

Transport mode

If the truck travels on a train the driver must put the OBU in transport mode to avoid charging. See chapter 5.2 OBU Settings “Non-self-driven mode for toll service Switzerland (CHlsv)” for details.



5.14 Toll service specifics Italy



INFORMATION ON THE TOLL SERVICES ITALY

Specifications for the toll in the toll service Italy (ITSit): the network includes the toll chargers and toll domains listed in the following:

Pos.	Toll Charger	Motorway / toll domain
1	AUTOSTRADE PER L'ITALIA S.p.A.	A1, A4, A7, A8-A9, A10, A11, A12, A13, A14, A16, A23, A26, A27, A30
2	SOCIETÀ AUTOSTRADA TIRRENICA p.A.	A12
3	RACCORDO AUTOSTRADALE VALLE D'AOSTA S.p.A.	A5
4	STRADA DEI PARCHI S.p.A.	A24, A25
5	AUTOSTRADA ASTI-CUNEO S.p.A.	A33
6	SALERNO POMPEI NAPOLI S.p.A.	A3
7	TANGENZIALE DI NAPOLI S.p.A.	A56
8	MILANO SERRAVALLE-MILANO TANGENZIALI S.p.A.	A7, A50, A51, A52, A53, A54
9	AUTOSTRADA TORINO-IVREA-VALLE D'AOSTA S.p.A.	A4, A5, A55
10	AUTOVIE VENETE S.p.A.	A4, A23, A28, A34, A57
11	AUTOSTRADA BRESCIA-VERONA-VICENZA-PADOVA S.p.A.	A4, A31
12	AUTOSTRADA DEL BRENNERO S.p.A.	A22
13	SOCIETA AUTOSTRADA TORINO ALESSANDRIA PIACENZA S.p.A.	A4
14	SOCIETA AUTOSTRADA TORINO ALESSANDRIA PIACENZA S.p.A.	A21
15	SOCIETA DI PROGETTO AUTOVIA PADANA S.p.A.	A21
16	SOCIETA' AUTOSTRADE VALDOSTANE S.p.A.	A5, Racc. A5-SS27
17	SOCIETA' AUTOSTRADA LIGURE TOSCANA S.p.A.	A12
18	SOCIETA' AUTOSTRADA LIGURE TOSCANA S.p.A.	A15
19	AUTOSTRADA DEI FIORI S.p.A.	A6
20	AUTOSTRADA DEI FIORI S.p.A.	A10
21*	CONSORZIO PER LE AUTOSTRADE SICILIANE	A18, A20
22	SOCIETA' ITALIANA TRAFORO AUTOSTRADALE DEL FREJUS S.p.A.	A32
23	CONCESSIONI AUTOSTRADALI VENETE S.p.A.	A4, A57, Raccordo Marco Polo
24	SOCIETA DI PROGETTO BREBEMI S.p.A.	A35
25	AUTOSTRADA PEDEMONTANA LOMBARDA S.p.A.	A36, A59, A60
26	TANGENZIALE ESTERNA S.p.A.	A58
27	SUPERSTRADA PEDAGGIO PEDEMONTANA VENETA S.p.A.	Vicenza – Treviso

The toll domain "ITSit" includes the toll chargers and toll domains listed in the table above with the exception of:

- the Montblanc Tunnel (Societa'italiana per azioni per il traforo del Monte Bianco),
- the Great St. Bernhard Tunnel (Societa'italiana traforo Gran San Bernardo S.p.A.),
- the Frejus Tunnel (Societa' Italiana Traforo Autostradale Del Frejus S.I.T.A.F.),
- *the above mentioned toll domain 21 of the toll charger
 - „Consortio per le Autostrade Siciliane“ (A18, A20).

Service specific changeable parameters

For the toll service Italy (ITSit) the driver should update the following parameters on the OBU according actual state:

- Number of trailer axles

Important information regarding failed payment in semi-closed systems - „Mancato Pagamento“:

If, while driving through a lane exclusively reserved for the electronic toll service, the traffic light is red and/or the barrier does not go up, the driver must stop and press the help button on the column to request assistance. In this case, the Toll Charger will initiate the credit recovery procedure ("Mancato Pagamento"). For the passage on all other types of freeways, payment can be made in the designated way (cash and/or approved cards).

A „Rapporto di Mancato Pagamento Pedaggio – RMPP“ (English: receipt of missing payment) is issued to the driver, if - at the moment of the exit - no toll payment device (OBU) can be used for toll payment. In this case, the driver will receive the "Mancato Pagamento" and must pay subsequently. The reason for this can be a failed OBU registration or if the wrong lane is used.

No electronic trip detail data is created for these manual transactions. It is the responsibility of the customer to pay the receipt within the deadlines specified (between 5 and 15 days). A failure to comply to this will result in high penalties.



Figure 17: Sample of a voucher for outstanding payment

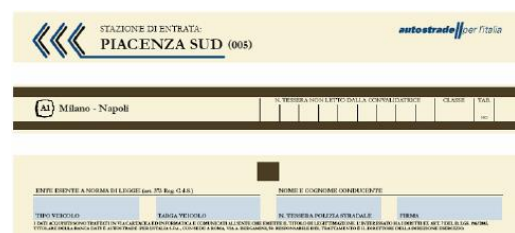
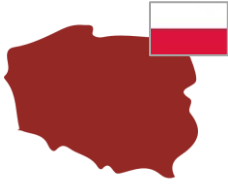


Figure 18: Sample of a toll ticket

5.15 Toll service specifics Poland



INFORMATION ON THE TOLL SERVICES POLAND

Specifications for the toll service Poland (PLeto) can be found under:

<https://etoll.gov.pl/en/heavy-vehicles/>

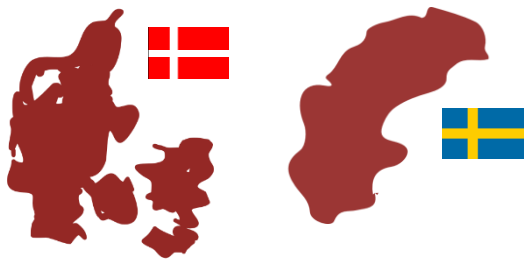
- The e-TOLL system in Poland is applicable for all vehicles with a maximum permissible gross weight above 3.5 tons.
- The e-TOLL system covers the state-owned toll roads in Poland with a total of more than 3.000 km of motorways and expressways.
- The tariffs are dependent on the EURO Emission Class, the maximum permissible gross weight of the vehicle combination and the vehicle type (bus / truck).

Service specific changeable parameters

In the toll service Poland (PLeto) the driver can update the following parameters on the OBU according actual state (optional):

- Current gross train weight. The current gross train weight (GTW) is the maximum permissible combined weight of the tractor and the currently attached trailer

5.16 Toll service specifics Denmark and Sweden



INFORMATION ON THE TOLL SERVICES DENMARK AND SWEDEN

Specifications for the toll service Denmark – Storebælt bridge (DKbri) can be found under:

<https://storebaelt.dk/en/>

Specifications for the toll service Sweden – Øresund bridge (DKbri) can be found under:

<https://www.oresundsbron.com/en/start>

Service specific changeable parameters

For the toll domain Storebælt and Øresund (DKbri) the driver do not have to update any parameters on the OBU.

Verification

The driver takes care for the correct installation of the OBU and observes the signalisation of the OBU. In case of disturbances (sign of malfunction when passing a toll station) the driver must contact the Service Partner.

Beep

Each successful transaction is reflected by one beep of the OBU when the barrier opens at a toll plaza.

Vehicle declaration

In Denmark and Sweden the driver is obliged to carry a vehicle declaration similar to the following example. He receives this declaration via his Service Partner. In case that the barrier does not open automatically, please show the vehicle declaration to the personnel at the toll plaza for identification.

The vehicle declaration must be verified by the user before the usage of the OBU. For each change of vehicle characteristics (e.g. license plate number, Euro class, engine characteristics) a new vehicle declaration must be delivered by the Service Partner.

Nur zur Verwendung an den Mautstellen Storebaelt (DK) und Öresund (SE/DK)!
Use at the toll plazas of Storebaelt (DK) and Öresund (SE/DK) only!

EETS On Board Unit

Vertragspartner / contract partner:
Sales Partner GmbH
Road 3
12345 City
Germany


**FAHRZEUGDEKLARATION
VEHICLE DECLARATION**

Ausstellungsdatum / Issuing Date	23/09/21 14:39:22
Kfz-Kennzeichen / License Plate	LPN123LPN
Nationalität / Nationality	CZ
PAN	608711523424523454235234
OBUS/N	000070001026996
OBUID	9400070007000FABB4
Antriebsart / Engine Characteristics	4 - Diesel
Emissionsklasse / Euro Emission Class	6
Achsanzahl (Zugfahrzeug) / Number of Axles (Tractor)	2
Europäische Fahrzeugklasse / European Vehicle Class	5
Service Provider	Toll4Europe GmbH Nymphenburger Str. 3c 80335 München Germany

Nutzungshinweise

Bitte überprüfen Sie vor Fahrtantritt, ob die oben angeführte EETS On Board Unit in dem oben angeführten Kfz ordnungsgemäß montiert wurde. Die Fahrzeugdeklaration ist vom Fahrzeuglenker während der Fahrt mitzuführen. Durch jedwede Änderungen der oben angeführten, registrierten Daten verliert diese Fahrzeugdeklaration ihre Gültigkeit. Änderungen sind umgehend bekanntzugeben. Auskunft zur EETS On Board Unit erteilt ihr Vertragspartner. Diese Fahrzeugdeklaration ist ausschließlich zur Verwendung an den Mautstellen Storebaelt (DK) und Öresund (SE/DK) vorgesehen.

OBUID



Advice for usage

Before starting your trip, please check if the above mentioned EETS On Board Unit has been mounted properly in the vehicle referred above. The vehicle driver must carry the vehicle declaration on the board during the trip. With any change of the above data this vehicle declaration loses its validity. Any changes have to be reported immediately. Information about your EETS On Board Unit will be delivered by your contract partner only. This vehicle declaration shall only be used at the toll plazas of Storebaelt (DK) and Öresund (SE/DK).

PAN




Figure 19: Vehicle declaration Denmark and Sweden (DKbri)

5.17 Toll service specifcs Slovakia



INFORMATION ON THE TOLL SERVICE SLOVAKIA

Specifications for the toll service Slovakia can be found under:

<https://www.emyto.sk/en/>

- The tolling system in Slovakia is applicable for all vehicles with a maximum permissible gross weight above 3.5 tons.
- The tolling network covers the state-owned toll roads in Slovakia with a total of more than 17.700 km.
- The tariffs are dependent on the road classification, EURO Emission Class, the maximum permissible gross weight of the vehicle combination, the vehicle type (bus / truck) and the number of axles of the Toll Vehicle. For vehicles with all-electric drive, the toll tariff for the emission class with the lowest emission limit shall apply.

Service specific changeable parameters

In the toll service Slovakia (SKmyt) the driver has to update the following parameters on the OBU according actual state:

- Trailer axles

6 Driving with the OBU

6.1 Start the OBU

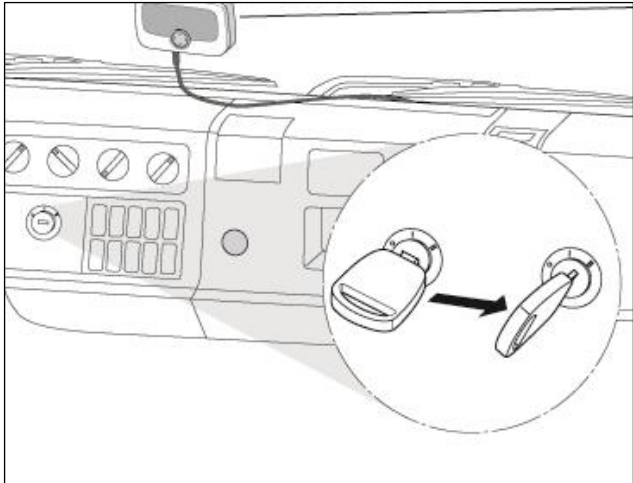


Figure 20: Start the OBU

- Turn on the ignition of your vehicle. The OBU starts to boot automatically.
- The boot information will be shown in the display. The status indicator shows the status of the OBU.
- The initial configuration and activation of the OBU is done automatically. The vehicle data for this OBU is provided according to the registration data provided by your Service Partner.
- Please note, the OBU indicates the corresponding EETS Service depending on your place of location.

	Welcome... please wait.
	Waiting for personalization
	Not ready
	DEbag t ≥7.5 3 ABCDEF12 EU5

The EETS Service is detected and the display shows the start screen with the corresponding EETS Service.



Before you start to drive:
Please, check the shown vehicle data: License plate number, number of axles.
Please, check the relevant settings for the corresponding EETS Service.
Change the settings if necessary, see chapter 5.2 OBU Settings:

- Number of axles
- Current gross train weight.

	DEbag t ≥7.5 3 ABCDEF12 EU5
--	---------------------------------

The OBU is ready for operation.
You can start driving.



Searching for GPS

In some cases, the EETS Service cannot be detected if the GPS reception is too low. In this case, please, move the vehicle shortly forwards to get a better GPS reception.



Not ready
Searching for GPS

If there is no GPS reception or a failure of GPS reception during driving the LED turns red, if the failure takes more than 30 minutes.

For any other information shown on the display, please, check chapter 7 Troubleshooting. If you would like to change some settings in the OBU, e.g. the language, please, go to chapter 5.1 OBU Menu Structure.

Hint: If you stop driving for longer than 30 minutes the OBU goes to sleep mode. It starts again automatically when the vehicle starts to move (see below).

6.2 Operation modes

Standard mode:

The OBU is in standard mode during driving. All data is available and the OBU is ready for operation. If the OBU detects vehicle movement it is ready to measure the driven kilometers. The status is shown in the display and the driver will be informed about status changes and changes depending on the current location.

Sleep mode:

Flexible installation: If the OBU detects no vehicle movements for 30 minutes it shuts down to sleep mode. If the vehicle starts to move the OBU will be in the standard mode after a few seconds.

Fix installation: The OBU shuts down to sleep mode after the ignition is switched off for longer than 30 minutes. If the ignition is switched on the OBU will be in the standard mode after a few seconds.

Power save mode:

Flexible installation: The OBU switches to power save mode after the power cable is disconnected from the cigarette lighter. The display will be dimmed. The OBU is still ready for operation. Please, consider the battery loading status during driving.

Permanent installation: The OBU switches to power save mode after switching off the ignition. The display will be dimmed.

Transportation mode/switched off:









The OBU is shipped to the customer in transportation mode. It has to be connected to electricity to get activated.

Also if the OBU is not connected to a power supply and the battery loading gets below a defined level, the OBU shuts down and switches itself off. Also in this case the OBU will only wake up, when connected to electricity.



6.3 OBU Display Information

Depending on the vehicle's location, the OBU indicates the relevant information during the trip. The registration for the corresponding EETS Service will be detected as well as the toll liable parameters.



OBU display information while driving in a booked EETS Service

	DEbag t ≥12  2 ABCDEF12 EU5	Start display. You can drive after you have checked or entered the relevant vehicle parameters.
	BEvia t 15.8  - ABCDEF12 EU5	You are driving in a booked Service (here Belgium) where the vehicle parameter "number of axles" is not a liable toll parameter. You can continue your drive.
 	ATasf t -  4 ABCDEF12 EU5	The buzzer beeps once. In some toll services a sound signal is requested by the national toll charger after passing a toll gantry and a transaction was performed. You can continue your drive.
	Searching for GPS.	The message is displayed if there is no GPS signal reception. If no GPS signal is received for more than 30 minutes, the LED turns red.

OBU LED and displayed messages while driving outside a booked EETS service

	No Service provided. Use local toll provider.	You are driving in a service area, for which the DKV Euro Service EETS service is not available or the OBU does not recognize the area as a toll domain, and thus does not perform any toll charging. Please, check if you must use another On Board Unit / tolling equipment of another service provider for toll charging.
	Service not booked or activated.	Shown while driving in a known but unbooked EETS service: You are driving in a toll domain, for which the toll service is not booked or the booking process is not yet completed (service not activated). Check if the service should be booked via your Service Partner.

Specific OBU display messages while driving in Switzerland

	Enter CHlsv Successful	The message is displayed after the vehicle passed the entry gate in Switzerland and the entry was confirmed by the gate.
	Enter CHlsv Failed!	The message is displayed after the vehicle passed the entry gate in Switzerland and the entry was NOT confirmed by the gate. In this case the OBU is not actively tolling and the driver has to go to the manual ticket machine before passing the border checkpoint.



Tolling deactivated
CHIsv

You are driving in non-self driven mode (e.g. vehicle loaded on a train).
The OBU is not actively tolling. Non-self-driven kilometers not counted for
charge calculation.

You can have a look on further information on warning messages or on solving certain problems of the OBU in
chapter 7 Troubleshooting.

6.4 Examples for driving across different EETS services



While travelling through Europe the OBU indicates if an EETS Service is booked for the local toll domain and
determines depending on the configured parameters (axles, weight) the amount of toll to be paid.



The number of axles and the current gross train weight must be declared by the driver depending
on the vehicle train and the EETS domain.

In the following, two exemplary road trips through European toll systems will be shown. You can follow the
changes during the trip on the OBU display.

Example 1: EETS Services are booked for Belgium (Viapass) **and** for Germany (BAG).
Vehicle parameters are: gross vehicle weight between 3.5 t and 7.5 t without trailer.
The vehicle is obliged to pay toll in Belgium.
The vehicle is not obliged to pay toll in Germany because the current gross train weight is
below 7.5 t.

Route	Information in the display	Explanation
Driving in Belgium	 <div> BEvia t 6.9  - ABCDEF12 EU5 </div>	The start display shows the active EETS Service and the related parameters.




Example 2: EETS Services **are booked for Belgium** (Viapass) but **not** for Germany (BAG) and not for the Czech Republic.

Vehicle parameters are: gross vehicle weight is 7.5t without trailer.







The vehicle is obliged to pay toll in Belgium.




The EETS Service for Germany is not booked but the vehicle is liable to pay tolls.

The Czech republic is not connected to EETS.

Route	Information in the display	Explanation
Driving in Belgium	 <div>BEvia t 7.5 I-I - ABCDEF12 EU5</div>	The start display shows the active EETS Service and the related parameters.
Passing the border and driving in Germany	 <div>Service not booked or activated.</div>	After entering Germany, the LED turns yellow because the EETS Service DEbag is not booked. In Germany you are obliged to pay toll. Therefore, you can contact your Customer Service to book the EETS Service on the OBU or use the equipment of the national provider.
Passing the border and driving in the Czech Republic	 <div>No Service provided. Use local toll provider.</div>	You are driving in a service area, which is not bookable / not known to the OBU, so no toll charging is being performed. Please, check if you must use another On Board Unit / tolling equipment of another service provider for toll charging in this domain.

7 Troubleshooting

Status indicator	Information in the display	Possible error	Troubleshooting
	Not ready	The OBU is not completely personalized or has not all data available after an over-the-air-update.	Please, wait a few minutes. The OBU is running the self-check automatically and will then normally start the boot routine again displaying different screen messages. If the OBU does not show a normal start screen at the end of rebooting, please, contact your Customer Service.
	FRtis locked Contact Customer Service	The OBU is locked for the French toll domains (FRtis).	Do not drive with the red OBU, contact your Customer Service.
Status display remains unchanged	Not permitted when driving	Warning for menu operation while driving, e. g. due to an attempt to change parameters.	No attempt must be made to open the menu while the vehicle is moving. In addition, the menu must not be open when the vehicle is started.
	Contact Customer Service	Your OBU asks you to contact the service after your trip.	Please, contact your Customer Service immediately after your trip.
	Searching for GPS...	Depending on your location the GPS signal could be poor, e.g. in a tunnel.	Please, continue your drive for a couple of minutes, e.g. after leaving the tunnel the GPS signal will be available again. If the GPS reception on the toll road does not get better, leave it as soon as possible. After 30 minutes, the LED will turn red. Contact your Customer Service.
	Not ready Searching for GPS	If there is no GPS reception and the failure of GPS reception during driving lasts more than 30 minutes, the LED turns red	Leave the toll road and contact your Customer Service.
	Not ready E04: Invalid Release (Release validity expired)	This could happen if you did not use the OBU for a long time. This message informs you that the status of the OBU release software is expired and must be updated.	Stop the vehicle. Normally OBU will request an update of the release software continuously during booting. Wait for a short time. If you cannot wait no longer or if you have already waited for a

			long time, please, contact your Customer Service and follow the given instructions.
	Service not booked or activated.	You are driving in the area of an EETS Service which is known by . But the EETS Service is not activated on your OBU.	Contact your Customer Service to book the EETS Service on the OBU or use the equipment of the national provider/pay the toll via another provider.
	No Service provided. Use local toll provider.	You are driving in an unknown area without any EETS Services supported by the OBU.	Check if there is an obligation for toll charging in the new area and if you must pay the toll via another provider before continuing your trip. In doubt, contact your Customer Service to get further instructions.
	Customer Service UNKNOWN	The feature of showing the telephone number of a Customer Service is currently not available. Therefore in the Customer Service menu item always shows UNKNOWN.	Please, find the telephone number of your Customer Service on the provided Service Partner web site. Please, note the telephone number of your Customer Service on page 2. Continue your trip.
	Out of Service Defect OBU	This could be a hardware problem	Leave the toll road and contact your Customer Service.

Technical data

Operating temperature	- 40 °C to +85 °C (also ambient storage temperature)
Power supply	Operating power supply 8–32 V DC
Fuse (external)	1 A (in cigarette lighter cable connector) 2 A (before connecting to vehicle electrical system Term 15 and 30), not included
Buffer battery	Coin cell, nominal voltage = 3.0 V
Rechargeable battery	Li-Ion with a nominal voltage of 3.6 V, nominal capacity of 1600 mAh. Charging time: 4 h at 3.0 V to 4.05 V
Power consumption	Power mode “Standby”: 25 mW typ. Power mode “Running”: 450 mW typ.
Supported technologies	GNSS: GPS, GLONASS, Galileo 12 channel high sensitivity GPS receiver with internal antenna GSM: Quad-band GSM module with GPRS (multi-slot class 10) capability DSRC: DSRC interface is in accordance with CEN/TC 278
Dimensions	145 × 93 × 36 mm
Weight	400 g
Protection class	IP42 according to IEC 60529

Conformity declaration



0408

The OBU is conform to European guideline 2014/53/EU (RED) and 2011/65/EU (RoHS).



10R – 04 0012

The OBU satisfies ECE Regulation No. 10.5 - Electromagnetic Compatibility.