TOLLTICKETS

Satellite Onboard Unit OBU 5310 Installation and Operating Manual

Release 01.03.01, Version 03-00

User manuel: OBU-5310
Doc No.: xxx
Version: 03-00
Release date: 2022-04-29
Documente state: Released
Document classification: Österreich

TOLLTICKETS

Table of Content

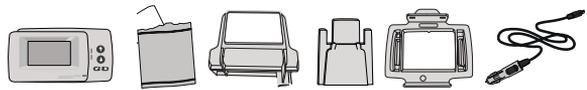# Docking-Station OBU 5310

1. Installation

⚠ CAUTION

The OBU must only be installed in the vehicle for which it is intended as vehicle license plate number and vehicle parameters for this vehicle are personalized in the OBU. It must be positioned visibly and in accordance with the instructions in this manual. The unit must remain installed in the vehicle and must be connected to a power supply:

a) At least 10min before entering the toll liable network to enable the reception of the latest updates
b) At all times when travelling on the toll liable network, including when parked on the network or in an adjoining rest area.

Parts supplied:

1.1. Installation

To avoid that your OBU is disconnected from a power supply, tolltickets has developed a docking station.
Please carefully follow the installation steps below to avoid any damage of the docking station. Be aware that once the small Cable Clip (2) is fixed, it is very difficult to remove it to reinstall the docking station.

Parts of the docking station

| 1 Windscreen Mount | 2 Cable Clip | 3 OBU Holder | 4 Power Cable |

1
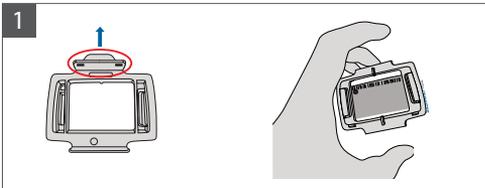
Take your OBU and clip the OBU Holder (3) to the OBU with the small tab on the square positioned upwards

2
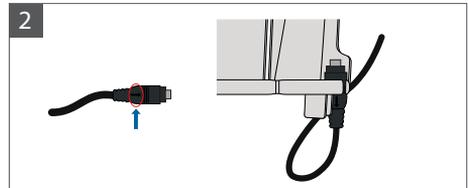
Take the Power Cable (4) and place it on the bottom right of the Windscreen Mount (1) so that the small arrow on the Power Cable (4) is facing you. Please push the Cable (4) all the way to the left.

3
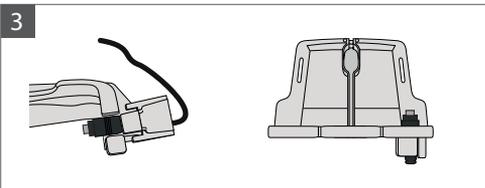
Fix the Power Cable (4) with the Cable Clip (2) – it needs to be pushed from below.

4
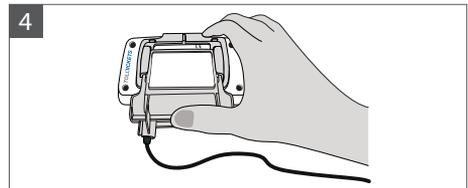
Install the Windscreen Mount (1) [with the fixed Power Cable (4)] by placing it under the OBU and pressing upwards from the bottom.

You can now fix your OBU to your windscreen and your power supply.

1.2. Installation steps:

1	2 Remove the sticker on the backside!	3 Place the device like indicated on the picture!	4 Press OBU for a couple of seconds against the window

2. Power Connection

1 CONNECTION TO THE CIGARETTE LIGHTER SOCKET	2 FIXED POWER

FIXED POWER

Red	+12V/+24V power
Black	+12V/+24V ignition
White earth	

This installation should be carried out by a qualified vehicle workshop.
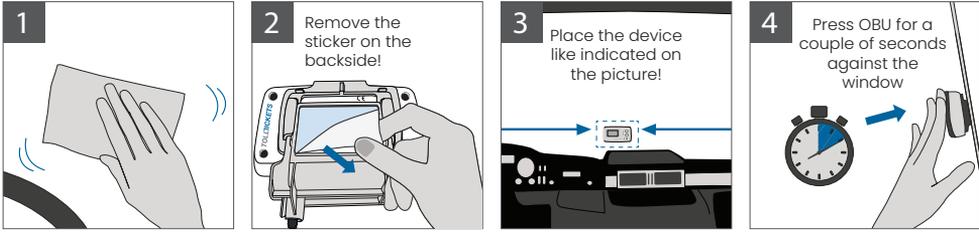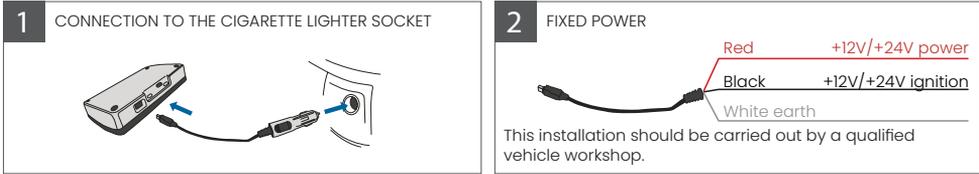
Please note: the OBU must always be connected to the power supply!

2.1. Connection to the cigarette lighter socket

Connect the charging cable supplied to the cigarette ligher socket and make sure:
• The plug is securely connected.
• The charging cable is routed in such a way that the driver is not obstructed.

2.2. Fixed power connection

1. Use the cigarette lighter cable supplied. Make sure the cable is long enough, then remove the lighter plug and any excess cable.
2. Locate the connection points in the vehicle using the diagram below. The black wire should be connected to the vehicle ignition.
3. Before connecting the cables to the vehicle, install a five-amp fuse in series with the power wires (red and black wires). If the vehicle's power supply is already fused, this step is not necessary.
4. Finally, connect each wire to the connection points you have identified (battery, ignition and earth).

INFORMATION

Without a power connection, the OBU in full charge can operate for **2 to 3 hours.** As soon as the display turns off, the OBU is offline and toll payment is not possible anymore. If the vehicle continues to pass through tolled sections, it may be enforced and any fees or fines must be paid by the user.

3. First Switch-On

1 shielded bag old OBU	2
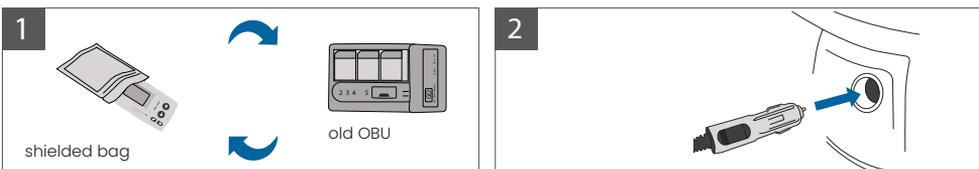
If a tolling device (OBU) for the same toll domain is already installed, please remove it and put it into the device bag of your tolling service provider or any other shielded bag (e.g. alufoil) to prevent it from generating tolling transactions. Ideally the old OBU should be removed from the vehicle. After completing the installation steps, the unit will start when the power cable is connected. In case the message „Waiting for vehicle data" is shown on the display, please wait until the final configuration of the OBU is downloaded. Once the download is completed, the message ‚Waiting for vehicle data' will disappear from the display. v

CAUTION   **INFORMATION**

In order to function properly, the unit must undergo four different activation steps.

1. **Select Language**
2. **Set Number of Axles**
3. **Set Weight**
4. **Check vehicle license plate number**

For your own safety, any interaction with the unit shall only be done when the vehicle is stopped . The buttons are non-operational at speeds above 10 km/h. For a complete overview of the OBU menu structure and navigation of the unit please refer to chapter 4.6: Menu Overview.

3.1. Select Language
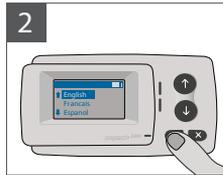
Choose your language using the ↑ and ↓ navigation buttons and confirm by pressing the selection button ✓.

INFORMATION

For a list of supported menu languages and display phrases see Appendix A: Supported Menu Languages.

3.2. Set Axles

CAUTION

Please note, that lifted axles must be included as well! Also make sure to always select the actual and correct number of axles (and the correct weight) before your trip starts. If axles and weight are not correctly set, you risk enforcement procedures and high penalties to be paid by the user.
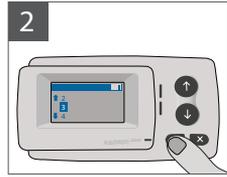
The number of axles can be set in eight different steps. The minimum selectable number corresponds to the number of axles of the tractor vehicle. If you use a trailer, the additional axles of the vehicle combination must be set in increments of one up to a number of 7 trailer axles. **Please always enter the axles number corresponding to the sum of the number of axles of the tractor and the trailer.**

3.3. Set Weight

⚠️ **CAUTION**

Please make sure to always select the correct weight (and the correct number of axles) before your trip starts. If weight and axles are not correctly set, you risk enforcement procedures and high penalties to be paid by the user.

The OBU allows the numerical setting of the weight in Tons in steps of 100kg. Please round up the weight to the next 100kg. You can only select a weight which is between:
- the maximum permissible weight of the tractor (The weight can be found in F.2. on the vehicle certificate and on the vehicle manufacturers plate).
- and the maximum permissible weight of the vehicle combination (The weight can be found in F.3. on the vehicle certificate and on the vehicle manufacturers plate).

The weight to be set must equal the maximum permissible weight of the tractor (F.2. of the tractor) plus the maximum permissible weight of the trailer (F.2. of the trailer currently in use). When entering the weight set submenu (this happens automatically after first switch-on) the weight editor always starts with the highest (most left) digit. The value of the digit can be changed by using the ↑ and ↓ navigation buttons. To move to the next lower digit, use the Selection button ✓. After setting the lowest (most right) digit, confirm the weight selection with the Selection button ✓(press twice until reaching the main menu). In case you want to change a higher digit again, use the Cancel button × to move back to the next left digit.
- the ✓ button allows to navigate on the menu from left to right
- the ↑ and ↓ buttons allow to increment and decrement the values of the weight
- the x button allows to navigate from right to left
- Once the lowest digit is set, a confirmation is required by pressing "✓" button twice to get back to the main menu

The following example shows the weight setting of a vehicle with an F.2 tractor weight of 7,9t if a trailer with F.2 equal to 1,6 tons is hitched up. In this case the actual weight of the vehicle combination to be set is 9,5t.v

Editor starts at the highest digit

Press ✓ to move to the next right digit

Use arrow keys to change the value

Press ✓ to move to the next right digit

5	6	7

Use arrow keys to change the value

Confirm setting by pressing ✓.

Confirm again with ✓ to get back to the main menu

Abb. 11
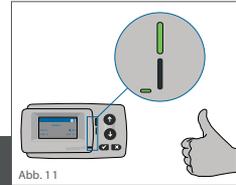
ℹ️ INFORMATION

Your unit is now active. Please wait for the Technical and Contractual status LED to be green. (more information on the LEDs is given in chapter 5: States and Indications.)

3.4. Check Vehicle Licence Plate Number
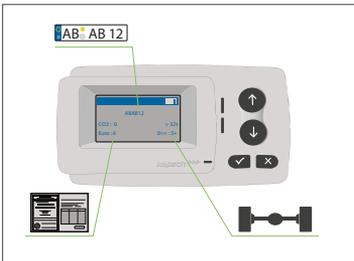
After completing the above settings, the Main Menu is displayed. Make sure that the registration number of the tractor, the number of axles and the vehicle weight correspond to the current vehicle combination.

⚠️ CAUTION

The OBU must not be used in a vehicle whose vehicle license plate number is different from the one shown on the screen. The displayed vehicle license plate number is normalised, i.e. it does not contain spaces and hyphens. Permitted special characters such as Cyrillic letters are replaced b y lower case letters of the Latin alphabet.
Make sure the vehicle license plate number displayed in the Main Menu matches that of the vehicle. If not, contact your service provider and have the license plate number of the vehicle ready .

3.5. Supported toll domains

⚠️ CAUTION

Please note, that only the toll domains which have been activated for your device are visible!

3.6. Caution before Use

CAUTION

- Please refer to Chapter 5.4: "Terms of Use and Safety Instructions".
- The device is only valid for Toll Domains for which you have a signed and valid contract /
- subscription.
- Always set the number of axles and the weight according to the tractor – trailer – combination in use!
- Check and change these parameters in case you remove, add or change a trailer!
- In case the number of axles and weight data are not correctly set, you may undergo
- enforcement actions and may have to pay penalties.
- The registration number displayed must correspond to that of the tractor, see also note in
- chapter 3.4.

4. Operation

4.1. Controls

Arrow keys Up / Down

Cancel or Back

Selection

4.2. LEDs

TEchnical Status LED

Message LED

Contractual Status LED

LED States

| OFF | Green | Green blinking | Red | White |
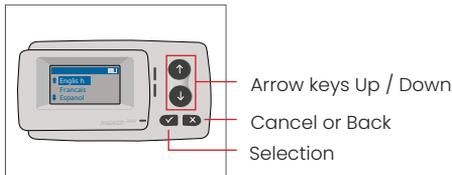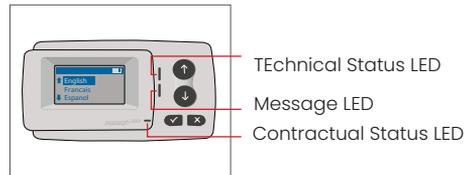
Meaning of the LED states

- The Technical Status LED can be either green, blinking green, or red. • The Message LED is either white or „OFF".
- The Contractual Status LED can be either green or red.
- The green color indicates a normal operational mode.
- The blinking green color indicates a warning. A message is displayed as an indication of what the problem might be. Please refer to the chapter „Error Codes".
- The red color indicates an error. A message is displayed as an indication of what the problem might be and/or support contact information.

4.3. Buzzer

Under normal conditions the buzzer is used to inform about a successful toll transaction at a toll station (OK beep). This indication might not be supported in certain toll domains (for example in the toll domains where the OBU uses a satellite-based technology (GNSS)). An alert with a beep is also given when the OBU status is changed (see States and Indications below).

Action	Beep Sequence	No. of beeps and duration
OK		1x medium
Warning		2x long
Not OK		4x short

4.4. Display

The basic display will be shown as soon as the OBU is active. A banner is shown at the top of the display. The banner is the topmost line with with light lettering against a dark background. When a message is displayed, the specific message banner is used.

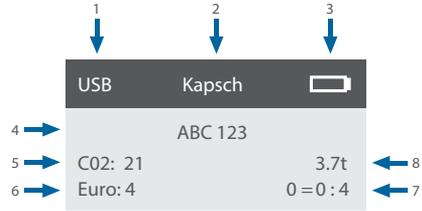|	Field	Description
1	External device connection status or GNSS privacy status	When an external device is connected via USB, the text USB is shown. When GNSS privacy is enabled and no external device is connected, the text "Pr" will be shown.
2	Banner text	This is a configurable header text and typically used for brand name.
3	Battery status	Battery state of charge indicator in steps of 25%
4	LPN	License plate number
5	CO2	CO2 emission class
6	Euro	Euro class
7	Vehicle axles	The value displayed on the main screen is the sum of the tractor and the trailer axles
8	Set weight	The selected weight of the vehicle combination

4.5. Messages

The OBU can display messages from several sources. These messages replace the basic display and are surrounded by a frame. The white Message LED is used to indicate that there is a message on the display. Messages andsupportcontactinformationwillbedisplayedfor15seconds.Afterthatthelastmessagecan be retrieved via the submenu "Latest Msg.".

Generic messages (zone or service messages)

Generic messages can originate from a toll transaction, the toll service provider, when passing a virtual gantry or when entering a certain geographic zone. The text associated with the source contains the three parts (Message type, Text row 1, Text row 2) as shown in the display:

Status messages

The green/red LEDs are used to notify the driver about a change in the OBU status. Additional information will be displayed when the OBU status changes to either WARNING, ERROR CONTRACTUAL, ERROR TECHNICAL or FATAL ERROR (for a detailed description of the OBU states see chapter 5: "States and Indications"). The OBU utilizes standard phrases and configurable parameters to compose the status message (please see chapter 7: "Error Codes" for a detailed description of status messages).

4.6. Menu Overview

The menu can be opened by pushing the Selection button twice. The menu can be scrolled using the arrow buttons. Use the selection button to select a menu option. This will either open a submenu or you can select the option. Use the Cancel button × to exit a submenu and return to the previous one.

Set axles

- N
- N+1
- N+2
- N+3
- N+4
- N+5
- N+6
- N+7

Initiates the Set axles selection sub- menu. The End User will enter the total number of axles in the Set axles sub menu from "N" to "N+7" (N Number of tractor axles)

Set weight

Inititiates the Set weight selection sub-menu. The end user will enter the sum of the F.2 [Tractor] and F.2 [Trailer] using the buttons.

12.3

Weight can be set in tons in steps of 100kg. Example here of 12.3 tons.

OBU status

- Battery — Indicates charging status in %
- SW version — Indicates OBU type and software version
- Activated on — Indicates date and UTC time of last activation
- LPN — Indicates License plate number
- Serial # — Indicates serial number: ID 123456789

Helpdesk #

Displays the support contact data. The text is defined by the service provider.

Latest msg

Displays the latest incoming message

Trip start/stop

trip start/trip stop

This will generate a trip start/stop event which is sent to the central system. The menu item toggles between „trip start" and „trip stop".

Networks

Displays a list of toll domain networks in which the OBU can operate. The list is maintained by the service provider.

Config

- **Language**
  Selection of the OBU operating display language

  English | Français| Español| Deutsch Italiano | Nederland | Polska | Portugés| Čeština

- **Backlight**
  Opens the Backlight settings sub-menu.

  - Auto
  - OFF

  the backlight will not light up for a toll gantry message or a traveler message. The backlight will still be activated when a button is pushed and when an error message is displayed.
  In this menu, it is possible to turn off the automatic backlight to avoid the display lighting up while driving.v

- **GNSS privacy**
  Opens the GNSS privacy settings sub- menu. It is possible to enable or disable sending positioning data related to other transportation services from the OBU to the central system.

  - Enable
  - Disable (default value)

5. States and Indications

The OBU has different statuses defined. The buzzer, the technical status LED and the contractual status LED will be used for signaling status transition. A message on the display gives additional information to the user. If a severe issue is detected, a support contact information will be displayed.

5.1. States and Indications: Driver's Guidance

INFORMATION

- WHITE „Message" LED → please check display or menu "latest msg" to read the message
- RED "Contractual Status & Technical Status" LED → If one of these LEDs turns red, please STOP driving and call your local service provider to investigate the error
- The images below show the indication with the Message LED being active (White)

5.2. OK State

The OBU is fully operational. Driving is allowed. Buzzer sound upon transition to OK state: OK beep (1x medium) LED Indications:
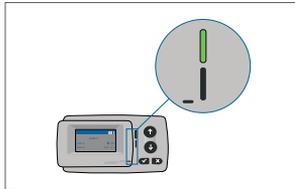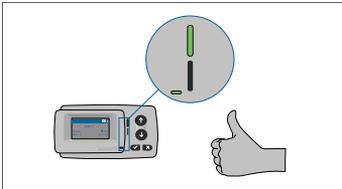- **Technical: OK (Green)**
- **Contractual: OK (Green)**

Messages: only active for incoming generic messages (WHITE)


INFORMATION

For some toll domains the Contractual LED might not be activated. However, this is not an error. It can indeed mean that you must get to a location with GPS coverage.

If a generic message (zone or service message) is received, the Message LED turns White and a message is displayed. After 15 seconds the message disappears and can be retrieved via the submenu "Latest Msg.".

Incoming message in OK state
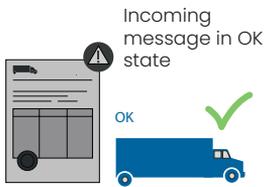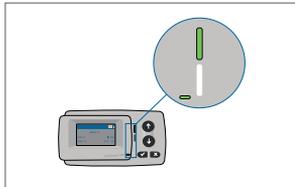
5.3. WARNING State

The OBU is ready to be used for the moment, however there is an issue. A message is displayed as an indication of what might be the root cause. Unless the issue is resolved, the issue might escalate. Buzzer: Warning Beep (2x long)
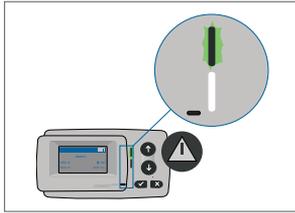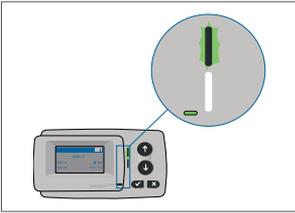
LED indications:
- **Technical: WARNING (Flashing Green)**
- **Contractual: OK (Green)**

Messages: Status message about root cause (WHITE)

INFORMATION

For appropriate action and permission to continue driving please refer to chapter 6: "Error Codes".

WARNING
There is a notification, PLEASE CHECK MENU „latest msg" for messages and error codes!

5.4. CONTRACTUAL ERROR State

The road user does not fulfil his obligations, e.g. is inside a GNSS toll domain without a valid contract. A message is displayed either showing an indication about the root cause of the problem or contact information for support.

CAUTION

If the OBU shows a CONTRACTUAL ERROR, driving in the toll domain you are is not allowed with your OBU. Please use another payment method to pay the toll in this toll domain. You risk enforcement procedures and high penalties to be paid by the user.

Buzzer: NOK Beep (4x short)
LED indications:
- **Technical: as actual technical status of the OBU: WARNING (Flashing Green) or OK (Green)**
- **Contractual: ERROR (Red)**
Messages: Status message about root cause (WHITE)
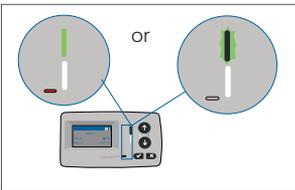
Please call your service provider

WARNING
There is a notification, PLEASE CHECK MENU „latest msg" for messages and error codes!

5.5. TECHNICAL ERROR or FATAL ERROR State

The OBU is not operation properly. The technical issue may be temporary, or the unit must be returned. A message is displayed either showing an indication about the root cause of the problem or contact information for support.

Buzzer: NOK Beep (4x short)
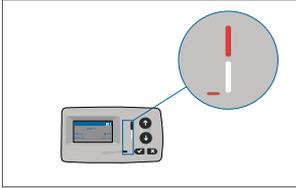**LED indications:**
- **Technical: ERROR (Red)**
- **Contractual: ERROR (Red)**
Messages: Status message (WHITE)

CAUTION

If the OBU shows a TECHNICAL ERROR or FATAL ERROR, driving in a toll domain is not allowed. Please use another payment method to pay the toll in this toll domain. You risk enforcement procedures and high penalties to be paid by the user.

Please call your service provider

WARNING
There is a notification, PLEASE CHECK MENU „latest msg" for messages and error codes!

# 6. Terms of Use and Safety Instructions

6.1. Terms of use

- This device is intended for operation in connection with the tolltickets central system inside EU and the EEA countries which operates toll systems in accordance with the Directive 2019/520/EC
- The device is suitable for being used in the driver's cab of a motor vehicle.
- Installation must be carried out only on the inside of the windscreen in accordance with the specifications in this installation and operating instruction.
- Permitted ambient conditions are -25ºC to + 85ºC and a relative humidity of max. 95%

6.2. Safety instructions

CAUTION

- Only interact with the unit while the vehicle is stopped. The buttons are non-operational at a speed of 10 km/h and above.
- Do not interact with the unit while passing through an automated toll lane.
- Do not write anything on the unit. Fees are charged for soiled or damaged equipment
- when it is returned.
- Do not manipulate the device and do not attempt to open it.
- Do not immerse the device in liquids and protect it from rain and splashing water.
- Do not use the device if it is visibly damaged or defective.
- Do not use the device if any liquids have penetrated or if liquids leak out.
- In the case of use of a fixed connection to the power supply of the vehicle, the installation shall be carried out by technically suitable persons, e.g. in a workshop.
- Mount the device only on the inside of the windscreen and never outside of the vehicle.
- Keep the device away from children.
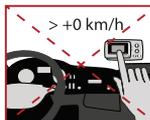
6.3. Disposal

Protect the environment!
Please do not dispose this product in the household waste after use. Return it to your service provider.

6.4. Declaration of conformity

The device complies with the relevant and applicable standards and legal regulations. An up-to-date Declaration of Conformity can be downloaded from the tolltickets website. The download link is given in Appendix B. Download-Information.

7. Error Codes

Code	Error type	Action	Driving?
10000 10009 10010 10011 10022 11000 12001 13001 20034 20035	Technical error	The OBU can not be used for paying tolls in this state. Please use other means to pay tolls! Please call your service partner for OBU replacement.	NO
1002	Device manipulated	The OBU can not be used for paying tolls in this state. Please use other means to pay tolls! Please call your service partner for OBU replacement.	NO
1031	Toll Domain error	The OBU can not be used for paying tolls in this state for THIS TOLL DOMAIN! (Possible reason missing subscription for this specific toll-domain or a failure in the configuration). Please use other means to pay tolls! Please call your service partner for advice.	NO
10003	DSRC battery low	The OBU can still be used for toll payments in this state. However, OBU needs replacement. Please call your service partner for replacement.	YES
10006	Main battery empty	The OBU can not be used for paying tolls while the battery is empty. Plug in on charger and restart the OBU before starting your trip. Please ALWAYS keep your OBU on electricity! When the battery is loaded and no more error, you may use the OBU again.	YES, after restart
10018	Central system connection failed	Please get to alocation with GSM coverage and wait up to 30 minutes. Make sure to always move the OBU to prevent from sleep modus. In case the warning disappears, you can use the OBU if NOT, please call your service partner for advice.	Only if no more error visible
10020	Operational temperature range exceeded	Please temporarily remove the OBU from the windscreen to protect it from sun! In case the error state disappears, you can use the OBU; if NOT, the OBU can not be used for paying tolls, you need to use a different payment method for tolling!	Only if no more error visible
8	Central System connection failed - persistent	Please get to a location with GSM coverage and wait up to 30 minutes. Make sure to always move the OBU to prevent from sleep modus. In case the warning disappears, you can use the OBU if NOT, please call your service partner for advice.	Only if no more error visible
11003 11004	No GPS signal / No continuous GPS signal	Please get to a location with GPS coverage and wait up to 30 minutes. Make sure to always move the OBU to prevent from sleep modus. In case the warning disappears, you can use the OBU if NOT, please call your service partner for advice.	Only if no more error visible
12003	GSM no communication to network	Please get to a location with GMS coverage and wait up to 15 minutes. Make sure to always move the OBU to prevent from sleep modus. In case the warning disappears, you can use the OBU if NOT, please call your service partner for advice.	Only if no more error visible

Code	Error type	Action	Driving?
12004	GSM no communication to network – persistent	Please get to a location with GMS coverage and wait up to 30 minutes. Make sure to always move the OBU to prevent from sleep modus. In case the warning disappears, you can use the OBU if NOT, please call your service partner for advice.	Only if no more error visible
20026	Battery lowindication raised	The OBU can not be used for paying tolls while the battery is empty. Plug in on charger and restart the OBU before starting your trip. Please keep your OBU on electricity AT ALL TIMES! When the battery is loaded and no more error is shown, you may use the OBU again.	Only if no more error visible
20037	Banned OBU	The OBU can not be used for paying tolls in this state! Please use other means to pay tolls! Please call your service partner for advice.	NO

APPENDIX A: Supported Menu Languages

English	Français	Español	Deutsch	Italiano	Nederland	Polska	Portugés	Čeština
Warning	Alerte	Alarma	Alarm	Allarme	Alarm	Uwaga	Alerta	Alarm
Error	Erreur	Error	Fehler	Errore	Fout	Błąd	Erro	Chyba
Empty battery	Batterie vide	Bateria vacía	Batterie leer	Batt. Vuota	Empty battery	Pusta bateria	Bateria vazia battery	Vybitá
Temperature	Température	Temperatura	Temperatur	Temperatura	Temperatuur	Temperatura	Temperatura	Teplota
No GPS signal	Pas de GPS	Sin signal GPS	Kein GPS	No Segnale GPS	No GPS Signal	Brak Sygn. GPS	Sem sinal GPS	Bez GPS signál
GSM failure	Comm GSM KO	Fallo GSM	GSM Fehler	Err. Conn. GSM	GSM failure	Wypadek GSM	GSM failure	Výpadek GSM
Low battery	Batt. faible	Bateria baja	Wenig Batterie	Batt. Scarica	Low battery	Slaba bateria	Bateria f raca	Slabá baterie
Banned OBU	OBU Refusé	OBU Rechazado	OBU blockiert	OBU Bloccato	Banned OBU	OBU Zblokowa.	OBU bloqueado	Zakázaná OBU
DSRC not pers	DSRC non perso	DSRC no persn	DSRC n. pers.	No DSRC persn	DSRC not pers	SRC bes pers.	DSRC not pers	Neperson. DSRC
Decomissioin	Désactiver OBU	Desactivar OBE	Außer Betrieb	OBU Disattiv.	Decommission	OBU dezaktyw.	OBU wylaczone	Vyřazená OBU
No subscript	Pas de contrat	Sin contracto	Kein Vertrag	No Contratto	Green contract	Bez umowy	Sem contrato	Žádná smlouva

APPENDIX B: Download Information

All relevant documents including this one can be downloaded from the tolltickets website. The respective URL can either be accessed by scanning the QR Code below or selecting the URL manually from a web - browser.

Document Description	Download information	QR Code
• Satellite Onboard Unit OBU 5310 Installation and Operating Manual Release 01.03.01 (this document) • Toll Domain specific Information • OBU 5310_01A EU Declaration of Conformity	https://downloads.tolltickets.com	

APPENDIX C: Service Contact Information

Tolltickets: tolltickets GmbH – Kaiserstraße 28, 83022 Rosenheim, Germany

E-Mail: partner@tolltickets.com