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Satellite Onboard Unit OBU 5310 Installation and Operating Manual

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Docking-Station OBU 5310

1. Installation

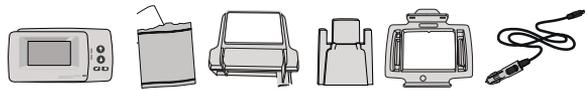


CAUTION

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. Device preparation

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



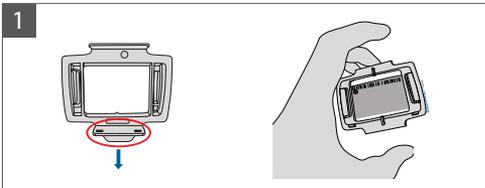
2 Cable Clip



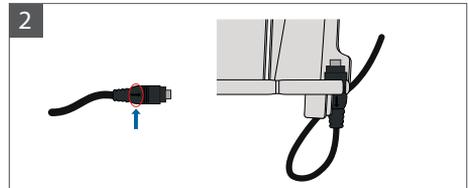
3 OBU Holder



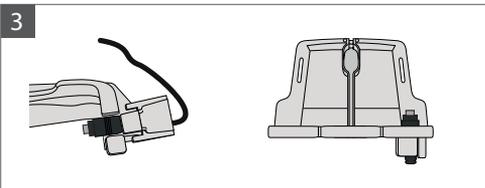
4 Power Cable



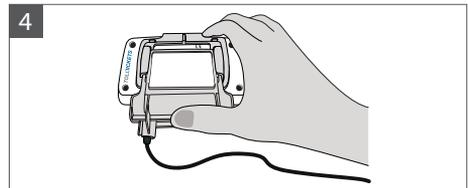
Take your OBU and clip the OBU Holder (3) to the OBU with the small tab on the square positioned downwards.



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.



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

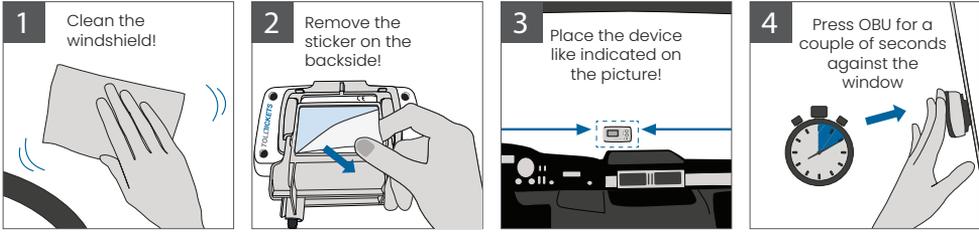


Install the Windscreen Mount (1) [with the fixed Power Cable (4)] by placing it under the OBU and pressing upwards from the bottom.

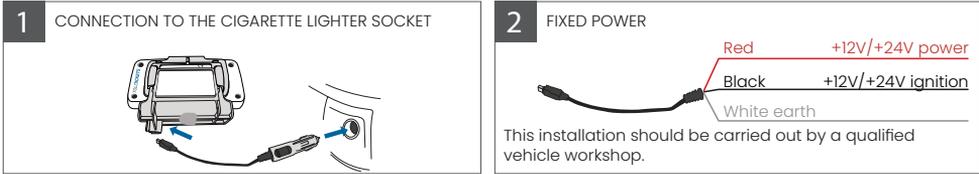
You can now fix your OBU to your windscreen and your power supply.



1.2. Windscreen installation



2. Power Connection



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 lighter 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

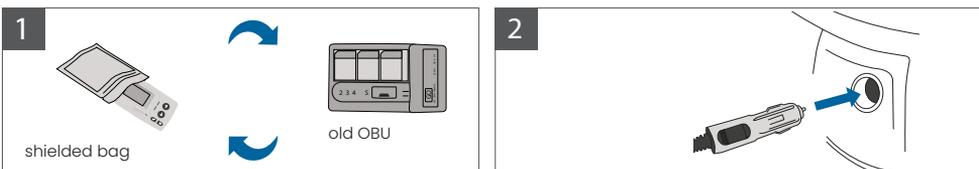
1. Use the cigarette lighter cable supplied. Make sure the cable is long enough, then remove the lighter plug and any excess cable.
2. Locate the connection points in the vehicle using the diagram 2. The black wire should be connected to the vehicle ignition.
3. Before connecting the cables to the vehicle, 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





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.



CAUTION



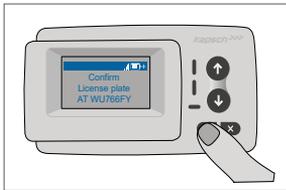
INFORMATION

In order to function properly, the unit must undergo four different activation steps. The following steps are displayed on the OBU during first activation:

- 1. Confirm License Plate Number**
- 2. Select Language**
- 3. Set Number of Axles**
- 4. Set Weight**

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 4.5: Menu Structure.

3.1. Confirm Vehicle Licence Plate Number



Confirm your License Plate Number by pressing the selection button ✓. If you notice there is a mistake in the License Plate Number, contact immediately your customer service and do not use the OBU.



CAUTION

The OBU cannot 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 by 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.

3.2. Select Language



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

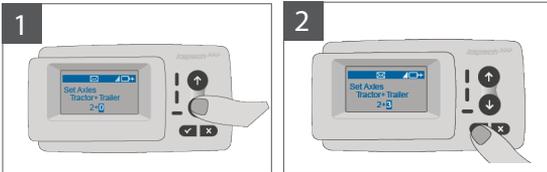


3.3. Set Axles

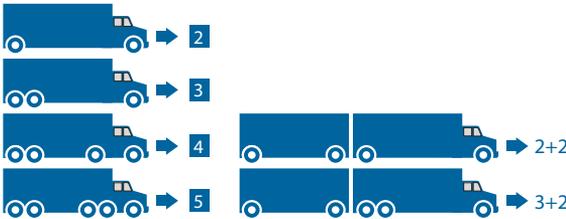


CAUTION

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 Tractor Axles is pre-set by your service provider according to your registration documents. If you use a trailer, you need to enter the number of axles of your trailer. **Select this number with the ↑ and ↓ buttons and validate your selection with the ✓ button. If you are driving without a trailer, set the Trailer Axles value to 0.**



3.4. 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 weight needs to be selected in case a trailer is present. Otherwise the weight input is skipped as the weight (FI) of the tractor is already configured and fixed according to your registration documents.

In the weight display of the on-board unit (OBU), the weight value appears in 10kg increments in the main menu and in steps of 100kg in the weight setting menu. For example: The F.I. weight of your towing vehicle is personalised as 3,510 kg, the value '3.51' appears in the main display of the on-board unit. However, this value appears as '3.5 t' in the weight setting menu.

In Germany, the weight to be set must equal the „maximum technically permissible laden mass“ of the trailer (F.1. of the trailer currently in use). In Switzerland, the weight to be set must equal the „maximum permissible laden mass “ of the trailer (F.2. of the trailer currently in use).

When entering the weight set submenu, 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).

- 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
- Once the lowest digit is set, a confirmation is required by pressing "✓" button to get back to the main menu



1 Editor starts at the highest digit
Use arrow keys to change the value



2 Press ✓ to move to the next right digit



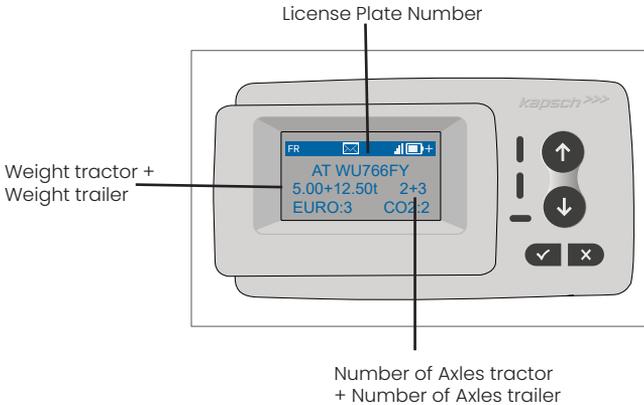
3 Use arrow keys to change the value



4 Confirm setting by pressing ✓

3.5. Final check

After completing the above settings, the Main Menu is displayed. Make sure that the License Plate Number of the tractor, the number of axles and the vehicle weight correspond to the current vehicle combination. You can find all information on the basic display in the chapter 4.3.



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.)

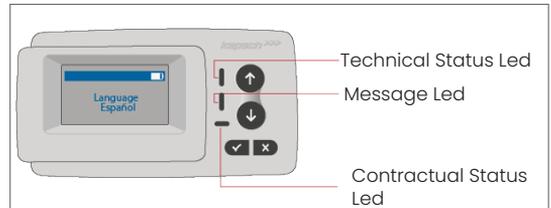
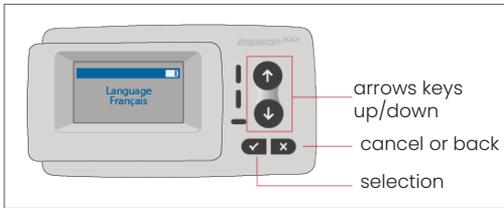


CAUTION BEFORE USE

- Please refer to Chapter 6: “Terms of Use and Safety Instructions”.
- The device is only valid for Toll Domains for which you have a signed and valid contract /subscription. You can check this list via the OBU Menu (see below in 4.5)
- Always set the number of axles and the weight according to the presence of a trailer! 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 License plate number displayed must correspond to that of the tractor.

4. Operation

4.1. Controls & Leds



LED States



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 green, blinking 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.
- The red color indicates an error. A message is displayed as an indication of what the problem might be and/or as a support contact information.

4.2. Buzzer

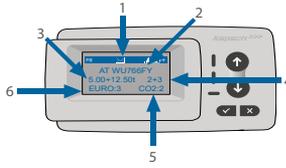
Under normal conditions the buzzer is used to inform about a successful toll transaction at a toll station (OK beep). This indication might not be supported in certain toll domains (for example in the toll domains where the OBU uses a satellite-based technology (GNSS)). An alert with a beep is also given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

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



4.3. 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 light lettering against a dark background. When a message is displayed, the specific message banner is used.



	Field	Description
1	Banner	See description in the table below
2	CC + LPN	Country Code + License Plate number of the associated vehicle
3	Weight class	Current tractor + trailer weight configuration
4	Axles	Current tractor + trailer axles configuration
5	CO2	CO2 emission class
6	Euro	Euro class

Status Symbol Banner	Description Banner symbols
	A two-letter country code shows the actual toll domain driven, but only if this domain is activated on the OBU.
	Cellular connection indicator showing if a mobile network signal is available.
	Battery indicator
	GNSS Privacy is enabled
	A new message is available.
	Indicates that the external power supply is connected.



INFORMATION

If the vehicle is standing still for more than 15 minutes, the OBU goes into parking mode and the display and LED indications are turned off.

4.4. Messages

The white Message LED is used to indicate that there is a message on the display.

Status messages

When the OBU state changes to Warning, Error Contractual, Error Technical, or Error Fatal, additional information will be displayed as a status message. See chapter 5: "States and Indications"). The OBU uses standard phrases and configurable parameters to compose the status message. See example below.



Field	Description
(Event ID)	The ID of the event that causes the change of the OBU state.

Generic messages (zone or service messages)

Generic messages can originate from a toll transaction, from the toll service provider, when passing a virtual gantry or when entering a certain geographic zone. See example below.



Message Priority and Interaction

The OBU can display only one message at a time. If more than one message is available, they will be shown based on their priority, with number one being the highest priority.

Status messages are constantly displayed till you press on the Selection button ✓. They can also be retrieved in the message history.



4.5. OBU Menu structure

Root Menus – Info and Settings

There are two main Root Menu Settings and Info.

Info and Settings menus can be entered directly by pressing ↑ and ↓ buttons. The button x will leave the Root menu together with buttons ↑ and ↓ that may be used to navigate out of the Root menu.

Settings Menu

Menu item	Description
Trailer Axles	Initiates the ,Trailer axles' selection sub-menu. It is used to set the trailer axles (0-7).
Weight	Initiates the trailer ,Weight' configuration sub-menu. It is used to set the trailer weight in 0.1t increments from 0 to 99,9 tons. Note: This sub-menu allows checking the current weight of the Tractor and Trailer.
LED brightness	Set the brightness of the LED from 10-100% in 5% steps via ↑ and ↓ buttons, confirm via ✓ button, or exit via x button.
Disp. brightness	Set the display's brightness from 0-100% in 5% steps via ↑ and ↓ buttons, confirm via ✓ button, or exit via x button.
Language	Select the language via ↑ and ↓ buttons, confirm via ✓ or exit via x button.
GNSS tracking	This GNSS privacy setting allows a driver to turn off position sending when vehicle in use is not subject to tolling. Turn GNSS tracking On or Off via ↑ and ↓ buttons and confirm via ✓ button or exit via x button.

Info Menu

Menu item	Description
Message history	Shows the history of the last ten messages. Select a message via ↑ and ↓ buttons and enter a message via ✓ button.
Serial number	Shows serial number
Helpdesk	Shows information on how to contact the help desk
Toll domains	Shows a list of toll domains for which a valid contract exists. The list can be scrolled by pressing ↑ and ↓ buttons
Battery charge	Shows the battery State-Of-Charge
License plate	Shows the License Plate Number
CO2 class	Shows the CO2 class
EURO class	Shows the EURO class

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 indicates that you need to check OBU display or “message history” to read the message
- RED “Contractual Status & Technical Status” LED → If these LEDs turns red, please STOP driving and contact immediately your local service provider to investigate the error

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:

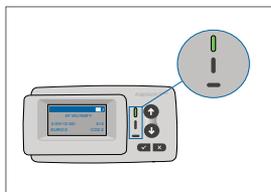
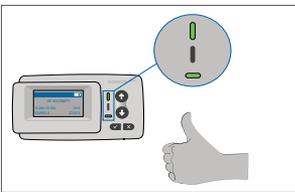
- **Technical: OK (Green)**
- **Contractual: OK (Green)**

Messages: only active for incoming generic messages (WHITE)

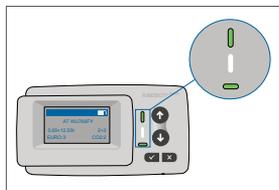


INFORMATION

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 “Message history”.



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:

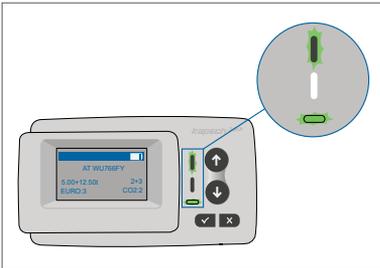
- **Technical: WARNING (Flashing Green)**
- **Contractual: WARNING (Flashing Green)**

Messages: Status message about root cause (WHITE)



INFORMATION

For appropriate action and permission to continue driving please refer to chapter 7: "Error Codes".



WARNING

There is a notification, PLEASE CHECK MENU „Message history“ for messages and error codes!

5.4. CONTRACTUAL ERROR State

The road user does not fulfil his obligations, e.g. is inside a GNSS (satellite-based technology) 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

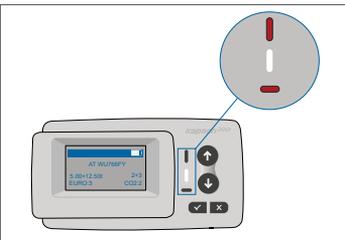
If the OBU shows a CONTRACTUAL ERROR, you cannot drive in this toll domain with your OBU. Please use another payment method to pay the toll in this toll domain. You risk enforcement procedures and high penalties to be paid by the user.

Buzzer: NOK Beep (4x short)

LED indications:

- **Technical: ERROR (Red)**
- **Contractual: ERROR (Red)**

Messages: Status message about root cause (WHITE)



 **Please call your service provider**



WARNING

There is a notification, PLEASE CHECK MENU „Message history“ 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:

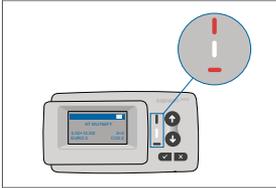
- **Technical: ERROR (Red)**
- **Contractual: ERROR (Red)**

Messages: Status message (WHITE)



CAUTION

If the OBU shows a TECHNICAL ERROR or FATAL ERROR, driving in the 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 „Message history“ for messages and error codes!

6. Terms of Use and Safety Instructions

6.1. Terms of use

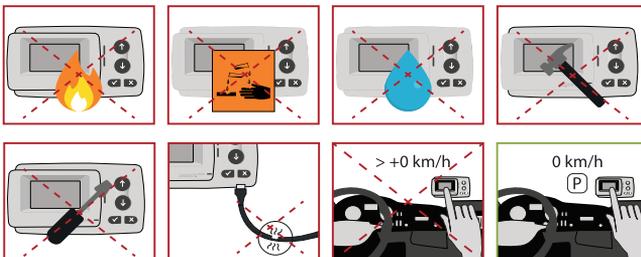
- This device is intended for operation in connection with the tolltickets central system inside EU and the EEA countries which operate toll systems in accordance with the Directive 2019/520/EC
- The device is suitable for being used in the driver's cab of a motor vehicle.
- Installation must be carried out only on the inside of the windscreen in accordance with the specifications in this installation and operating instruction.
- Permitted ambient conditions are -25°C to + 85°C 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 Kapsch TrafficCom AG product On-Board Unit 5310-22A is compliant with the relevant provisions and standards outlined in the European Directives 2009/750/EC (Commission Decision of 6 October 2009 on the definition of the European Electronic Toll Service and its technical elements) and 2019/520/EU (Directive 2019/520 of the European Parliament and of the Council of 19 March 2019 on the interoperability of electronic road toll systems and facilitating cross-border exchange of information on the failure to pay road fees in the Union).

7. Error Codes

Code	Error type	Action	Driving?
7014, 8002, 9010, 10000, 16002, 50020	Technical error	The OBU is not fully operational. The status of ERROR TECHNICAL may be temporary if the issue is resolved. 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 further analysis.	NO
24, 1008, 3016, 3018, 4006, 4008, 4010, 9012, 9014, 11002, 17002	Fatal error	The OBU is not fully operational, and a persistent error is occurring. The OBU can not be used for paying tolls in this state. Please use other means to pay tolls! The OBU must be returned and replaced.	NO
5002, 5004, 9006, 13002, 50102, 50104	Warning	The OBU is operational and alerts the driver of a potential issue and if there is recommended action (for example: providing the external power supply to the OBU). The OBU can still be used to pay tolls but you need to pay attention to the warning message display and solve the issue.	YES
50000, 50010, 50100	Contractual error	The OBU is fully operational, but the road user does not fulfill contractual obligations. For example the toll domain driven is not included in your contract. The OBU can not be used for paying tolls in this state. Please use other means to pay tolls! Please contact your service provider to adapt or check your contract and the toll domains configuration of your OBU.	NO
2002, 3012	Technical error	The OBU has just been started, you are parked or driving in a location without GSM reception. You must find a location with GSM reception and wait up to 10 minutes. Make sure that the OBU is not in sleep mode. When the red LED goes out, you can use the OBU. If NOT, the OBU may not be working. Stop using the OBU and contact your service partner for further analysis.	Only if no more error visible

APPENDIX A: Service Contact Information

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

E-Mail: partner@tolltickets.com