TS3290/00A.
On-Board Unit.

The Kapsch OBU (on-board unit) TS3290/00A is the in-vehicle part of the Kapsch Satellite Tolling System which facilitates the implementation of road user charging schemes based on geographical positions obtained from a GNSS (Global Navigation Satellite System).

The OBU makes use of the latest GNSS and GSM technologies which are combined into one compact unit that also contains a DSRC (Dedicated Short-Range Communication) interface according to the CEN TC278 DSRC standards.

The TS3290/00A is in line with the EETS (European Electronic Toll Service) directive and it supports regional and multinational interoperability schemes.

The TS3290/00A supports both on-board as well as central system based detection of charging events.

The OBU includes functionality to automatically adopt its behaviour depending on its location (geo-object functionality). This includes features like position acquisition / reporting and detection of charge objects. This flexible location dependent OBU configuration enables multiple toll domain capabilities. The set-up of the OBU functionality and the definition of geo-objects can be managed remotely.

The implementation of the latest GNSS technology provides high accuracy and availability in even the toughest conditions such as urban canyons. It also provides advanced TTFF (Time To First Fix) reducing functionality.

The OBU is designed to fulfil the high security requirements that are applicable for high volume interoperable payment systems such as multinational truck tolling schemes. This includes features like data encryption, authentication, cryptographic access control and tamper detection.

Installation and activation of the OBU can be performed by the user in a matter of minutes. The OBU is attached to the windscreen with an adhesive and connected to the vehicle power system with a cigarette lighter connector. It is also possible to make a fix connection to the vehicle power system.

In-vehicle ITS devices may be connected to the OBU via the USB interface. The OBU can provide location information to this device as well as exchange data between the in-vehicle ITS device and an ITS back end system.

The OBU comprises a Man-Machine Interface for configuration and supervision of the unit.

Features.

Supports all current types of DSRC and GNSS based tolling concepts

Compliant with the EETS related GNSS and DSRC standards

Supports interoperability specifications such as GSS/A1/ CARDME/CESARE/PISTA/IAP/LAC/CCC

Location dependent configuration capability

Supports the handling of up to 100.000 geo-objects

Remote management of parameters, firmware and geo-objects

Multi toll context vehicle class management

Data authentication / encryption based on a secure core concept

Intuitive MMI with display, buttons, LEDs and buzzer

Casing tampering detection/reporting and critical data deletion

Provides location data and transparent mailbox services to an in-vehicle ITS device via USB

7 - 30 days data storage standalone capability

More than 3 h of operation by means of rechargeable battery

Fully independent CEN DSRC functionality powered by separate lithium battery

Technical features

GNSS receiver

In accordance with GPS-SPS (Standard Positioning Service Signal Specification)

Accuracy	2,5 m (CEP50)
TTFF cold	35s typ
TTFF warm	35s typ
TTFF hot	1s typ
SBAS	EGNOS

GSM/GPRS communication

In accordance with:
EN 301511 harmonized Standard for Mobile stations in the GSM 900 and DCS 1800 bands
3GPP 51.010-1 mobile station conformance specification – part 1

DSRC communication

In accordance with:
EN 12253 physical layer
EN 12795 data link layer
EN 12834 application layer
EN 13372 DSRC profiles (set L1-B)
EN ISO 14906 EFC application interface definition
TS 13141 (LAC)
TS 12813 (CCC)
EN 15509 (IAP)
GSS (Global Specification for Short Range Communication)

Power supply

External power 10 - 36 V DC

12 V DC average 40 mA, peak 1000 mA

24 V DC average 20 mA, peak 500 mA

USB power 5 V DC, average 120 mA, peak 500 mA

Internal re-chargeable battery > 3 h

Internal 3,6 V Lithium back-up and DSRC battery. Lifetime typically more than 7 years

Man-machine interface

2" LCD display

4 buttons up/down and OK/NOK

Status LED Green/Red & Aux LED Blue

Buzzer for both DSRC and GNSS

User memory

Data storage 16 MB (flash)

Operational data: 1 MB (flash)

DSRC user data: 4 KB

Housing

Enclosure: IP41, IEC60529

Casing: Polycarbonate/ABS

Dimensions: 137 mm x 81 mm x 42 mm (excluding windscreen mounting bracket)

Colour
Light grey section towards windscreen (RAL7035)
Dark grey section towards vehicle cabin (RAL7016)
Black, middle section and frame (NCS9000)

Weight: 238 g (excluding windscreen mounting bracket)

Installation

With bracket TS3220/23A that is fixed to the windscreen with adhesive

Connection to power supply (cigarette lighter plug) via a 3 m cable

Optional fix installation to the vehicles power system with ignition signal support

Geo-object capabilities

3 levels of geo-zones with individual configuration

Supports up to 100.000 geo-zones

Radio compliance

According to EN 300 674

According to EN 301 511

Electromagnetic compliance

According to EN 301 489-1, -3, -7

Environmental Conditions

Temperature range, storage
+5 °C to +40 °C
Ref: IEC 60721-2-1, class 1K2

Temperature range, operating
-25 °C to +85 °C
Ref: IEC 60721-2-1, class 5K2

Humidity
Max 95% relative humidity, non-condensing
Ref: IEC 60721-3-5, class 5K2

Vibration

Random	3 m^2/s^3	10-200 Hz
	1 m^2/s^3	200-500 Hz

Ref: IEC 60721-3-5, class 5M3

Shock

300 m/s^2, half sine, 6 ms

Ref: IEC 60721-3-5, class 5M3

Bump

150 m/s^2, half sine,11 ms

Ref: IEC 60721-3-2, class 2M2

Free fall

1.000 mm, each face

MTBF

370.000 h according to Telcordia (Bellcore) SR-332

Type approval

The on-board unit is compliant with the European directives:
R&TTE 1999/5/EC
EMC 2004/108/EC
LVD 2006/95/EC
RoHS 2002/95/EC
WEEE 2002/96/EC

Kapsch Group.

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