Kapsch TrafficCom

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Elumian
TRP 4010-40E

Preliminary Datasheet

The TRP 4010-40E is an ambient light-powered transponder for worldwide implementations of EFC and ITS services according to the European CEN standards.

The transponder is fully compliant with harmonized Electronic Fee Collection (EFC) specifications and standards such as A1, CESARE/PISTA, CARDME, and EN 15509. It also supports other application types such as AVI, parking, and access. The multi-application architecture provides separate security domains for the applications, ensuring that different entities have access to distinct parts of the user memory and the necessary protections for their respective data.

The TRP 4010-40E fulfills requirements for demanding applications such as high-speed multi-lane free-flow scenarios as well as slow congested traffic in stop-and-go situations.

The transponder's operational lifetime is not limited by battery capacity thanks to the sustainable power supply technology through ambient light. The rechargeable battery supports 10,000 charging cycles, providing over 10 years of power supply capability under normal usage conditions.

Data security and integrity are secured by a high degree of integration in combination with efficient built-in cryptographic functions based on the DES and triple-DES algorithms.

The transponder also supports Advanced Encryption Standards (AES) during personalization. Furthermore, it provides feedback to the driver through configurable buzzer sounds that are activated from the roadside system.

The user can easily install the unit on the inside of the windscreen within a couple of seconds by following the installation instructions available in the user manual. The unit can be removed from the mounting bracket and, if allowed by the issuer, it can be used in more than one vehicle.

The TRP 4010-40E contains an in-bracket detection functionality that notices when the unit is removed from its bracket. This feature can also be configured to allow DSRC communication only when the unit is mounted in the bracket.

The compact design, combined with optimized manufacturing and delivery processes and an extended life cycle, enables a smaller carbon footprint than other similar products on the market.

Technical features

Features

- Fully proven in demanding multi-lane high and low-speed scenarios.
- Compliant with CEN DSRC/EFC/AVI standards.
- Compliant with interoperability specifications and standards.
- High security through mutual authentication and separate security domains.
- 4 Kbytes of application memory allows multiple DSRC applications and several key generations.
- Continuously recharging battery.
- Flexible configuration of buzzer sounds and patterns.

Casing

- Color windscreen side: White.
- Color cabin side: Black, Yellow, White.

Weight

- The final product will be between 22-35g.

Size

- 63 x 40 x 15 mm.

Enclosure

- IP40, Ref: IEC 60529.

Power supply

- 14 mAh rechargeable battery continuously recharged by the Powerfoyle™.
- Only active within the communication range of a DSRC roadside system.
- Indefinite power supply until the end of life of the rechargeable battery (10+ years, 10,000 charging cycles).

User memory

- RAM/Flash.
- Capacity: 4 Kbytes.
- Access only from the DSRC interface.

Driver feedback

- Buzzer (sound level: 55 dBA @ 1m).
- Configurable buzzer tunes.

Customization of casing:

- Optional pad print on cabin and/or windscreen side according to the branding guidance.
- Ink-jet or laser printed serial number in text and in bar code (CODE 128).

Accessories

- Bracket TRP-4090-00A (angled windscreen).
- Bracket TRP-4090-01A (vertical windscreen).
- Brackets are supplied with a cleaning tissue and a pre-mounted adhesive.
- Bracket color: White.
- Customized package for individual transponder including installation manual and bracket.

DSRC compliance:

In accordance with:
- EN 12253 physical layer.
- EN 12795 data link layer.
- EN 12834 application layer.
- EN 13372 DSRC profiles 0/1 L1-B.
- ISO 14906 EFC Application Interface.
- ISO 17264 AVI Application Interface.
- EN 15509 EFC Interoperable Application Profile.
- EN 16312 AVI Interoperable Application Profile.
- GSS 3.2 (Global Specification for Short Range Communication).

Environmental conditions

- Temperature range, storage: +5 °C to +40 °C.
- Temperature range, operation: –25 °C to +85 °C.
- Humidity: Max 95% relative humidity, non-condensing.

Vibrations

- 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

- Half-sine 300 m/s^2, duration 6 ms.
- Ref: IEC 60721-3-5, class 5M3.

Conformance

Compliant with the following EU directives:
- RED 2014/53/EU.
- RoHS 2011/65/EU.
- WEEE 2012/19/EU.

This is a preliminary datasheet. Specifications and features are subject to change without notice.