



## Transponder Unit TS3204/02A (Basic)

### Description

The Transponder Unit TS3204/02A is the basic Transponder model in the PREMID® TS3200 product family, which includes a range of Transponder Units: that all are compliant to the European CEN DSRC/EFC standards and to the GSS specification.

The Transponder contains functionality that enables interoperability between systems according to harmonised specifications as A1, PISTA or CARDME.

The user memory can be structured in several elements and attributes and this flexibility make the TS3204/02A an excellent choice for electronic fee collection and multiple other applications.

Data security and integrity is ensured by a high degree of integration in combination with built-in cryptographic functions based on the DES-algorithm.

High speed internal processing enables the use of TS3204/02A in single lane and in high-speed multilane free flow systems.

The TS3204/02A contains a buzzer that may be activated from the Roadside System to give information to the driver.

The Transponder Unit is attached to a bracket that is easily mounted by the user on the vehicle windscreen.

For additional information, please refer to the TS3200 System data sheets or manuals.

### Features

- > CEN DSRC/EFC compatible
- > GSS compatible
- > A1/CARDME/CESARE/PISTA compatible
- > Mutual Authentication
- > Data access protection
- > Fast DES and 3-DES
- > Several key generations
- > Compact and lightweight
- > High speed operation
- > Fully proven in multi lane free flow
- > Supports multiple applications
- > 420 bytes of data memory
- > Battery lifetime more than 7 years
- > Buzzer



### DSRC communication

- > In accordance with
  - EN 12253 Physical Layer
  - EN 12975 Data Link Layer
  - EN 12834 Application Layer
  - EN 13372 DSRC Profiles (Set B)
  - EN ISO 14906 EFC Application Interface Definition
  - GSS (Global Specification for Short Range Communication)
- > Centre Frequency: 5.8 GHz
- > Uplink subcarriers: 1.5 and 2.0 MHz

### Power supply

- > Built-in 3.6 V Lithium battery
- > Typical battery lifetime more than 7 years @ 2 000 transactions/year

### User memory

- > Type: RAM (battery backed-up)
- > Capacity: 420 bytes
- > Access only via the DSRC-interface

### Man-Machine interface

- > Buzzer 3.8 kHz, 55 dBA @ 1 m

### Enclosure

- > IP40 (in bracket)
- ref: IEC 60529

### MTBF

- > 380 000 hours
- ref: MIL-HDBK-217F

### Accessories

- > Bracket TS3220/00A, TS3220/01A or TS3220/05A including adhesive and cleaning tissue.

### Casing

- > Polycarbonate/ABS

### Weight

- > 75 g

### Dimensions

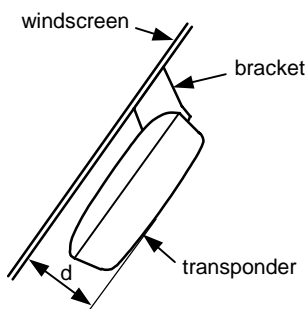
- > 107 mm x 67 mm x 28 mm  
(Transponder without bracket)

### Colour

- > White (front side)
- > Dark grey (rear side)

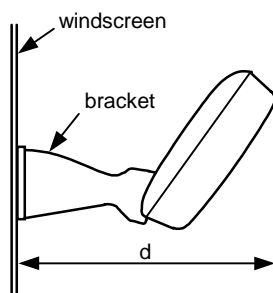
### Installation in Cars

- (raked windscreens)
- > With bracket TS3220/00A or TS3220/05A at the top and centre of the windscreen inside (behind or beside the rear view mirror).
- Depth of transponder from windscreen (d):  
37 mm



### Installation in Lorries and Buses

- (vertical/near vertical windscreens)
- > With bracket TS3220/01A at the bottom and centre of the windscreen inside.
- Depth of transponder from windscreen (d):  
90 mm



### Temperature range, storage

- > -40 °C to +55 °C
- ref: IEC 60068-2-1 Ab and 60068-2-2 Bb

### Temperature range, operating

- > -25 °C to +85 °C
- ref: IEC 60068-2-1 Ab, 60068-2-2 Bb

### Humidity

- > Max 95% relative humidity, non condensing
- ref: IEC 60068-2-56 Cb

### Solar radiation

- (Survival)
- > 1120W/m<sup>2</sup>, 56 days
  - ref: ISO 4892-2

### Vibration

- > Random 0.01 g<sup>2</sup>/Hz 5-200 Hz  
0.005 g<sup>2</sup>/Hz 200-500 Hz
- 3 axes x 100 min
- ref: IEC 60068-2-64 Fh

### Shock

- > 300 m/s<sup>2</sup>, half sine
- 11 ms, ±3 axes x 3 shocks
- ref: IEC 60068-2-27 Ea

### Free fall

- (Survival)
- > 1000 mm, Each face.
  - ref: IEC 60068-2-32 Ed

### Electrostatic discharge

- (Survival)
- > 8 kVp (direct)
  - 15 kVp (indirect)
  - ref: EN 61000-4-2

### Electromagnetic immunity

- > 100 V/m, 26-1000 MHz AM (radiated)
- ref: EN 61 000-4-3
- > 30 V/m, 900 MHz ± 5 MHz FM (radiated)
- 30 V/m 1800 MHz ± 10 MHz FM (radiated)
- ref: ENV 50204

### Electromagnetic emission

- > 30-230-1000 MHz, 30-30/37-37 dBμV/m (radiated)
- ref: EN 55022, class B