

TBS-201 Wireless Vehicle Detector

Application Protocol





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1. Overview

This document describes the definition and composition of TBS-201 protocol. The protocols is a agreement that TBS-201 and server complied. Device will not repose to any data exceed this protocol.

RFU: Reserved for Future use

Encrypted field value

1: 0 no need encryption

2: AR (according to the registration result)

2. Communication Mode

TBS-201 detector adopts LoRaWAN protocol to communication with server.

3. Data Type

Date type	Description
BIT	bit
BYTE	Unsigned single byte, int (8 bit)
WORD	Unsigned double bytes, int (16 bit)
DWORD	Unsigned four bytes,int (32bit)
BYTE[n]	N bytes
BCD[n]	8421 code N bytes

4. Frame Structure

Head	Protocol version	Time	Frame number	Length	Instruction	Encryption	Message body	CRC	End
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Frame Description :

Name	Number of Bytes	Description
Head	1	Start
Protocol Version	1	Protocol Version
Time	4	The time(UTC) current frame are sent

Frame Number	2	Frame count
Length	2	Length of message body
Instruction	1	Attribute of current frame
Encryption	1	If the message body is encrypted
Message Body	N	Message body
CRC	2	CRC
End	1	End

5. Application Data

The application data is composed of encryption word, instruction word and message body. There are three types of message data.

- Uplink parameters message
- Uplink state message
- Downlink parameters configuration message.

5.1. Uplink Parameters Message

After successful registration, the device will send parameters information. The data structure of the information is as follows.

Instruction code	Encryption	Message body
0x01	0	Message body of parameters information

The total length of uplink parameters message is 26 bytes .

Description of message body is as follows.

T	L	V	
0x03	1	1	Device type:0x82
0x05	1	1	Software and hardware version Hardware version: High 4 bits Software version: Low 4 bits
0x06	1	3	Detection interval, step 30s, maximum 24h, 12h by default
0x22	1	1	Sensitivity
0x29	1	1	Detection mode,

			01: single mode, geomagnetic sensor 02: dual mode, geomagnetic and microwave sensor
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5.2. Uplink State Message

The data structure is as follows. The total length of state message is 29 bytes.

Instruction code	Encryption	Message body(Tag value)
0x02	0	Message body of state message

Description of message body is as follows.

T	L	V	
0x02	1	1	Detected state information 0x00: heartbeat report 0x0B: unoccupied 0x0C: occupied 0x0D: strong magnetic disturbance 0x0E: low battery alarm 0x0F: sensor failure (IC information can be read) 0x10: sensor damaged I IC information can not be read)
0x23	1	3	Parking space information, at the 7th bit in first byte. 1: vehicle 0: no vehicle
0x24	1	1	Battery capacity 0~100%
0x25	1	6	The magnetic value XYZ
0x32	1	1	01: vehicle 00: no vehicle

5.3. Downlink Parameters Configuration Message

The device will report acknowledgement message once received the downlink parameters configuration message from server.

The data structure is as follows. The total length of message is 18~35 bytes.

Instruction code	Encryption	Message body (Tag value)
0x07	0	Parameters list

Description of Parameters list is as follows.

T	L	V	
0x0C	1	1	Device restart
0x06	1	3	Heartbeat interval
0x26	1	1	Detection calibration
0x22	1	1	Detection sensitivity
0x27	1	1	Time synchronization mode 1: synchronize immediately once receives the message
0x28	1	1	Request to report parameters frame

5.4. Acknowledge Message

The data structure is as follows. The message body is the same as the above.

Instruction code	Encryption	Message body
0x01	0	Parameters list

6. Data Sending Sequence and Frame Structure Analysis

6.1. Data Sending Sequence

- First package is parameters frame
- Second package is no vehicle frame
- Heartbeat or parking state frame is flowed

6.2. Frame Structure Analysis

Example 1: parameters frame

7E105CC2C2BC000000110100030183050110060300000129010122010400007E

Data	Description
7E	Head
10	Protocol version 1.0
5CC2C2BC	Time

0000	Frame no
0011	Length of message body
01	Instruction code
00	Encryption
030183	03: device type
0501100	05: software/hardware version
0603000001	06: heartbeat interval
290101	29:detection mode
220104	22: sensitivity
0000	CRC
7E	End

Example 2: state frame

7E105CC2C2F000010013010002010023030000002401642506FC0BFD67056A320101
00007E

Data	Description
7E	Head
10	Protocol version 1.0
5CC2C2F0	Time
0001	Frame no
0013	Length of message body
01	Instruction code
00	Encryption
020100	02: detector state
2303000000	23: parking space information
240164	24: battery capacity
2506FC0BFD67056A	25: magnetic value XYZ
32	01: Vehicle

0000	CRC
7E	End