1. GENERAL TECHNICAL DESCRIPTION

1-1. INTENDED USE AND OPERATION INSTRUCTIONS

This equipment constitutes a keyless entry system comprising a portable transmitter and a control unit including receiver installed in a inside of the vehicle.

This system is a radio frequency apparatus which distantly controls the locking and unlocking of motor vehicle door locks, unlock and trunk lid by operating a portable transmitter with six control buttons(six push button switches).
The transmitter is a portable device and the control unit including the receiver which has an integral receiving antenna is a mobile device installed behind the instrument panel of the vehicle.
The construction of the system is given in section1-2.
The transmitter is activated by loading a battery cell in it.

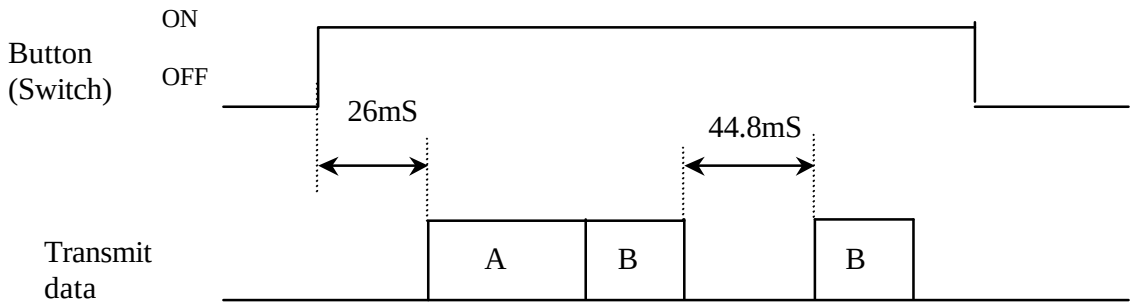
The Specification of operation is shown below.

By pressing the “LOCK” or “UNLOCK” or “POWER SLIDE DOOR RIGHT” or “POWER SLIDE LEFT” or “REAR GATE” or “PANIC” button for least 13 milliseconds, the duration requird for the transmitter and the receiver to recognize the state of the switch as ON or OFF, the vehicle’s door lock actuators are energized, and flash the hazard lamps for indicator purpose.

By pressing one of the buttons, the radiation occurs in the form of coded signals that are received by the control unit installed in the vehicle. The control unit wakes-up,then compares the received ID code with the pre-stored ID code in its non-volatile memory, then activates the door lock actuators upon coincidence of both codes.

The ID signal is consisted by unique ID portion and function portion which directs the control units “LOCK” or “UNLOCK” or “POWER SLIDE DOOR RIGHT” or “POWER SLIDE LEFT” or “REAR GATE” or “PANIC” status.

To press one of the buttons for at least 13 milliseconds,the transmitter about after 26 milliseconds, radiatesA+B+B coded signal to be received by the control unit installed in the vehicle to corresponding vehicle parts actuated,where A is a wake up signal and B is a word signal(see Timing Diagram below).
Regarding “PANIC” it is required to actuate corresponding function on the vehicle, to press continuously at least 0.5 seconds.
To press any buttons continuously up to 25 seconds, the transmitter continuously send word signal B.



1-2. CONSTRUCTION OF KEYLESS ENTRY SYSTEM

The construction of the system is shown below.

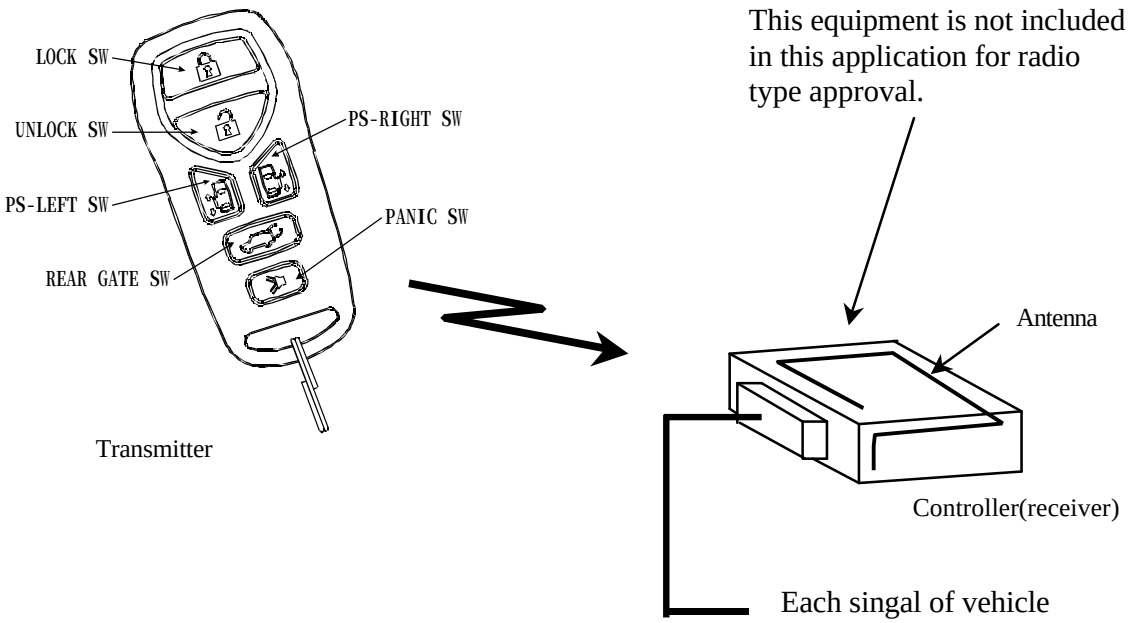
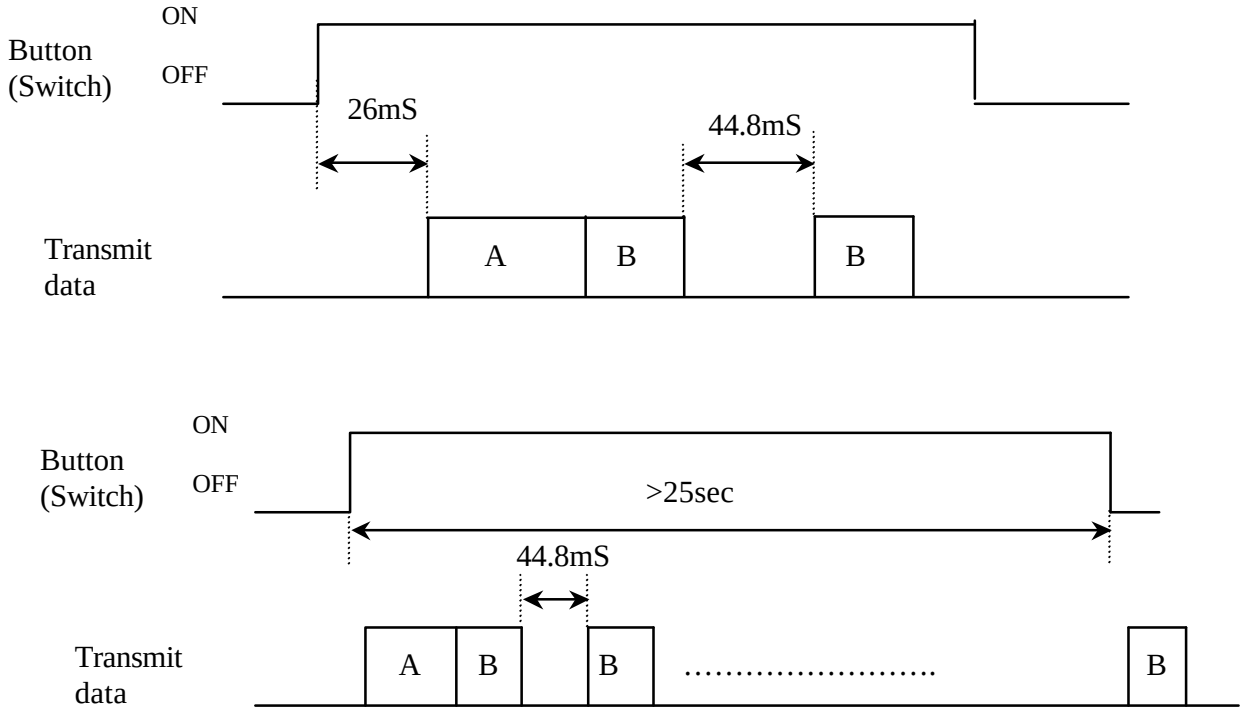


Figure 1-1:system construction

1-3. TIMING DIAGRAM

(1) To press one of the buttons for at least 13 milliseconds,the transmitter about after 26 milliseconds, radiatesA+B+B coded signal The timing diagram of the system is shown below.

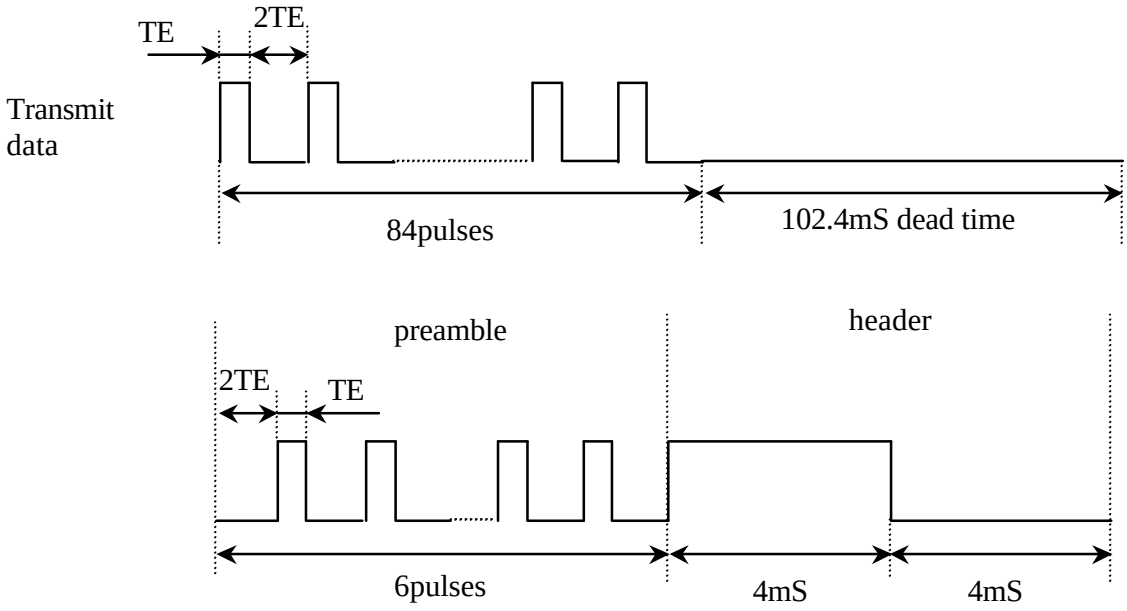


(2) The word signal B is consisted by six portions, which are preamble(a), header(b), encrypt(c), serial number(d), function code(e) and verify code(f).

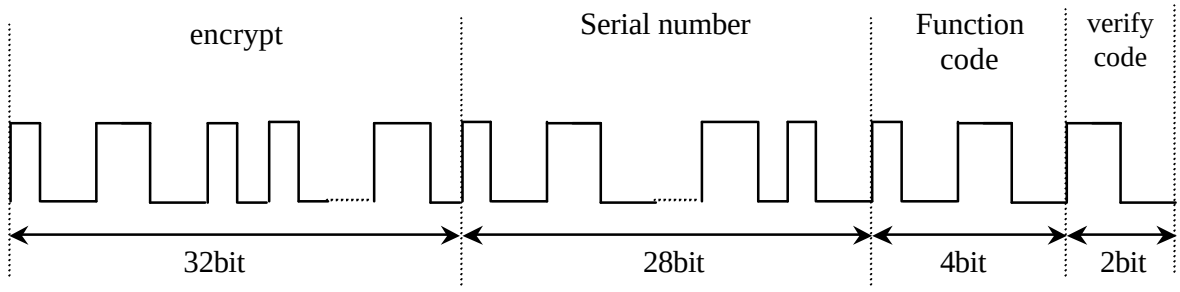
construction of Word signal B

preamble	header	encrypt	Serial number	Function code	Verify code

(3) The signal of wake up A and preamble(a) are consisted by a element pulse of on time 400 microseconds(TE)and off time 800 microsecond(2TE), duty 1/3 pulse. The wake up signal A is consisted by 84 element pulses and a 102.4 milliseconds dead time. The preamble(a) is consisted by 7 element pulses. The header(b) is consisted by a 4 milliseconds on and 4milliseconds off long pulse.



(4) The encrypt(c) is 32 bit, the serial number(d) is 28 bit, function code(e) is 4 bit and verify code(f) is 2 bit pluses are used, where data 1 bit is consisted by one single high or low signal, for example, TE high or 2TE low means “1”, 2TE high or TE low means “0”.



(5) To press of one of the “LOCK”,“UNLOCK”,“POWER SLIDE DOOR RIGHT”,“POWER SLIDE LEFT”, “REAR GATE”or “PANIC” buttonsaas mentioned (1). , the transmitter transmits all same signal except function code(e). the button function is characterized by the fuction code(e), which is unique for each buttons.

(6) To press “UNLOCK” button once, the driver door of the vehicle is unlocked, to press twice within 1.5 seconds, all doors unlocked.

(7) To press any button for longer period, the transmit of word cord B will be continued but will cease it within 25 seconds.

(8) Regarding “PANIC” button, it makes sound the alarm and the head lights of the vehicle for approximately 30 seconds, during sound alarm period, to press “PANIC” button again it stops.

(9) To press the “LOCK” and “UNLOCK” buttons simultaneously at least 2 seconds, it switches one mode which deactivate the horn chirp and the hazard flashing as the indicator on locking, and other mode which activate them.

The transmitter and receiver communication is made on frequency f=315MHz, and the modulation is AM, corresponding to binary digit 0 and 1.

2.TECHNICAL SPECIFICATIONS

2-1.Transmitter specifications

-Model number : ASTU51

-Power source : CR2025(Lithium battery 3V)

-Nominal voltage : 2.85V/3.0V(On load/Off load)

-Center frequency : 315MHz

-Number of channels : 1

-Emission designator : H1D

-Type of antenna : P.C.B pattern antenna

-Method of frequency generation : SAW

-Frequency multiplication : 1

2-2.Transmitter's characteristics

-Maximum output field strength : 6000uV/m(@3m)
-maximum spurious radiation : FCC rules Part15;15.209
-Frequency tolerance : 315MHz+65,-40kHz