

1. GENERAL TECNIAL DESCRIPTIN

1-1 INTENDED USE AND OPREATION INSTRUCTIONS

This equipment, known as an immobilizer, is a vehicle anti-theft device to prevent from the unauthorized use of a motor vehicle. The equipment allows the ignition system to be disabled when the ignition system is manipulated without using the proper key, such as by direct connection of power supplying lines or breakdown of the key-cylinder. The system is a radio frequency apparatus comprising of a transponder integrally incorporated within the ignition key, a radio frequency module (RFM) with an antenna installed on the key-cylinder case and a controller (BCM) controlling the operation of the RF module.

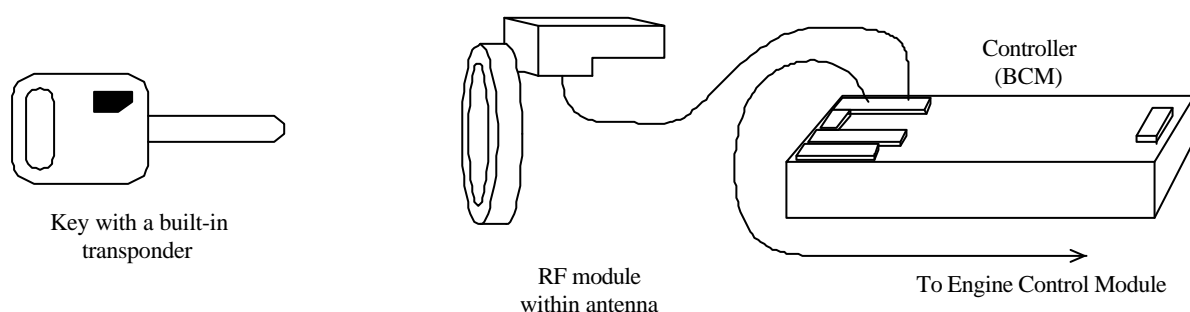
Whenever the ignition key is inserted the key-cylinder and turned to the "ON" position, the RFM continues to generate a radio frequency carrier operating on frequency 125kHz powered by the BCM, and bi-directional transmission in half duplex mode between the BCM and the transponder occurs. The transponder requires no internal power supply; it derives its power from the magnetic component of the radio frequency carrier. Data is stored in the transponder and the BCM in its non-volatile memory (EEPROM). Data is transmitted via radio frequency link by ASK-modulating this carrier. Absorption modulation is used to transmit data from the transponder to the BCM. The transponder absorbs the magnetic field which hence modulates the current in the antenna of the RFM.

Upon receiving the start command from the BCM, the energized transponder transmits its identifier to the BCM. The BCM sends its own password (A) together with a set of random numbers to the transponder in return. If the received password matches the password (A) stored in the transponder, the transponder reprogrammed the data using its own password (B) and the set of random numbers received in accordance with the pre-determined protocol, data with the pre-calculated data using the transponder's password (B) stored in the BCM and same random numbers in turn, whereupon the matching being verified as s result of the comparison. After the comparison the BCM sends the result of the comparison to engine control module (ECM). When coincidence has been verified, the ECM enable the engine to activated, but when the result is negative it will be not allow the engine to be activated.

Whenever the ignition switch is turned from the ON position to the OFF position during processing, the system is shifted to ignition OFF mode. The BCM causes the indication lamp on the dashboard to flash when the ignition switch is in the OFF position or a malfunction of the system occurs. The ECM sends a rolling code to the BCM every time the ignition switch is turned from the OFF position to the ON position in order to watch for an unauthorized replacement or a manipulation of the controller.

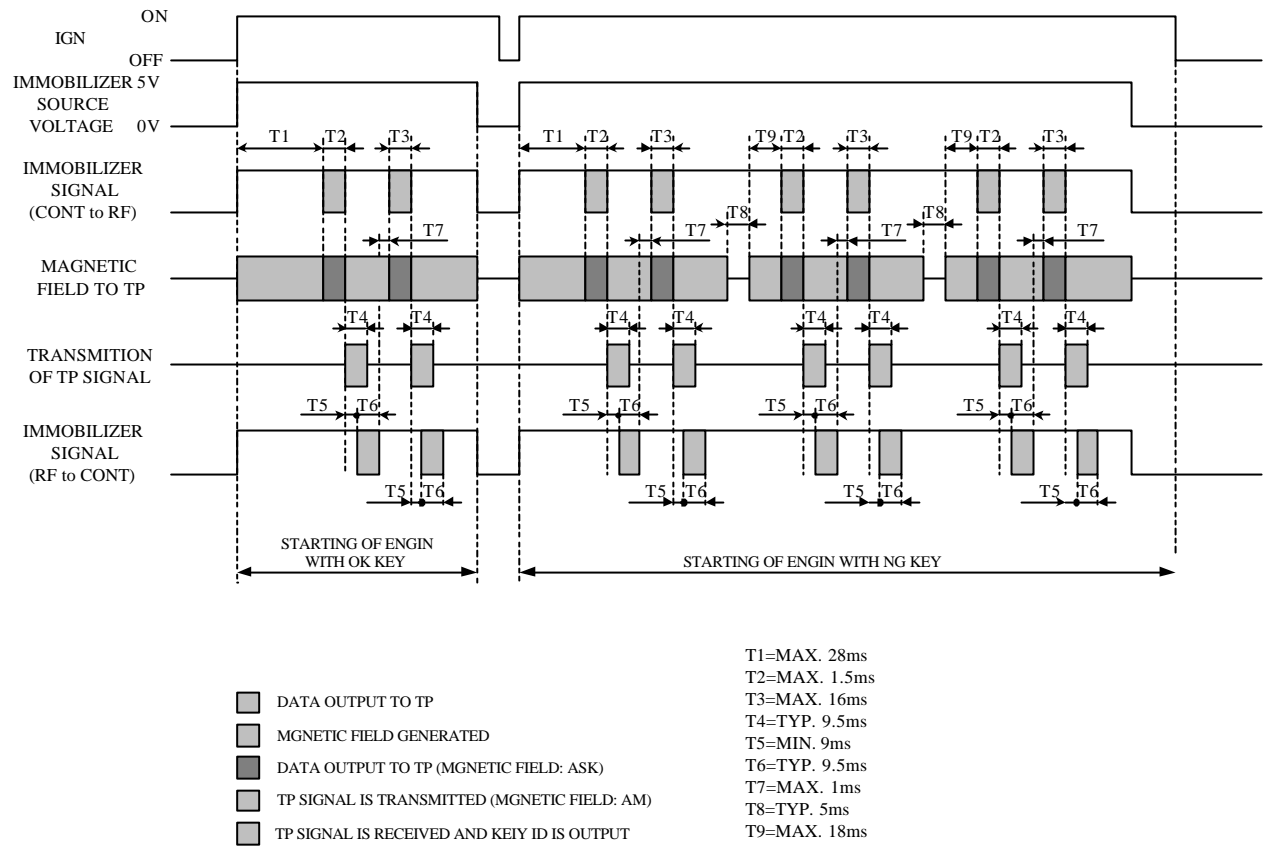
1-2 SYSTEM CONSTRUCTIONS

The construction of system is shown following:



1-3 TIMING DIAGRAM

The timing diagram of system is shown following:



1-4 APPLIED REGULATIONS

This equipment will be applied under FCC Rules and Regulations Part 15.

2. TECHNICAL SPECIFICATION

2-1 Fundamental Specifications

- Nominal voltage : 5V (Transformed from the 12V battery)
- Power source : Regulated lead-acid battery (12V)

2-2 Transponder specifications (Referred to PHILIPS reference manual)

- Model number : PCF7936AS
(Security transponder for car immobilizer manufactured by PHILIPS)
- Operating frequency : N.A.
- Number of channel : N.A.
- Emission designator : N.A.
- Maximum output field strength : N.A.
- Type of antenna : Ferrite core antenna

2-3 RF module specifications

- Operating frequency : 125KHz
- Frequency tolerance : 0.3%
- Number of channel : 1
- Emission designator :
- Maximum output field strength : 0.2704W
- Type of antenna : Loop antenna