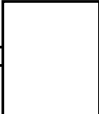
	Functional Manual for IMMOBILIZER Certification	2010/12/09 1/8
Electronics Systems R&D - Hortolândia	GOL G4	

Document	Functional Manual for Immobilizer Certification.
Customer	VOLKSWAGEN Automóveis S/A.
Manufactory	Magneti Marelli Sistemas Automotivos.
Product	GOL G4.

Author: Reinaldo M. Ferreira	Functional Manual	GOL G4
Version:1.0 Date: 2010.12.09		IMMOBILIZER

MAGNETI MARELLI	Functional Manual for IMMOBILIZER Certification	2010/12/09 <i>2/8</i>
Electronics Systems R&D - Hortolândia	GOL G4	



Reinaldo M. Ferreira

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Author: Reinaldo M. Ferreira	Functional Manual	GOL G4
Version:1.0 Date: 2010.12.09		IMMOBILIZER


	Functional Manual for IMMOBILIZER Certification	2010/12/09 3/8
Electronics Systems R&D - Hortolândia	GOL G4	

Contents

Page

1. Customer Part Numbers	4
1.1 GOL G4 Part Number's	4
2. System Specification	4
2.1 General Product Data	4
2.2 General System Description	4
2.3 Frequency of Operation	5
2.4 Product Visual Identification	6
3. Functional Simulation Conditions	7
3.1 List of Equipment	7
3.2 General Simulation Setup	7
3.3 Functional Operation Description	7
4. ANATEL Label	8

Author: Reinaldo M. Ferreira	Functional Manual	GOL G4
Version:1.0 Date: 2010.12.09		IMMOBILIZER

	Functional Manual for IMMOBILIZER Certification	2010/12/09 4/8
Electronics Systems R&D - Hortolândia	GOL G4	

1. Customer Part Numbers

1.1 GOL G4 Part Number's	
VOLKSWAGEN Part Number	Magneti Marelli Part Number
5W0.920.XXX.Y WWW	BH300231XXXX

Note: For ANATEL Certification purposes, any cluster Gol G4 with Part Number described above can be used, and the results considered for others Part Numbers. It is possible because for all family of cluster Gol G4, the IMMOBILIZER circuit is the same.

2. System Specification

2.1 General Product Data

The Instrument cluster Gol G4 has an integrated immobilizer system, which works with a security transponder assembled into the body of the car keys and interfaces to the Engine Management System via CAN Bus. This system uses the Challenge/Response principle from the base station to the transponder and vice versa. The antenna is assembled out side the instrument cluster and it is connected through the harness cable of the vehicle (length of the cable ~0,6m).


2.2 General System Description

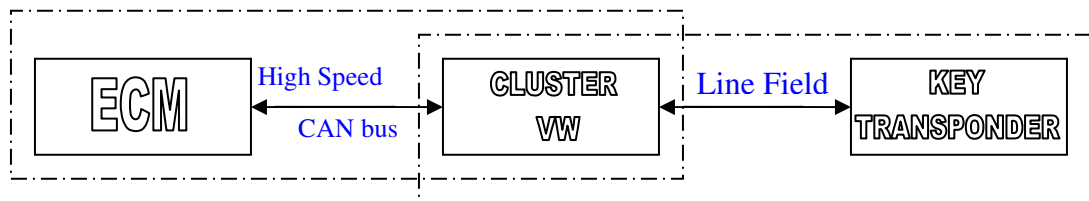
The immobilizer system is to prevent unauthorized people from starting the vehicles engine to steal it. The system is based on a crypto coded data exchange between the engine control unit and a transponder via the immobilizer.

The transponder (transponder = transmitter + responder) is an electronic module integrated in the top of the car key. The information stored in it decides whether or not the person in question is authorized to use the car. The transponder supports the write, read and calculating functions required for the alternating code process which is to be implemented without battery.

The intervention into the engine control unit is done via an electronically coded signal. A consistent alternating code process is used for the communication between the transponder and the engine management system (ECM). When the ignition is switched ON, the engine control unit enables the engine functions for a predefined period (= pre-enable time, max 1.8s after engine is running).

Author: Reinaldo M. Ferreira	Functional Manual	GOL G4
Version:1.0 Date: 2010.12.09		IMMOBILIZER

	Functional Manual for IMMOBILIZER Certification	2010/12/09 5/8
Electronics Systems R&D - Hortolândia	GOL G4	



As consequence, the engine functions remains enabled only is a correct transponder code is detected within the pre-enable time. In all the others cases, the engine functions are inhibited and the vehicle cannot be started.


Access to safety-related functions and data of the immobilizer and of the engine control unit – e.g. programming of a new transponder – is protected by a password function. Access to these functions is only possible after correct entry of the Security Code which has been programmed previously; this entry is possible via a tester (e.g. VAS Tool from VW).

This Security Code is documented in the so-called SECURITY CAR PASS which is in the possession of the vehicle owner.

2.3 Frequency of Operation

The operating frequency of the immobilizer system is 125 KHz.

Author: Reinaldo M. Ferreira	Functional Manual	GOL G4
Version:1.0 Date: 2010.12.09		IMMOBILIZER

	Functional Manual for IMMOBILIZER Certification	2010/12/09 6/8
Electronics Systems R&D - Hortolândia	GOL G4	

2.4 Product Visual Identification

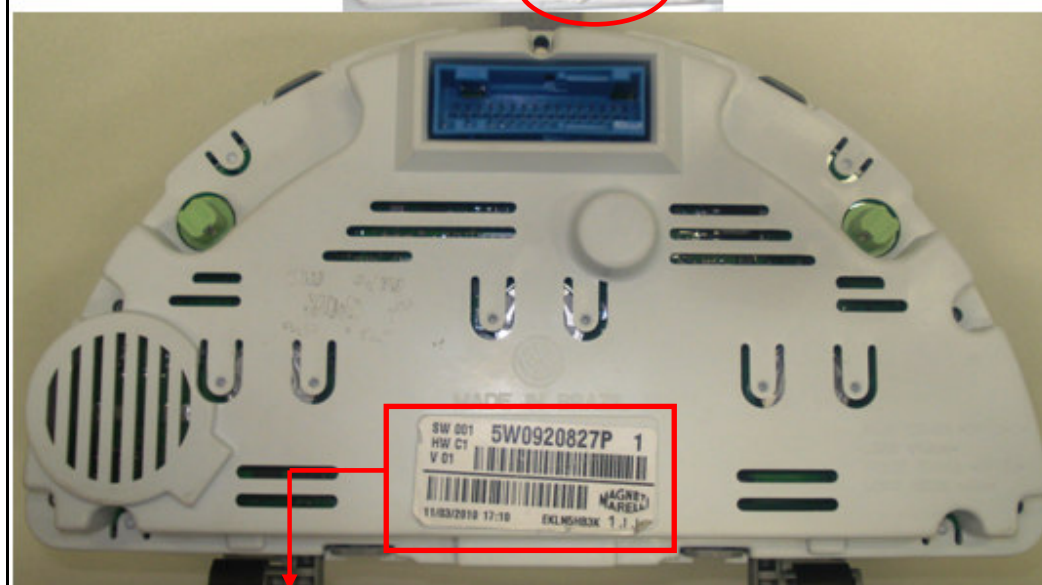
GOL G4 – 5W0920827P



**VOLKSWAGEN
Part Number
Identification**




**MID
CODE**



Example of GOL G4 production label

Author: Reinaldo M. Ferreira Version:1.0 Date: 2010.12.09	Functional Manual	GOL G4 IMMOBILIZER
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	Functional Manual for IMMOBILIZER Certification	2010/12/09 7/8
Electronics Systems R&D - Hortolândia	GOL G4	

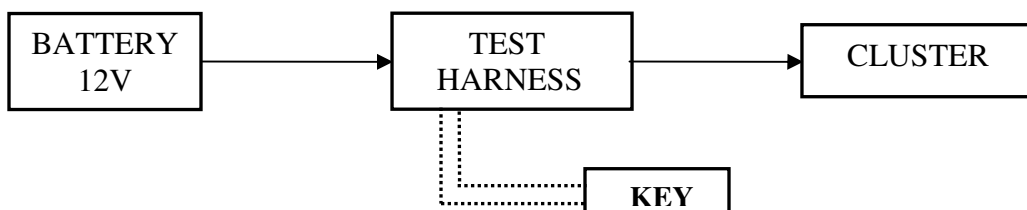
3. Functional Simulation Conditions

3.1 List of Equipment

The functional operation of the GOL G4 is provided using the following list of equipment:

- Vehicle battery 12V;
- Test harness;
- Key with transponder;
- Ignition switch with immobilizer antenna coil.


3.2 General Simulation Setup



3.3 Functional Operation Description

The immobilizer function of the GOL G4 starts to work when the key (KL15) is turned on. The modulate frequency, AM 125 KHz, is emitted and the Cluster do the recognition of the transponder code. If the answer is positive, the cluster tells ECM that key was recognized.

Author: Reinaldo M. Ferreira	Functional Manual	GOL G4
Version:1.0 Date: 2010.12.09		IMMOBILIZER

	Functional Manual for IMMOBILIZER Certification	2010/12/09 8/8
Electronics Systems R&D - Hortolândia	GOL G4	

4. ANATEL Label



Example of an ANATEL certification label.

Author: Reinaldo M. Ferreira	Functional Manual	GOL G4
Version:1.0 Date: 2010.12.09		IMMOBILIZER