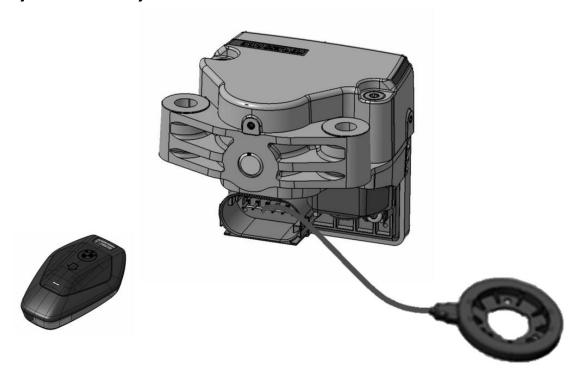


User Manual

BMW

Keyless Ride System



INDEX OF REVISIONS:

05.07.22: Rev00 First Release

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Abbreviations

KR Keyless Ride System

Main Unit Keyless Ride System's base station

User Key / Active Key Key with transponder and battery used to drive the motorcycle

Transponder / Passive Key Passive identification electronic device without supply

ECU Electronic Control Unit
CAN Controller Area Network

Antenna Device to transmit and receive RF signals

RF Radio Frequency
LF Low Frequency
HF High Frequency
KL15 Ignition signal

KL30 Vehicle power supply (battery +)

KL31 Vehicle GND (battery -)

2. Description

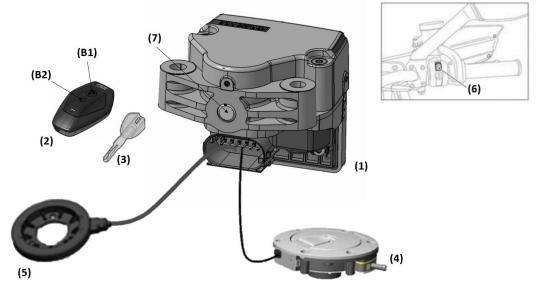
The Keyless Ride System (KLR) is an electronic unit for vehicles, composed by:

- the main unit (1), which provides the following functions:
 - user recognizer, by means of an active key (2) or a passive key (3);
 - the enable and disable of the ignition of the bike;
 - the Lock and Unlock of the steering, by moving a bolt (7);
 - the arming and disarming of the anti-theft alarm system;
 - Fuel Tank Cap opening (4);
- the active key (2);
- the **passive key**, an RFID transponder (3).

The customer should provide the following connections:

- LF antenna;
- external push button called Lock/Unlock button (6);
- CAN bus;
- fuel tank cap.

The KLR-System combines the transponder functionality (LF, Low Frequency 134.5 kHz) and the radio controller transmission (HF, High Frequency 433.92 MHz) to recognize the right user of the vehicle. The system is integrated on CAN bus to communicate with the other electronic units on the vehicle. Following, a typical mechanical application of the electronic system has been considered in order to explain its functionalities on the vehicle:



1.1 Key ON

1.1.1 Normal Mode

The user recognizing with the active key (2) is performed as described below:

- press the Lock/Unlock button (6) on the handlebar of the vehicle for less than 1 second (customizable parameter);
- the main unit (1) performs the radio frequency authentication of the key (2 or 3) by sending a request on LF band though the LF antenna (5);
- if the active key (2) is within the LF detection range (1.5 m) and the battery is charged, then it replies to the main unit (1) by transmitting its ID via an HF signal;
- the main unit (1) receives the information through an internal HF antenna;
- · if the main unit (1) recognizes the active key (2):
 - 1. starts the transmission of a periodical message on CAN bus;
 - 2. if the steering is:
 - a. locked: unlocks it by retracting the bolt (7);
 - i. press the Lock/Unlock button (6) on the handlebar of the vehicle for less than 1 second (customizable parameter);
 - ii. if the main unit (1) recognizes the active key (2), then it sets KL15 ON:
 - b. unlocked: sets KL15 ON.

Note: when the battery is discharged, the active key (2) acts like a passive key (3), as reports below.

1.1.2 Emergency Mode

The user recognizing with the passive key (3), or with a discharged active key (2), is performed as described below:

- · press the Lock/Unlock button (6) on the handlebar of the vehicle for less than 1 second (customizable parameter);
- the main unit (1) performs the radio frequency authentication of the key (2 or 3) by sending a request on LF band though the LF antenna (5);
- if the passive key (3) is within a range of distance up to 5 cm near the LF antenna (5), then it replies to the main unit (1) by transmitting its ID via a backscattered LF signal;
- the main unit (1) receives the information through the LF antenna (5);
- · if the main unit (1) recognizes the passive key (3):
 - 3. starts the transmission of a periodical message on CAN bus;
 - 4. if the steering is:
 - a. locked: unlocks it by retracting the bolt (7);
 - i. press the Lock/Unlock button (6) on the handlebar of the vehicle for less than 1 second (customizable parameter);
 - ii. if the main unit (1) recognizes the passive key (3), then it sets KL15 ON:
 - b. unlocked: sets KL15 ON.

1.2 Key OFF

When vehicle speed is equal to zero, by pressing the button (6) on the handlebar for less than 1 second (customizable parameter) the system goes in deactivation state for 2 minutes (customizable parameter); this is the time necessary to be able to open the fuel tank cap (4), after that Key OFF state occurs (KL15 OFF). Neither active key (2) nor passive key (3) are required.

1.3 Steering lock

To engage the steering lock:

- · stop the vehicle (perform a Key OFF);
- keep the active key (2) or the passive key (3) within the recognizing area;
- press the Lock/Unlock button (6) and hold it depressed for more than 3 seconds (customizable parameter) with steering turned completely to the left or to the right: steering lock will be engaged after this time (the bolt of the system (7) goes out).

1.4 Steering unlock

To unlock the steering, perform the Key ON procedure.

1.5 Fuel Tank Cap opening

Stop the vehicle and press the Lock/Unlock button (6). The fuel tank cap (4) can be opened in two ways:

Variant 1: Within the deactivation time

- · Pull the lid of the fuel tank cap (4) slowly upwards;
- · Fuel tank cap (4) unlocked;
- · Open the fuel tank cap (4) completely.

Variant 2: After the deactivation time

- Keep the active key (2) or the passive key (3) within the recognizing area;
- · Slowly pull the lid of the fuel tank cap (4) upwards;
- · Wait for the key to be recognized;
- · Slowly pull the lid of the fuel tank cap (4) upwards again;
- · Fuel tank cap (4) unlocked;
- · Open the fuel tank cap (4) completely.

1.6 Anti-theft alarm system

1.6.1 Anti-theft alarm system arming

To arm the anti-theft alarm system:

- · Press the Lock/Unlock button (6) to switch off the ignition;
- · Press button B1 of the active key (2) twice.

1.6.2 Anti-theft alarm system disarming

The anti-theft system can be interrupted at any time by pressing the button B2 of the active key (2), which should be within the recognizing area.

3. Installation notes

- 1. Zadi reserves of approve the installation activities on the vehicles.
- 2. The bolt, in rest position, must allow the overall/complete movements of the steering.
- 3. <u>LF Antenna Installation</u>: the item must be put in air, far from metallic parts. Every single installation must be agreed and approved by/with Zadi.
- 4. It is strictly forbidden modify, tamper the harness, antenna and any other part of the system.
- 5. <u>Harness installation</u>: the harness must be put in place far from the metallic parts and every single installation must be agreed and approved by Zadi.
- 6. Every single device damaged, MUST be replaced.
- 7. <u>Active key</u>: it is strictly forbidden have access to the inner electrical component of the active key, except for the battery compartment (to replace the battery exhausted).



3.1 Replacing the battery in the active key

It is strictly forbidden have access to the inner electrical component of the user key, except for the battery compartment in order to replace the battery exhausted.

To replace the battery in the user key follow the procedure described below:

NR.	DESCRIPTION	ILLUSTRATION
1	Turn the key upside down	
2	Identify on the bottom side of the key the battery cover release cut	V 05/15/1
3	Using the nail (or a plastic leverage) apply a pressure to remove the battery cover Note: DO NOT use a screwdriver or a knife or a metal leverage	

NR.	DESCRIPTION	ILLUSTRATION
4	Open the battery cover and place it in a safe place	
5	Insert your nail or a plastic lever into the entrance indicated by the yellow arrow and gently push from the opposite side following the direction of the red arrows	
5.1	Previous phase will free the battery to be removed	

NR.	DESCRIPTION	ILLUSTRATION
6	Battery removal complete Note: Old batteries must be lodged at a collecting point or at a service center	
7	Compatible batteries Type: CR2032 3V 225-235mAh Manufacturers:	CR 303
8	Insert the new battery in the reverse way of the removal procedure, check that the battery is correct inserted ("+" is to the external side of the key, "-" is to the internal of the key) and locked and check that the o-ring gasket is positioned correctly	

NR.	DESCRIPTION	ILLUSTRATION
9	To close the battery cover repeat the "Point n° 4" in the revers way	
10	Apply a pressure on the bottom side of the battery cover until you hear a "click"	
11	Replacement completed. Enjoy your ride!!!	

3.2 Warnings



The User Key contains a coin/button cell battery. If the coin/button cell battery is swallowed, it can cause severe internal burns in just 2 hours and can lead to death.

Do not ingest battery, Chemical Burn Hazard.

Keep new and used batteries of the User Key away from children.

If the battery compartment of the User Key does not close securely, stop using the product and keep it away from children.

If you think batteries might have been swallowed or placed inside any part of the body, seek immediate medical attention.

CAUTION. Risk of fire or explosion if the battery is replaced by an incorrect type.

4. Technical Specification

4.1 KLR Main Unit

4.1.1 Electrical features

Nominal voltage

Operating voltage

Operating temperature

13.5 V

6.7-16 V

-25 °C @ +60 °C

Storage temperature $-40 \,^{\circ}\text{C} \,^{\circ}\text{C}$ Operating Current consumption $-40 \,^{\circ}\text{C} \,^{\circ}\text{C}$ $< 0.25 \,^{\circ}\text{A} \,^{\circ}\text{C}$ 13.5 V

< 4 A @ 13.5 V with motor running

Stand-by Current consumption (5 s maximum)
< 1 mA @ 13.5 V
Key supply output (+15) 2.00 A

2nd Output supply 2.00 A
Operating Frequency LF 134.5 KHz
Operating Frequency HF 433.92 MHz

RF Power < 66 dBµA/m @10 m

Modulation Type UHF band: downlink only, FSK

LF band: uplink to RFID transponder, ASK downlink from RFID transponder, FSK

4.1.2 Mechanical features

Dimensions (with bolt for steering inside) 74.3 x 87.8 x 77.5 mm Dimensions (with bolt for steering outside) 84.3 x 87.8 x 77.5 mm

Weight 480 g
Bolt PUSH / PULL load \leq 50 N
External Housing Aluminum

Protection grade IP5K6K

Vibration resistance Sine on Random
Random: 100÷800 Hz @0.1 (m/s2)2/Hz

Sine:

X: 100÷2000 Hz peak 181 m/s2@424 Hz Y: 100÷2000 Hz peak 147 m/s2@182.06 Hz 182.07÷331.45 Hz peak 312 m/s2@240 Hz

Z: 100÷2000 Hz peak 162 m/s2@416 Hz

For an overcurrent protection an external fuse of 4.5 A is required.

4.2 Active Key - Remote control

4.2.1 Electrical features

Battery type CR2032
Nominal voltage 3 V
Operating voltage 2.5-3.16 V
Operating temperature -20 °C @ +60 °C
Storage temperature -30 °C @ +60 °C
Battery life > 12 months

Operating distance for Key-Card
Operating distance for passive key
Operating Frequency LF

10-150 cm (on air)
1-5 cm (on air)
134.5 KHz

Operating Frequency LF 134.5 KHz
Operating Frequency HF 433.92 MHz
RF Power < 10 mW e.r.p.

Modulation Type UHF band: uplink only, FSK

LF band: downlink from Main Unit: ASK (RFID)

uplink to Main unit: FSK (RFID)

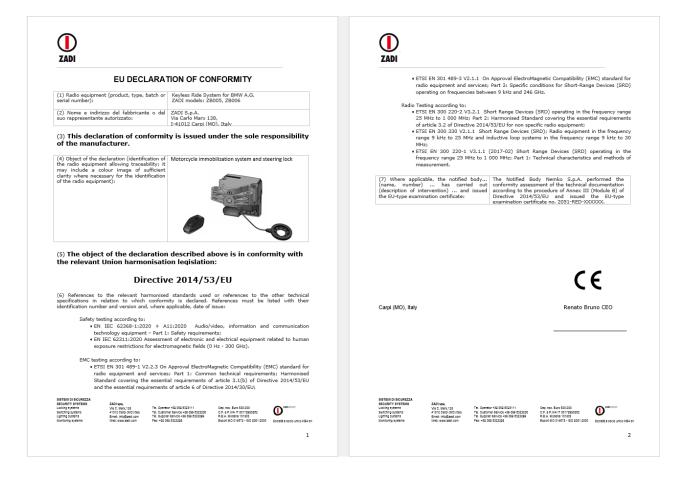
4.2.2 Mechanical features

Dimensions (with closed blade) 51.3 x 72.9 x 20.8 mm Dimensions (with opened blade) 51.3 x 110.4 x 20.8 mm

Weight 41 g

5. Certification

5.1 EU Declaration of conformity



5.2 USA Certification

Product name: Keyless Ride System Main Unit

FCC ID: VFZKLRMZB005

Product name: Keyless Ride System Active key

FCC ID: VFZKLRKZB006

Warnings

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

FCC§ 15.105 Information to the user statements

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- —Reorient or relocate the receiving antenna.
- —Increase the separation between the equipment and receiver.
- —Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- —Consult the dealer or an experienced radio/TV technician for help.

FCC § 15.21 - Information to user. "Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment."

RF Radiation Exposure

This product complies with FCC and ISED radiation exposure limits set forth for an uncontrolled environment. The antenna should be installed and operated with minimum distance of 20 cm between the radiator and your body.

5.3 Canada Certification

ICES-003 Class B Notice -Avis NMB-003 Class B: This Class B digital device complies with Canadian ICES-003 Cet appareil numerique classe B est conforme à la norme Canadien NMB-003. CAN ICES-3(B) /NMB-3(B)

Responsible party's contact located in the Canada:

Company Name:	BMW CANADA INC.
Company Number:	5452A
Company Address:	50 Ultimate Drive, Richmond Hill, Ontario, L4S 0C8 - Canada
Contact Name:	Andre Richard

5.3.1 Main Unit Certification

Product name: Keyless Ride System Main Unit (ZB005)

IC: 22239-KLRMZB005

This device contains licence-exempt transmitter(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada's licence exempt RSS(s). Operation is subject to the following two conditions: (1) This device may not cause interference. (2) This device must accept any interference, including interference that may cause undesired operation of the device.

L'emetteur/recepteur exempt de licence contenu dans le present appareil est conforme aux CNR d'Innovation, Sciences et Developpement economique Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisee aux deux conditions suivantes : (1) L'appareil ne doit pas produire de brouillage; (2) L'appareil doit accepter tout brouillage radioelectrique subi, meme si le brouillage est susceptible d'en compromettre le fonctionnement.

5.3.2 Active Key Certification

Product name: Kevless Ride System Active key (ZB006)

IC: 22239-KLRKZB006

This device complies with Industry Canada licence-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes: (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

RF Radiation Exposure

This product complies with FCC and ISED radiation exposure limits set forth for an uncontrolled environment. The antenna should be installed and operated with minimum distance of 20 cm between the radiator and your body.

Cet appareil est conforme aux limites d'exposition aux rayonnements de l'ISED pour un environnement non contrôlé. L'antenne doit être installé de façon à garder une distance minimale de 20 cm entre la source de rayonnements et votre corps.

This device complies with Health Canada's Safety Code. The installer of this device should ensure that RF radiation is not emitted in excess of the Health Canada's requirement.

Cet appareil est conforme avec Santé Canada Code de sécurité 6. Le programme d'installation de cet appareil doit s'assurer que les rayonnements RF n'est pas émis au-delà de l'exigence de Santé Canada.

5.4 Technical details for China market

BMW Keyless Ride System composed by:

(1) **Main Unit ZB005** (134.5kHz)

General transmitting SRDs; Category A equipment Operating frequency: 134.5 kHz (band 9-190 kHz)

EMF emission: < 72 dB µA/m (at 10 m) (-3 dB/octave) (quasi-peak)

Extreme environment condition: -25 °C + 60 °C

(2) Active Key ZB006 (433.92 MHz)

Radio control device for various kinds of civilian equipment

Operating frequency: 433.00-434.79 MHz Transmit power limit: <10 mW (e.r.p) Occupied bandwidth: ≤ 400 kHz

Extreme environment condition: -20 °C + 60 °C

is in conformity with the requirements specified in the Technical Requirements for micro-power (Short range) Devices, MIIT Notification no. 423,2005 when used within the Extreme environment conditions listed above.

Information:

1) 不得擅自更改发射频率、加大发射功率(包括额外加装射频功率放大器);不得擅自外接天线或改用 其它发射天线。

(Do not change the designed parameters (e.g. operating frequency, transmit power or antenna) without permission or connect the device to external RF power amplifier or antenna).

2) 使用时不得对各种合法的无线通信业务产生有害干扰;一旦发现有干扰现象时,应立即停止使用,并 采取措施消除干扰后方可继续使用。

(Stop the operation of the device immediately, if it causes any harmful interference to the existing radio communication operations or systems).

- 3) 使用微功率无线设备,必须忍受各种无线电业务的干扰或工业、科学及医疗应用设备的辐射干扰。
 (The operation of the device shall tolerate interferences form the radio communication system or radiated interferences from the ISM devices).
- 4) 不得在飞机或机场附近使用。

(Do not use the device near aircrafts or airports).

Sources:

1) 信部无[2005]423号:微功率(短距离)无线设备的技术要求

Technical requirements for micro-power (short-range) devices, MIIT notification no. 423, 2005.

2) 信部[1998]178号:微功率(短距离)无线电设备管理暂行规定

Provisional regulations for the management of micro-power (short-range) radio devices, MIIT notification no. 178, 1998.

5.5 Singapore Radio Equipment Type Approval Number

The certification label is reported in the User Manual due to the lack of space on the Active Key and of the fact the Main Unit it is not accessible to the final user.

ZB005 / ZB006: complies with IMDA Standards, DA105282

Complies with IMDA Standards DA105282

5.6 India Equipment Type Approval (ETA)

ZB005 Registration Number: XXX ZB006 Registration Number: XXX

5.7 Thailand NBTC sDoC

เครื่องโทรคมนาคมและอุปกรณ์นี้มีความสอดคล้องตามมาตรฐานหรือข้อกำหนดทางเทคนิค ของ กสทช

Telecommunication equipment and this device are comply with the standards or technical requirements of NBTC.

5.8 NCC Warnings

第十二條 經型式認證合格之低功率射頻電機,非經許可,公司、商號或使用者均不得擅自變更頻率、加大功率或變更原設計之特性及功能。 第十四條 低功率射頻電機之使用不得影響飛航安全及干擾合法通信;經發現有干擾現象時,應立即停用,並改善至無干擾時方得繼續使用。 前項合法通信,指依電信法規定作業之無線電通信。 低功率射頻電機須忍受合法通信或工業、科學及醫療用電波輻射性電機設備之干擾。

5.9 Serbian Approval



5.10 IFETEL Certifications

Advertencias de IFETEL

La operación de este equipo está sujeta a las siguientes dos condiciones:

- (1) es posible que este equipo o dispositivo no cause interferencia perjudicial y
- (2) este equipo o dispositivo debe aceptar cualquier interferencia, incluyendo la que pueda causar su operación no deseada.

5.10.1 Modelo ZB005 (unidad central)

Certificado Homologacion Numero: XXX

5.10.2 Modelo ZB006 (llave activa)

Certificado Homologacion Numero: XXX

5.11 Morocco Certifications

5.11.1 Main Unit ZB005

AGREE PAR L'ANRT MAROC

Numéro d'agrément : XXX Date d'agrément : XXX

5.11.2 Active Key ZB006

AGREE PAR L'ANRT MAROC

Numéro d'agrément : XXX Date d'agrément : XXX

5.12 Ukraine Certifications

5.12.1 Main Unit ZB005 Certification



5.12.2 Active Key ZB006 Certification



5.13 South Korea Certification



Company name: ZADI S.p.A.

Equipment Name: Keyless Ride System 자계유도식 무선기기

Basic Model Name: ZB005 Manufactured Date: Week / Year

Manufacturer / Country: ZADI S.p.A./ ITALY



Company name: ZADI S.p.A.

Equipment Name: Active Key 특정소출력 무선기기

(데이터전송용 무선기기)

Model Name: ZB006

Manufactured Date: Week / Year

Manufacturer / Country: ZADI S.p.A./ ITALY

5.14 UAE Certification

5.14.1 Main Unit ZB005 Certification

NOTICE

This equipment has been registered with the Telecommunications Regulatory Authority for use in the UAE.

TRA
REGISTERED No:
XXX
DEALER No:
XXX

5.14.2 Active Key ZB006 Certification

NOTICE

This equipment has been registered with the Telecommunications Regulatory Authority for use in the UAE.

TRA
REGISTERED No:
XXX
DEALER No:
XXX

5.15 Israeli Certification

5.15.1 Main Unit ZB005 Certification

שם בעל ההיתר: ZADI S.P.A ITALY

דגם: ZB005

Italy :ארץ:

5172747 מס. אישור מ

אסור להחליף את האנטנה

434.79-433.05 MHz מאושר לתחום תדרים

אשר ספק השידור אינו עולה 10.MW

5.15.2 Active Key ZB006 Certification

שם בעל ההיתר: ZADI S.P.A ITALY

דגם: ZB006

Italy :ארץ

אישור מס. 5172748

אסור להחליף את האנטנה

434.79-433.05 MHz מאושר לתחום תדרים

אשר ספק השידור אינו עולה 10.MW

5.16 South Africa Radio Equipment Type Approval Number

5.16.1 Main Unit ZB005 Certification

5.16.2 Active Key ZB006 Certification

5.17 Paraguay Approval Number

5.17.1 Main Unit ZB005

Este sistema posee el siguiente componente de radiofrecuencia, homologado por la CONATEL – Paraguay: marca BMW modelo ZB005, Fabricado por ZADI S.p.A.



5.17.2 Active Key ZB006

Este sistema posee el siguiente componente de radiofrecuencia, homologado por la CONATEL – Paraguay: marca BMW modelo ZB006, Fabricado por ZADI S.p.A.



5.18 Nigeria NCC

Connection and use of this communications equipment is permitted by the Nigerian Communications Commission

5.19 Jordan TRC

BMW Keyless Ride System, composed by Main Unit ZB005 and Active Key ZB006, is in conformity with Jordanian technical requirements