

# **User Manual / Functional description**

**5WK4 9233**

# **User Manual / Functional Description**

**of the**

**Siemens VDO**

**Radio Frequency Transmitter/Receiver**

**Type**

**5WK49230**

**5WK49231**

**5WK49232**

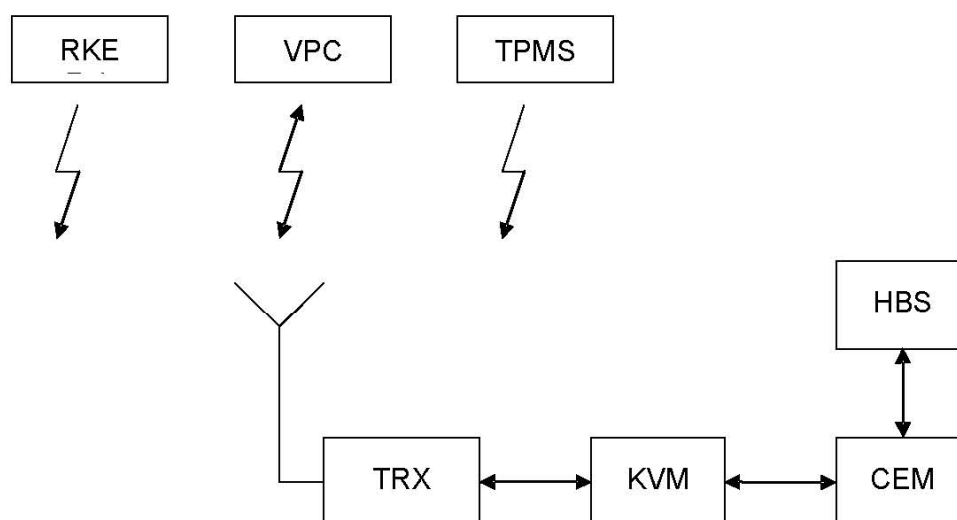
**5WK49233**

**5WK49234**

## 1. SYSTEM OVERVIEW

The Siemens VDO Transmitter / Receiver Unit (TRX) are placed in the vehicle and support the following Modules: Remote Keyless Entry (RKE), Tire Pressure Monitoring System (TPMS), Personal Communicator (VPC) and the Keyless Vehicle Module (KVM).

The Siemens VDO Transmitter / Receiver receive via RF transmission messages from the RKE, VPC, KVM and TPMS Modules and forward the message data via serial communication line to the KVM, which acts as a gateway to the Central Electronic Module (CEM). Furthermore, the Siemens VDO Transmitter / Receiver transmit data via RF transmission from the CEM and KVM to the VPC/KV remote unit.



Components of a KV/VPC system (bidirectional)

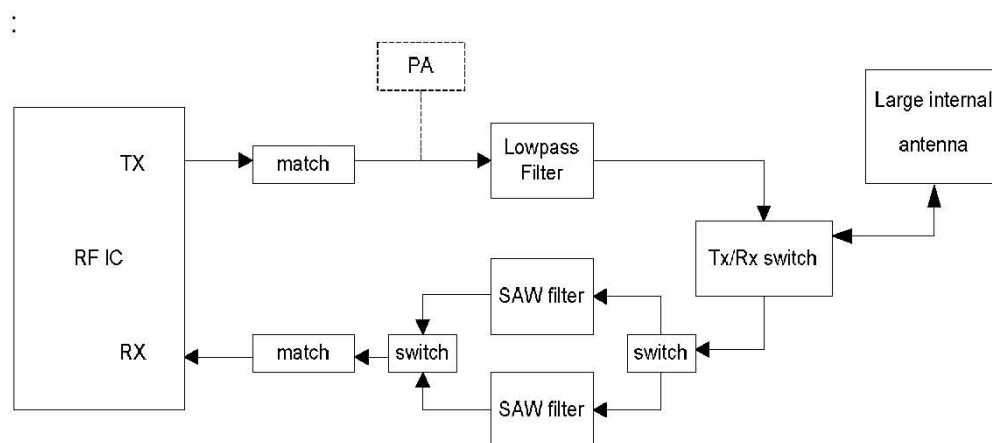
## 2. THEORIE OF OPERATION

For RKE messages it will be achieved a two-frequency agility function which means that the first part of a transmission is at one frequency  $f_1$  and the other within 2 MHz at  $f_2$ . Another receive path with matching to a second frequency band  $f_3$  used for TPMS messages.

The Transmitter / Receiver unit receives a radio signal from the corresponding transmitting unit and demodulates it. The TRX analyses if the received signal is having valid RF data. The TRX is be able to receive the RF signal and communicate via the communication bus simultaneously or with just a slight delay within milliseconds. The transmitter function will be controlled by the controller by configuring the IC and switching a receive/transmit switch fitted between antenna and receive/transmit circuitry on the PCB.

### 3. BLOCK DIAGRAMM

The block diagram below shows the main electronic units of the Transmitter / Receiver



### 4. VARIANTS

|                 |         |                    |
|-----------------|---------|--------------------|
| <b>5WK49230</b> | 426 MHz | Variant for Japan  |
| <b>5WK49231</b> | 447 MHz | Variant for Korea  |
| <b>5WK49232</b> | 868 MHz | Variant for Europe |
| <b>5WK49233</b> | 902 MHz | Variant for US     |
| <b>5WK49234</b> | 434 MHz | Variant for China  |

#### 5.1 TECHNICAL DESCRIPTION 5WK49230

|                                          |                              |
|------------------------------------------|------------------------------|
| Carrier frequency CH1 (incl. Tolerance): | 426, 0375 MHz $\pm$ 2.4 kHz  |
| Carrier frequency CH2 (incl. Tolerance): | 426, 1125 MHz $\pm$ 2.4 kHz  |
| Output power/field strength:             | < 10 mW                      |
| Type of modulation:                      | GFSK                         |
| Method of frequency generation:          | fractional N PLL synthesizer |
| Number of channels:                      | 2ch                          |
| Power supply:                            | car battery                  |
| nominal voltage:                         | 12V $\pm$ 0.1V               |
| Voltage supply range:                    | 10.5 ... 16V                 |
| Transmission range:                      | 100 m (system range)         |
| type of antenna:                         | Planar inverted f-antenna    |

## 5.2 TECHNICAL DESCRIPTION 5WK49231

|                                          |                              |
|------------------------------------------|------------------------------|
| Carrier frequency CH1 (incl. Tolerance): | 447,6500 MHz $\pm$ 2.0 kHz   |
| Carrier frequency CH2 (incl. Tolerance): | 447,8000 MHz $\pm$ 2.0 kHz   |
| Output power/field strength:             | < 10 mW                      |
| Type of modulation:                      | GFSK                         |
| Method of frequency generation:          | fractional N PLL synthesizer |
| Number of channels TRX:                  | 2ch                          |
| Power supply:                            | car battery                  |
| nominal voltage:                         | 12V $\pm$ 0.1V               |
| Voltage supply range:                    | 10.5 ... 16V                 |
| Transmission range:                      | 100 m (system range)         |
| type of antenna:                         | Planar inverted f-antenna    |

## 5.3 TECHNICAL DESCRIPTION 5WK49232

|                                          |                              |
|------------------------------------------|------------------------------|
| Carrier frequency CH1 (incl. Tolerance): | 868,05 MHz $\pm$ 5.85 kHz    |
| Carrier frequency CH2 (incl. Tolerance): | 868,55 MHz $\pm$ 5.85 kHz    |
| Carrier frequency CH3 (incl. Tolerance): | 433,92MHz $\pm$ 35 kHz       |
| Only Receive Path                        |                              |
| Output power/field strength:             | < 10 mW                      |
| Type of modulation:                      | GFSK                         |
| Method of frequency generation:          | fractional N PLL synthesizer |
| Number of channels TRX:                  | 2ch                          |
| Power supply:                            | car battery                  |
| nominal voltage:                         | 12V $\pm$ 0.1V               |
| Voltage supply range:                    | 10.5 ... 16V                 |
| Transmission range:                      | 100 m (system range)         |
| type of antenna:                         | Planar inverted f-antenna    |

## 5.4 TECHNICAL DESCRIPTION 5WK49233

|                                          |                              |
|------------------------------------------|------------------------------|
| Carrier frequency CH1 (incl. Tolerance): | 902,160 MHz $\pm$ 5.85 kHz   |
| Carrier frequency CH2 (incl. Tolerance): | 903,575 MHz $\pm$ 5.85 kHz   |
| Carrier frequency CH3 (incl. Tolerance): | 433,92MHz $\pm$ 35 kHz       |
| Only Receive Path                        |                              |
| Output power/field strength:             | < 10 mW                      |
| Type of modulation:                      | GFSK                         |
| Method of frequency generation:          | fractional N PLL synthesizer |
| Number of channels TRX:                  | 2ch                          |
| Power supply:                            | car battery                  |
| nominal voltage:                         | 12V $\pm$ 0.1V               |
| Voltage supply range:                    | 10.5 ... 16V                 |
| Transmission range:                      | 100 m (system range)         |
| type of antenna:                         | Planar inverted f-antenna    |

## 5.5 TECHNICAL DESCRIPTION 5WK49234

|                                          |                              |
|------------------------------------------|------------------------------|
| Carrier frequency CH1 (incl. Tolerance): | 433, 670 MHz $\pm$ 5.85 kHz  |
| Carrier frequency CH2 (incl. Tolerance): | 434, 251 MHz $\pm$ 5.85 kHz  |
| Carrier frequency CH3 (incl. Tolerance): | 433,92MHz $\pm$ 35 kHz       |
| Only Receive Path                        |                              |
| Output power/field strength:             | < 10 mW                      |
| Type of modulation:                      | GFSK                         |
| Method of frequency generation:          | fractional N PLL synthesizer |
| Number of channels TRX:                  | 2ch                          |
| Power supply:                            | car battery                  |
| nominal voltage:                         | 12V $\pm$ 0.1V               |
| Voltage supply range:                    | 10.5 ... 16V                 |
| Transmission range:                      | 100 m (system range)         |
| type of antenna:                         | Planar inverted f-antenna    |

## 7. LABEL DESIGN

### JAPAN (5WK49230):

Siemens VDO  
5WK49230

### KOREA (5WK49231):

Siemens VDO  
5WK49231

### EUROPE (5WK49232):

Siemens VDO  
5WK49232



### US,CANADA (5WK49233):

Siemens VDO  
5WK49233

FCC ID:KR55WK49233  
IC:267T-5WK49233

### Entry Owners Manual, Canada, USA:

#### NOTE

This device complies with part 15 of the FCC Rules and RSS-210. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept interference received, including interference that may cause undesired operation.

#### CAUTION

Changes or modifications not expressly approved by the manufacturer could avoid the user's authority to operate the equipment.

**CHINA (5WK49234):**

Siemens VDO  
5WK49234