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# Table of Contents

## TIRE PRESSURE CONTROL (RDC)

<b>Subject</b>	<b>Page</b>
Introduction. . . . .	3
System Overview. . . . .	3
Components	
RDC Control Unit. . . . .	4
Receiving Antennas. . . . .	4
Wheel Transmitter Modules. . . . .	5
Principle of Operation	
Initialization. . . . .	6
Tire Pressure Monitoring. . . . .	7
Tire Failure Warning. . . . .	8
Self Diagnosis. . . . .	8
Review Questions. . . . .	9

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## **TIRE PRESSURE CONTROL (RDC)**

**Model: E65 - 745i**

**Production Date: 11/2001 - Start of Production**

### **Objectives:**

After completing this module you should be able to:

- Recognize the components used in the RDC system.
- Explain when the initialization process is necessary.
- Understand the different criteria the RDC uses to distinguish a poorly inflated tire from a flat tire.

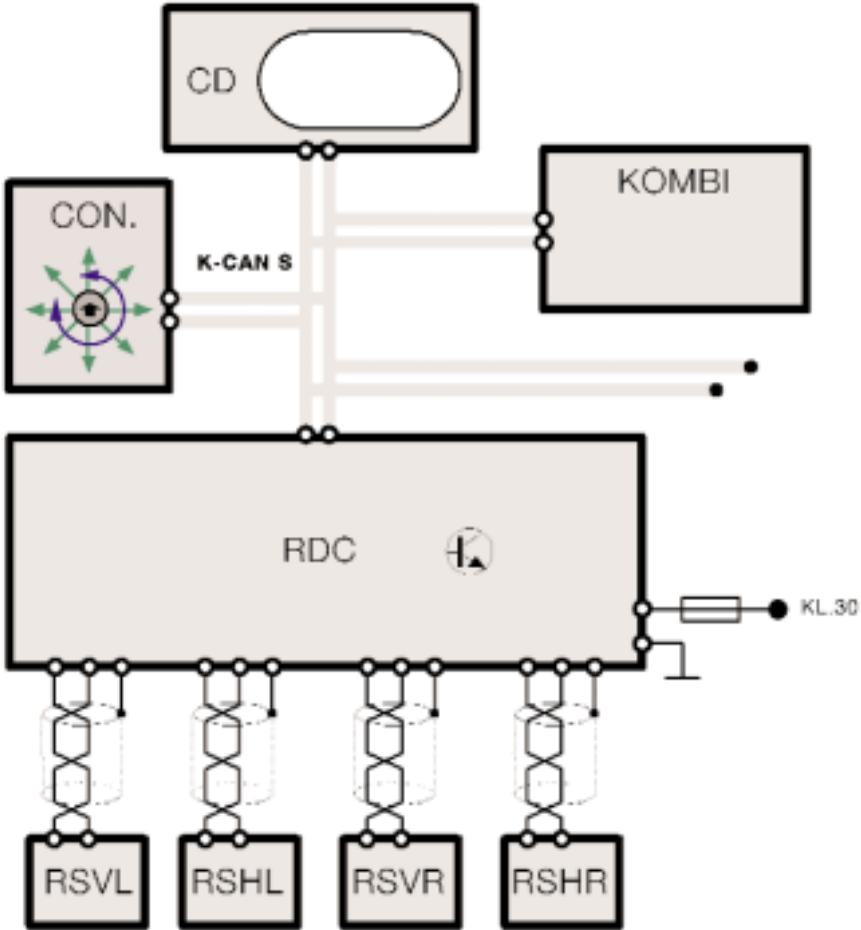
# Introduction

RDC is an available option for the E65. The system monitors the tire inflation pressures, both when the vehicle is being driven and when it is stationary.

An electronic transmitter module mounted inside each tire measures the tire pressure and temperature at regular intervals and transmits the information by radio frequency to the RDC control unit.

The driver is warned with a Check Control message of a tire that needs inflation or a possible flat tire.

# System Overview

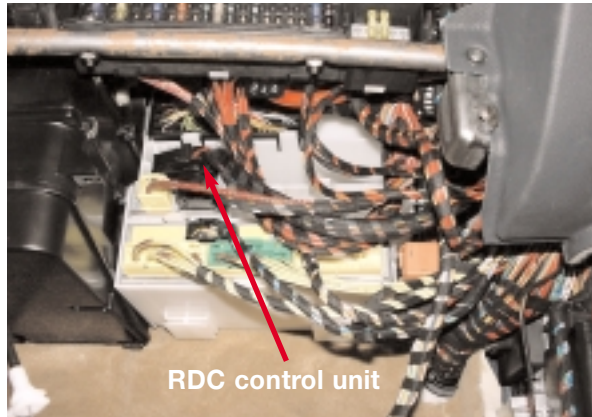


## Components

### RDC Control Unit

The RDC control unit is located behind the glove box on the equipment carrier above the ZGM.

The control unit is connected to the K-CAN System bus.



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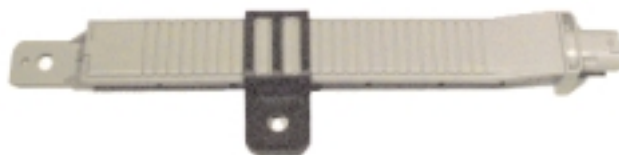
The RDC control unit is responsible for monitoring the individual pressures and temperatures of the tires (including the spare). If one of the tires inflation pressure falls below a specific threshold then the RDC generates a CC warning and telegrams it over the K-CAN-S.

The Instrument Cluster displays the check control warning icon and text message according to the message sent. The Control Display is informed by the Instrument Cluster of the required extended message.

### Receiving Antennas

The RDC antennas are located behind the splash shield of each of the four wheel houses.

The antennas receive the radio signals from the RDC transmitters and pass the signals along a shielded cable to the RDC control unit.



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## Wheel Transmitter Modules

The transmitter modules are located inside the tire attached to the valve stem. The modules contain a pressure and temperature sensor, a long life 3.6V lithium battery and a radio transmitter.

- Operating frequency for the U.S. : 315Mhz
- Battery life: 5 to 7 years



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The transmitter modules are active in an energy saving mode even when they are sitting on the shelf.

Each transmitter module has its own unique I.D. code. The I.D. code is assigned to a position on the vehicle (Right rear, left front etc.) after a successful initialization has been completed.

The radio signal transmitted by the wheel modules is received when the tire passes close to the antenna. The valve stem of the spare tire should be pointed towards the right rear wheel house because the spare is also included in the monitoring (although it is not displayed on the CD).

The wheel transmitter module measures its ambient air pressure every minute. If the air pressure increases by 0.5 bar between measurements, the transmission rate increases to every 0.8 seconds.

If the increase in air pressure is detected for approximately 216 seconds, the full functionality of the wheel module is activated. If the higher pressure then continues, the module remains permanently active and measures the air pressure and temperature every 0.3 seconds and transmits the information by radio signal every 55 seconds.

At temperatures over 120°C the transmitter modules are switched off. Once the transmitter cools to below 110°C operation resumes.

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# Principle of Operation

## Initialization

After the tires are replaced, rotated or if their inflation pressures are adjusted, then the wheel transmitter modules must be initialized using the RDC function in the “Settings” menu of the Control Display.

During initialization the following processes are performed:


- Individual wheel recognition (Identification of wheel transmitter modules).
- Wheel position assignment.
- Plausibility check (setpoint pressures checked).
- Adoption of setpoint pressures as specified pressures.

The RDC then learns the wheel transmitter module position.

The minimum air pressure accepted by the RDC on initialization is 1.7 bar (24.7psi). If the tire pressures deviate more than 0.4 bar (6psi) per axle the initialization is rejected after a plausibility check.

1.3 bar is the lowest pressure detected by the wheel transmitter module. At that point, a tire failure warning will always be issued.

Complete initialization can take up to 30 minutes. Only the actual driving time over 6 km/h is taken into account. During initialization, the CC message “Initializing RDC!” is displayed on the Instrument Cluster.

<b>Check Control Message displayed in KOMBI</b>	<b>Message displayed in Control Display</b>
Initializing RDC! 	“Initializing RDC!” RDC tire pressure monitor not available for 15 to 30 min. System is temporarily unable to detect flat tires.

When the initialization from the Control Display is activated, the wheels appear black and the pressures are not shown.



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Once initialization is complete, the tires of the car on the graphic turn green and pressure values are shown for each tire.

**Tire Pressure Monitoring**

During monitoring, the RDC control unit takes the measured temperature and pressure and determines a target pressure value.

If the tire pressure being monitored falls below the required level by 0.2 bar for more than 8 minutes, a CC message appears on the instrument cluster after the car is started. The driver is prompted to to check the tire pressure.

- “Autumn warning”: If the tire temperature is 20°C lower for 14 days than the temperature was when the RDC was last initialized the RDC will also warn the driver to check the tire pressures.


<b>Check Control Message displayed in KOMBI</b>	<b>Message displayed in Control Display</b>
Check tire pressures! 	“Check tire pressures!” Check tire inflation pressures; refer to owners manual or inflation chart.

When the RDC menu on the Control Display is activated, the car is shown with yellow tires.

The tire pressures must be adjusted and an initialization carried out.

## Tire Failure Warning

If a tire being monitored falls below the specified level by 0.4 bar after temperature calculation or 16% of the inflated pressure then a CC message appears on the instrument cluster with an audible warning tone. A message also appears on the Control Display.

<b>Check Control Message displayed in KOMBI</b>	<b>Message displayed in Control Display</b>
Flat tire! stop vehicle carefully 	Left front tire is flat, refer to owners manual or contact BMW Roadside assistance.

When the RDC menu on the Control Display is activated, the car is shown with the defective tire in red. In the case of a spare tire failure, all wheels are shown in red.

Once the tire pressures are restored to the setpoint in the RDS control unit the tires of the car graphic in the Control Display return to green and the Check Control message is withdrawn.

See the chapter “E65 Instrument cluster” for details on additional Check Control messages.



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## Review Questions

1. Where are the transmitters and antennas located for the RDC system? What is the operating frequency for the U.S.?

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2. What conditions cause the wheel transmitter units to go from energy saving mode to full functionality?

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3. When adjusting tire pressures on a vehicle equipped with RDC, what is the maximum difference between tires of the same axle allowed by the system?

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4. When is initialization of the RDC system necessary? Explain briefly what the system is doing during the learning process.

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