



# DB BR 204



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Whilst we do our utmost to reproduce sounds that are accurate and true-to-life, sometimes these sounds may not completely tally with the user's expectation. Due to the nature of the simulation, it is often not possible to reproduce a completely accurate soundscape for a variety of reasons such as limitations with our current technology and occasional inability to gain meaningful access to the locomotives being created. You should therefore regard the audio reproduction for our locomotives as authentic interpretations rather than perfect recreations.

## Background

### DB BR 204

The BR 204 was originally developed by the Deutsche Reichsbahn in the 1960s. They were known as the DR V100 series and built at LKM Babelsberg and LEW Hennigsdorf. A total of over 1,200 locos were built in different types, with different diesel engines and transmission drives for different countries. The first was the V100.1 (also known as the DR110 or BR 201) with a 900PS diesel engine. In addition, there was the refined or reconstructed V100.1 (also known as the DR112 or BR 202/204) with a 1250PS diesel engine. The last reconstructed V100.1 was the DR114 (or BR 204) with a 1500PS diesel engine and a new transmission drive without the mechanical 2-stage gearbox. There were also 68 units built for industrial usage, the DR108/DR111 (BR 293).

From 1994, ADTranz and Alstom bought a lot of the widely withdrawn V100s and carried out a refurbishment programme on them. Since then, the V100s are used all over Germany and even in other countries - mostly for shunting or industrial purposes.

The version, represented by this pack, is a by Alstom Stendal refurbished DR112, equipped with a new 1200PS Caterpillar diesel engine and modern train protection systems.

### Provided Functionality

- DB Traffic Red Livery.
- Prototypical driving behaviour, based on the DR V100.1.
- Plausible recreation of a 3-stage fluid torque converter transmission gearbox with additional 2 mechanical gears (shunting gear and fast gear).
- Prototypical PZ80r PZB90 V2.0 with AZ720.
- Prototypical Time-Time SIFA.
- Two brake modes (P and G) switchable and enforceable via. scenario script.
- Optional cold start functionality.
- Usable in double formation, including a switch to select which loco provides traction (leading only, leading + trailing).
- Switchable instruments light.
- Cab and desk light switches.
- Wipers with speed control.
- Usable cab windows, with lock lever and audible sound changes.
- Raindrop and lens flare effects.
- Diverse camera positions within the cab view.
- Scenario save system and rolling start compatible.
- Realistic sounds recorded from a real BR204.

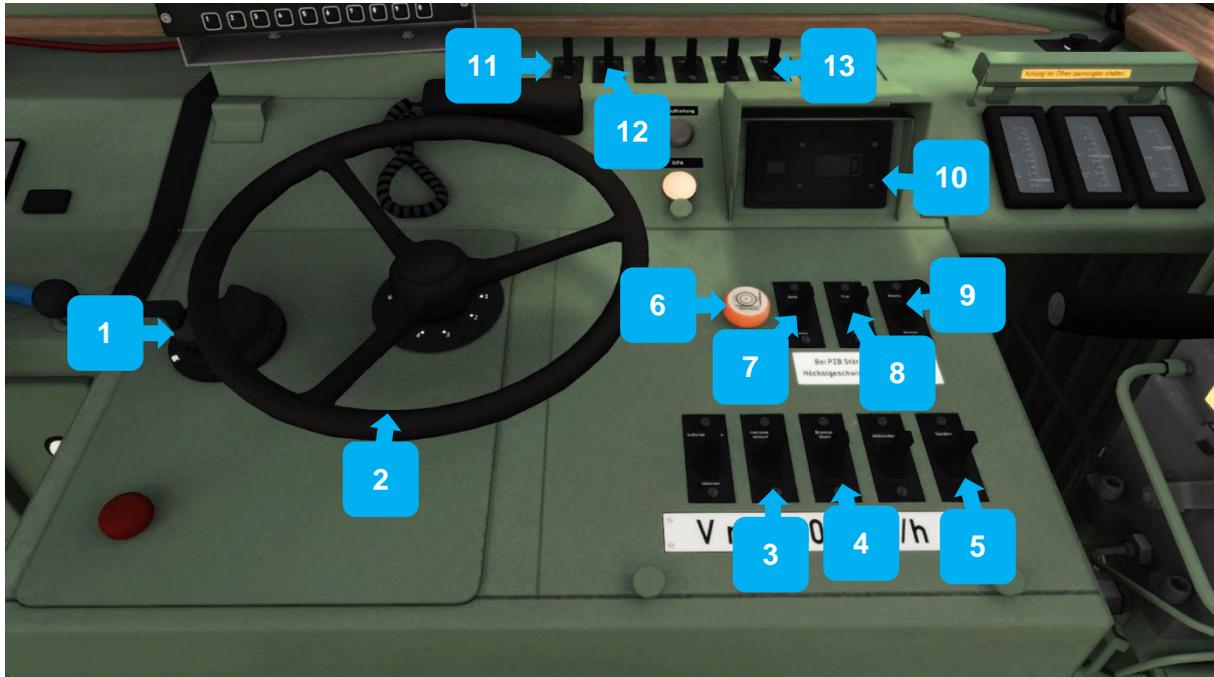
## Rolling Stock

### BR 204 in DB Livery

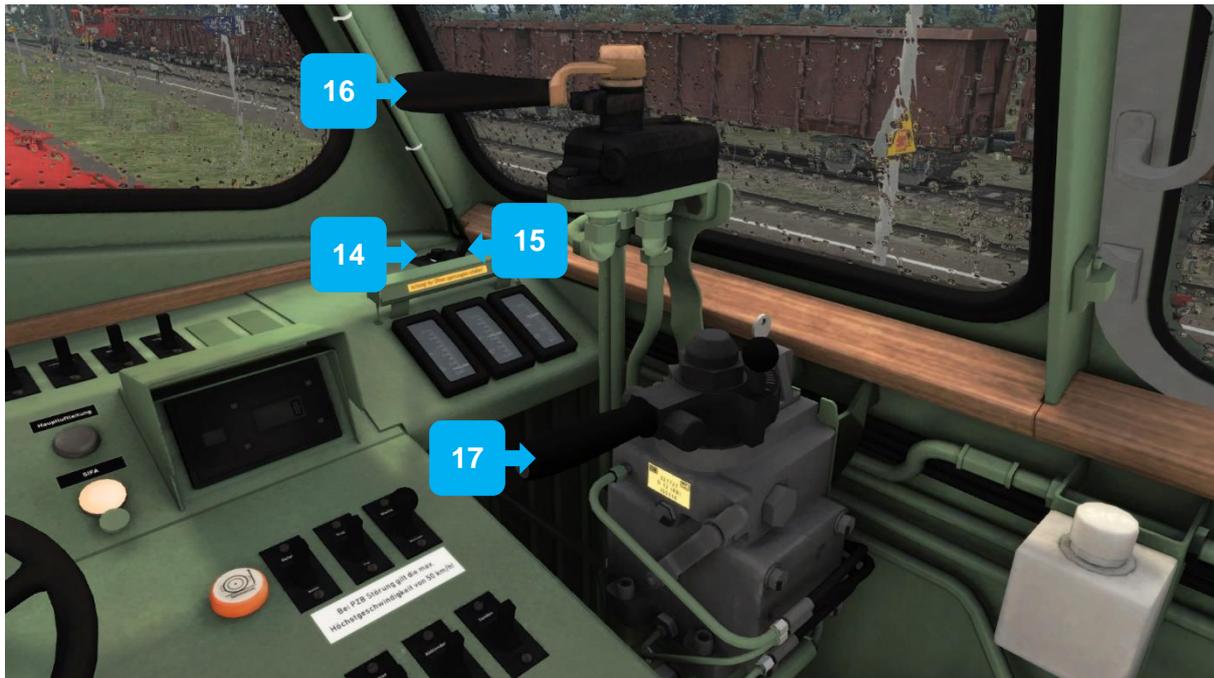


# Driving the BR 204

## Cab Controls



1	Reverser	8	PZB Free
2	Throttle wheel	9	PZB Acknowledge
3	Instruments light	10	AZ720 Display Unit
4	Release loco brake	11	Diesel engine start / stop (1)
5	Sander	12	Diesel engine start / stop (2)
6	Sander Hold	13	Cab light
7	PZB Command40		



14	Wipers speed	16	Loco brake
15	Wipers	17	Train brake

## Key Layout

Function	Key	Key
Battery on / off	Shift	B
Throttle wheel		A / D
Reverser		W / S
Gear selection	Shift	E
Train brake		; / '
Loco brake		[ / ]
Brake mode selection	Ctrl+Shift	;
Emergency brake		Backspace (←)
Hand brake		/
Sander		X
SIFA on / off	Shift Shift	7 NumPad-Enter
SIFA reset		Q NumPad-Enter
PZB on / off	Shift Ctrl	8 NumPad-Enter
PZB Acknowledge		PageDown
PZB Free		End
PZB Command40		Del
PZB Train mode	Ctrl Ctrl+Shift	8 NumpadEnter
PZB System information	Ctrl+Shift	8
Horn		Space
Wipers		V
Wipers speed	Shift / Ctrl	V
Cab light		L
Desk light		L
Gauges light	Shift	L
Instruments light		I
Help system of / off	Shift	[ (?)*

*\*may be a different key on some keyboard layouts*

## **Startup**

The locomotive is already set up and ready to drive when a scenario starts. All safety and protections system are off. You can switch them on if you need. There is also a cold start option. Please have a look into the associated sections within this manual.

## **Message and Help system**

The locomotive has a special message and help system to give you information about events and errors which may occur.

### **PZB Help system**

The locomotive has a help message system for the train protection systems. If you get an emergency brake due to incorrect operation, additional information will be displayed in a message box. This should help you to understand these complex systems.

Switch on or off the PZB help system with the key command <Ctrl+[>.

## **Battery**

Before you can start driving with this locomotive, the battery needs to be switched on. You do this by using the key command <Shift+B>. The battery can only be switched on when the train is not moving, and the reverser is set to position 0 (zero) and the diesel engine is stopped. The battery is always fully charged. Normally the battery is switched on already at the begin of a scenario and therefore you won't normally need to switch it on.

## **Diesel engine start / stop | Cold start | Double formations usage**

Normally at scenario start, the diesel engine is already running. Even when using a double formation, the second trailing locomotive's engine is already running.

### **Cold start**

If you are using the cold-start option, you need to start the diesel engine by yourself. To do that, you first need to switch on the battery. That can be done by using the key command <Shift+B>. After turning on the battery you need to wait some time for the engine water and transmission oil temperatures to adjust to their normal levels (Normally these locos need a prewarming procedure before you can start them. This has been simplified in this version of the locomotive so you don't need to wait to long). For this have a look at the temperature gauges. If the engine water temperature is at about 55°C you can start your diesel motor with using the engine start/stop button "Eig. Diesel" on the upper desk 1 panel putting it to the "Ein" position for a moment.

When using a double formation with a cold start you will also need to go to the second locomotive and switch on its battery. You could start the diesel engine from there, but you don't need to since you can start and stop the engine of the trailing locomotive from within the leading locomotive. For doing that use the "Fremd. Diesel" switch on the upper desk panel and switch it to the "Ein" position for a moment.

You can of course stop the diesel engine with the same switch by moving it into the "Aus" position. That also works for the trailing locomotive in a double formation.

### **MU switch**

With using a double formation of this locomotive you can control which locomotive should give tractive effort when applying power with the throttle wheel. In the real locomotive you can chose between "own locomotive", "both locomotives" and "only trailing locomotive". In this simulation the first two options are modelled.

When both engines are running and you temporarily don't need the power of both, switch the MU switch into the "Eigene Lok" and only the leading locomotive will give tractive effort, even when the diesel engine of the second locomotive is already running. When you then need the full power of both locomotives back simply put the MU switch to the "Vielfach" position.

## Throttle wheel and transmission

With the throttle wheel you can select the notches for the engine speed and the transmission fill state. It has 7 notches (0-6). In position 0 (zero) the diesel engine will hold in idle state and the fluid transmission box does not fill the converters with oil. So, there is no tractive effort. When you wish to start, you first need to select notch 1 and stay there for about 2 seconds. In that time the first converter of the fluid transmission box will be set under oil pressure to provide some tractive effort to the gearbox and the axles. The diesel engine will not spin up at notch 1. But you will have a little portion of tractive effort for slow moves.

If you want to go faster just select a higher notch. Please notice that every selected notch gives some tractive effort to the axles at every speed. Even in notch 1 you may reach about 80km/h with a light engine. That's how a torque converter works in such a diesel locomotive. If you move some heavy trains you will of course need some higher notches. Please also keep in mind, that with heavy trains, the resistance at the start will let you wait up to about 15 seconds until the train finally starts moving. It depends on the length and weight of the train. Additionally, you will lose some tractive effort when in curves. The sharper a curve is the more tractive effort will be lost. The measurement of that in the simulation will respect the train length and mass in some portion.

## Fluid transmission

The simulation of that locomotive involves a 3-stage fluid torque converter transmission with additional two mechanical gears. That means, that you will not have a constant tractive effort at every speed. Each converter has its own torque curve by the given speed. The transition between the stages depends on the speed and the throttle wheel position. Higher notches will move the transition point up. You can also hear that transition because the diesel engine spins a bit up and down at that moment. At the same time, you will lose a bit of tractive effort which you may need to bear in mind when hauling heavy trains up hills. The transition downwards follows the same procedure but with an offset. That's called hysteresis and is there to prevent the stages from switching back and forth at a constant speed.

## Mechanical gear box

The BR204 also has a two-stage mechanical gear box. The first gear - the slow or shunting gear – provides additional starting tractive effort (202kN / 45,411 lb/ft) at lower speeds but will limit the maximum speed to 65km/h (40mph). The second gear - the fast gear – provides around 157kN (35,295 lb/ft) for starting and allows a maximum speed of 100km/h (62mph).

To change the gear please use the key command <Shift+E>. Please note that there is no lever or control in the cab view or HUD control for this function.

The gear may only be changed while the train is at a complete stop and the reverser is set to 0 (zero). The gear in use by default is the 'fast' gear, and if this is changed a pop-up message will confirm which gear has been selected.

## Throttle wheel lock

In the following situations the throttle wheel will be locked:

- PZB/SIFA emergency braking is applied
- Normal brake application of the train brake
- You hit the emergency engine shutdown button
- Reverser is in 0 position (mechanical lock, wheel will not move)
- If the wheel is locked, you can't apply any notch and therefore no power.

## Zero position force

If the wheel is locked, you need to have specific conditions to unlock it again. Additionally, the wheel needs to be set to notch 0 once before. To unlock the wheel again, the following conditions are needed:

- Throttle wheel in position 0
- There is no emergency braking active
- The diesel engine is running
- The reverser is set to M,V or R

## Reverser lock

The reverser handle is locked as soon as the throttle wheel is not in zero position.

## Brakes

This train is equipped with 2 brake systems.

- Direct air brake
- Automatic train air brake with two brake modes, G and P

### The automatic train air brake

The air brake in that train is normally a release-once brake system, where you are able to proportionally apply the brakes, but once they have been released no further application is possible until the brakes have been fully released. In this simulation we decided to implement a more common and simpler usage. As a result, the braking represented is a full proportional brake system. You can apply and release it in stepped proportions like usual on modern German trains.

### Brake mode

The brake is able to use two different brake modes. The 'P' mode for lighter freight or passenger trains, and the 'G' mode for heavy freight trains, where the fill and release rates are significantly slower. You can switch the brake mode by using the <Shift+Ctrl+;> key command. Before you can do that, the brake lever needs to be in the emergency brake position and the train needs to be at a complete stop. Keep in mind that the braking in mode 'G' can be very challenging.

#### Please note:

There is a possibility to set the brake mode from scenario script and then the mode is forced and can't be switched again by the player. If this happens, you will get a message box on the top right corner that informs you about it.

### The direct air brake

The direct locomotive brake is a proportional brake system that only acts on the locomotive itself and is controlled by the engine brake lever, to apply or release the brakes. The lever has three positions.

- The release position releases the brake if it is in that position.
- The middle position holds the actual pressure in the brakes.
- The apply range applies the brakes, and the application will be faster the more the lever is moved back. The lever is designed to self-centre and will not rest in the apply range, returning to the middle position when not in use.

### Wheel slip and sander

Use of the sander should not typically be a concern as this locomotive does not have that much power on the rails to begin slipping at normal operations. If the train slips or glides, you can use the HUD Sander switch, or the button on the desk, or hold the <X> key down.

## PZB

PZB stands for Punktförmige Zugbeeinflussung, loosely translated to English this means “Spotwise Train Control”.

A given line is broken up into a series of blocks, and trains are permitted (via green or yellow) signals to enter a block. While a train is present in a block the signal permitting entry is set to red, preventing any more trains to enter.

PZB is a complex system and requires that you understand the varying speed limits and the requirement to respond promptly to the signalling system.

### **PZ80r System PZB90 V2.0 (Point-based train protection and control system)**

The train has a realistic built in PZB90 system used in Germany for the speed control of trains. It represents in its actual state the near full prototypical implementation of the software version 2.0. This means it reacts like in the real world but is dependent upon the trackside equipment installed in each route. Most German routes for Train Simulator are equipped with a proper PZB implementation, but not all.

### **AZ720 Display Unit**

This locomotive, as most other DR locomotives or trains, is equipped with an AZ720 display unit to display the PZB states and the speedometer value. For PZB, there is only one blue indicator lamp for all three train modes. The selected train mode and the associated control speed is displayed in the smaller left LCD of the AZ720. For train mode O, it displays an 85, for mode M a 70 and for mode U, a 55. When under restrictive mode, it displays the maximum speed at which you can drive. When under a normal influence, the yellow 1000hz lamp lights up and the blue indicator starts blinking. The rest of it works like a normal PZB display.

After switching on or changing the mode the PZB will start a self-test. The PZB can only be switched on or off and the train mode could only be changed when the train is not moving, and the reverser is set to M.

## PZB Key Controls

Function	Key	Key
Toggle PZB On/Off	Ctrl +	Enter (Numpad)
Change PZB Mode	Ctrl + Shift +	Enter (Numpad)
PZB Wachsam / Acknowledge		Page Down
PZB Frei / Free		End
PZB Wachsam / Acknowledge		Del

**Important:** The use of the PZB Acknowledge switch will be registered by the PZB system when the switch is releasing! That is a prototypical behaviour and different to earlier/other PZB systems installed in other vehicles with PZB equipment. You can switch and hold PZB Wachsam / Acknowledge switch when you pass a 1000Hz magnet, but you need to release the switch in before four seconds have elapsed to avoid an emergency brake application.

## PZB Help System

The help system will assist you when you have no experience with the PZB and a message box will be displayed detailing why an emergency brake application has been made, for example.

An additional yellow needle on the speedometer gives you information about the target speed. Switch the help system on or off with <Ctrl+->.

## SIFA

SIFA is short for Sicherheitsfahrerschaltung or “Safety Driving Switch”.

The train has a working Time-Time-SIFA (vigilance alarm with timer) which can be activated or deactivated with <Shift+NumPad-Enter> The purpose of the SIFA is to keep the driver vigilant at all times and to allow the train to come quickly and safely to a stop should the driver become incapacitated or otherwise not be in proper control of the train.

If SIFA is activated you must press the SIFA reset every 30 seconds to reset the timer. Use the key command <NumPad-Enter> or <Q> for this.

If you forget to reset the SIFA timer, the SIFA lamp will light up on the desk to remind you to press the SIFA reset. If you miss this, after 2 seconds you will get a warning signal that will last for a further 2 seconds after which the train will begin braking automatically and give an emergency warning signal. This braking may be stopped at any time by pressing the SIFA reset button, as this is not categorised as a real emergency brake application.

The SIFA will pause if you switch to an outside view. So, you can have it switched on even if you want to explore the route scenery from an external view which driving. On returning to the cab view the SIFA timer will begin counting down again from 30 seconds.

### SIFA Key Controls

Function	Key	Key
Activate/Deactivate	Shift +	Enter (Numpad)
Alarm Acknowledge		Enter (Numpad)

## Additional Systems

### Headlight Controls

You can switch on or off each headlight or taillight individually. Use the six switches on the panel left on desk 2. For the main headlights there are only two options; on or off. For the ditch lights you have three options for each; white, off, red.

#### **Please note:**

When using the individual switches for the lights, the internal headlight switch will remain showing the existing off/on position and does not get switched. That means if you have wagons with tail lights, they will not be switched on/off. This may be achieved by the use of the internal headlight switch instead of the individual switches, using the standard key command <H> or <Shift+H>. When doing that, the standard light configuration will be applied to the switches.

This usage also applies to the HUD headlight switch. AI uses standard configurations dependent on the driving direction.

# Scenarios

## Career Scenarios

- [204] 1. Stralsund Harbour
- [204] 2. Port Shunt
- [204] 3. The Rescue

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