



dovetail
GAMES

DB BR474.3



| | |
|--|-----------|
| 1 BACKGROUND | 4 |
| 1.1 Loco..... | 4 |
| 2 ROLLING STOCK | 5 |
| 2.1 DB BR474 Driving Trailer | 5 |
| 2.2 BR474.3 Motor Trailer (Pantograph) | 5 |
| 2.1 BR474 Motor Trailer (Third Rail)..... | 6 |
| 3 DRIVING THE DB BR474.3 | 7 |
| 3.1 Cab Controls | 7 |
| 3.2 Locomotive Keyboard Controls..... | 8 |
| 3.3 General Keyboard Controls | 8 |
| 4 USING CUSTOM NUMBERING | 9 |
| 4.1 Assigning Destinations and Numbering..... | 9 |
| 5 PZB SIGNALLING SYSTEM | 10 |
| 5.1 PZB Track Interface | 10 |
| 5.2 In-Cab Indicators | 11 |
| 5.3 Cab Controls | 11 |
| 5.4 Key Controls..... | 12 |
| 5.5 Train Types | 12 |
| 5.6 PZB Example | 13 |
| 6 SIFA | 16 |
| 7 MANUAL DOOR CONTROL | 17 |
| 8 SCENARIOS | 18 |
| 8.1 1. [474.3] Strange-bahn | 18 |
| 8.2 2. [474.3] Strange-bahn: The Return..... | 18 |
| 8.3 3. [474.3] Even More Strange-bahn | 18 |
| 8.4 4. [474.3] Replacement Shuttle: Part 1 | 18 |
| 8.5 5. [474.3] Replacement Shuttle: Part 2 | 19 |
| 9 ACKNOWLEDGEMENTS | 20 |

1 Background

1.1 Loco

The BR474.3 is a three-car electric multiple unit train, designed and operated for the Hamburg S-Bahn, replacing the nearly 60 year old Class 471 had previously been used.

In 2006-2007 9 new vehicles and 33 cars were converted cars were produced for catenary operation in order to operate services on the line to Stade.

Design & Specification

| | |
|--------------------------|----------------------------|
| Power Type | Electric |
| Locomotive Weight | 106t |
| Vehicle Length | 66m (216' 6") |
| Build Date | 2007 |
| Vehicle Power | 920kW (1,230bhp) |
| Top Speed | 100km/h (62mph) |
| Brake Types | Electric, Air |
| Tractive Effort | Maximum: 144kN (32,000lbf) |

2 Rolling Stock

2.1 DB BR474 Driving Trailer



2.2 BR474.3 Motor Trailer (Pantograph)

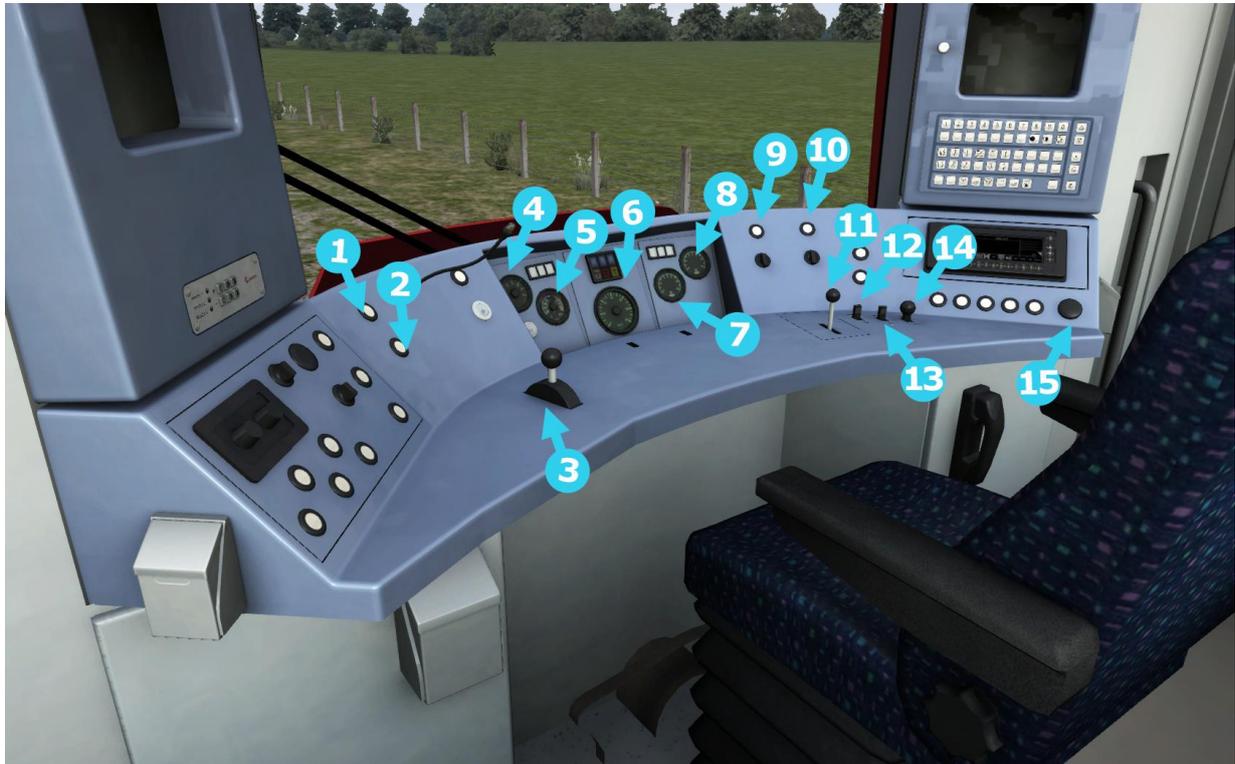


2.1 BR474 Motor Trailer (Third Rail)



3 Driving the DB BR474.3

3.1 Cab Controls



| | | | |
|---|-------------------------------|----|------------------|
| 1 | Forward | 9 | Headlight Switch |
| 2 | Reverse | 10 | Wipers |
| 3 | Combined Throttle/Brake | 11 | Train Brake |
| 4 | Main Reservoir | 12 | Override |
| 5 | Traction Needle | 13 | Release |
| 6 | Speedometer | 14 | Acknowledge |
| 7 | Airbrake/Train brake Pressure | 15 | SIFA Reset |
| 8 | Main Reservoir/Airbrake | | |

3.2 Locomotive Keyboard Controls

| Key Equivalent | Action |
|----------------|--|
| D / A | Decrease or Increase Throttle. |
| S / W | Move Reverser Control Forward or Backward. |
| ; / ‘ | Decrease or Increase Train Brake. |
| [/] | Decrease or Increase Locomotive Brake. |

3.3 General Keyboard Controls

| Key Equivalent | Action |
|------------------|---|
| T | Load/Unload. Press to load/unload passengers or freight. |
| H | Headlights. Repeatedly pressing will cycle through headlight states as appropriate. |
| I | Instrument Lights. Press to toggle instrument lighting on and off. |
| L | Cab Lighting. Press to toggle the cab lighting on and off. |
| V | Windscreen Wipers. Press once to switch on and again to switch off. |
| Z | (Expert) Engine Stop/Start. By default engines will already be running at the start of a scenario. Press this button to stop and then again to restart the engine. |
| X | (Expert) Sander. Causes sand to be laid on the rails next to the wheels to assist with adhesion. Press once to apply sand and again to stop. |
| Space | Horn. Press to sound the horn. |
| / | Handbrake On/Off. This icon is displayed in the Coupling view. |
| Shift + Ctrl + C | Couple Manually. |
| Tab / Ctrl + Tab | Request authority to pass a signal at danger. |

4 Using Custom Numbering

4.1 Assigning Destinations and Numbering

When placing a BR474 in custom scenarios you may want to change the vehicle number or destination board. These properties are controlled by editing the rail vehicle number, which is accessed by double clicking the rail vehicle when editing a scenario within the scenario editor.

In order to display a specific destination, the correct value must be entered into the vehicle properties window. This consists of a 12 digit value prefixed with the destination code letter e.g. B948004741435

The destination codes assigned to the BR474 are –

- A -Nicht Einsteigen
- B -Harburg Rathaus
- C -Stade
- D -Altona
- E -Aumuhle
- F -Bergedorf
- G -Elbgastrabe
- H -Poppenbittel
- I -Airport/Poppenb.
- J -Pinneberg
- K –Wedel
- L – Sonderzug

The destinations may also be changed when driving by pressing Ctrl+Shift+ 5 or Ctrl+Shift+ 6 to scroll through the list in either direction.

5 PZB Signalling System

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

Safe distances between trains are managed conventionally through the use of block-based signalling, whereby a given line is broken up in to a series of blocks and trains are permitted (via green or yellow) signals to enter a block. Once a train is present in a block the signal permitting entry is set to red, preventing any more trains entering.

As railways have developed more complex control systems and in-cab signalling have been implemented to improve the safety of the railways, and to ensure that drivers are fully aware of what is happening around them by requiring them to take certain actions as each new situation develops.

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

5.1 PZB Track Interface



The PZB system incorporates in-cab signalling where the control desk has indicators, alarms and buttons that will react according to the signalling status on the railway.

The mechanism by which this works is a series of “balise” magnets placed on the side of the track as shown above which are detected by the passing train.

5.2 In-Cab Indicators

Inside the cab there are lights pertaining to the state of the PZB system as shown in the diagram below:



5.3 Cab Controls

There are also three controls that you will need to use in order to interact with the PZB system.



PZB controls in the cab of a DB BR474.3

These three controls, to the right of the throttle wheel on the DB BR474.3, are named as follows:

- 1 – German: PZB Befehl / English: PZB Override
- 2 – German: PZB frei / English: PZB Release
- 3 – German: PZB wachsam / English: PZB Acknowledge

5.4 Key Controls

| Key Equivalent | Function |
|----------------|---------------------|
| Ctrl + Numpad | Activate/Deactivate |
| Enter | |
| Delete | Override |
| End | Release |
| Page Down | Acknowledge |

5.5 Train Types

There are three PZB setups to accommodate three general train classifications by imposing different speed limits.

| | |
|-------------------|-----------------------------|
| Type O (Obere) | Passenger Trains |
| Type M (Mittlere) | Faster Freight Trains |
| Type U (Untere) | Slow / Heavy Freight Trains |

The DB BR474.3 uses the Type O implementation of PZB, and when the system is active the LED display will show the number 85 as seen above.

5.6 PZB Example



There are three primary points noted in the diagram above:

A – The distant signal, placed around 1.2km from the hazard (such as a converging junction).

B – Around 250m before the guarding signal.

C – The guarding signal; normally placed around 200m before the hazard.

Let's take a look at what happens in this simple example as you begin on the left hand side of the image above and progress along the track until you get to the guarding signal on the right.

We'll assume that in this case there is a converging junction set against us and therefore the guarding signal is at a stop indication.



As you approach point A, the Distant Signal will show a Yellow indication to let you know that the signal it is reflecting (at C) is at red indicating danger.

You will also notice that there is a magnet next to this signal. This is called a 1000Hz magnet.

As the signal is not showing a green aspect the magnet will be energised and the PZB system on-board the train will sense its presence.

As the train passes over the 1,000Hz magnet the driver has *up to 4 seconds* in which to press the PZB Acknowledge button.

If the driver fails to do this the PZB system will apply emergency brakes to stop the train.



When the 1,000Hz magnet has been passed an audible alert will sound and the "85" display will begin to blink.

Once the PZB Acknowledge button is pressed the audible alarm will cease, the "85" display continues to blink and the 1,000Hz display is shown, indicating that the train is now in a PZB monitored state.

A further 23 seconds are then allowed in which the train speed must be decreased to 85km/h. If after 23 seconds this speed is being exceeded then the PZB system will apply emergency braking.

Continue onwards towards the guarded signal at no greater speed than 85km/h. After 700 metres, PZB monitoring temporarily ceases and the 1,000Hz display will no longer be shown. Now the driver can make a decision based on the aspect shown by the upcoming signal.

If the signal is showing a red aspect the train needs to continue slowing down to stop.

If, however, the signal is now showing a clear aspect (because the hazard has cleared) the driver has the ability to fully release the train from monitoring by pressing the PZB Release button. As long as this is pressed before reaching Point B on the diagram the train will be permitted to return directly to line speed.

Caution:

Be careful to ensure that you only release PZB when the signal is clear. If you release and the signal is not clear, when you reach Point B the system will assume that you are incapable of safely driving the train and will apply emergency braking.

Assuming the signal is still at danger and that PZB monitoring has not been fully released a further track magnet will be encountered: this is the 500Hz magnet.

As the 500Hz magnet is passed the train speed must not exceed 65km/h or emergency braking will be applied.



At this point the 500Hz indicator will be displayed, although no acknowledgement of this is required.

After passing the 500Hz magnet the train speed must be reduced to under 45km/h within 153 metres to avoid an emergency brake application.

Even if the signal now changes to a clear aspect the 45km/h speed limit must still be adhered to, and it is not possible to use PZB Release whilst being monitored under a 500Hz restriction. Once the guarding signal (Point C) has been passed normal line speed may be resumed.

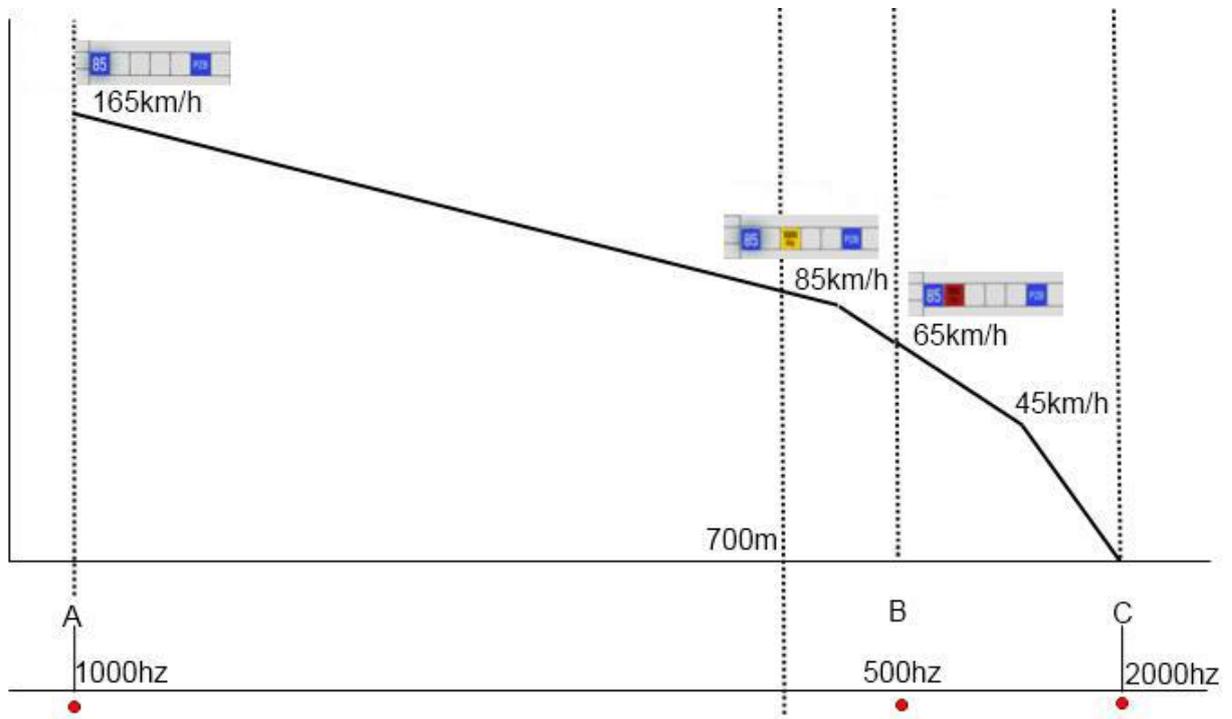
After stopping at a red signal the driver may request permission from the controller to pass it at danger. In order to pass the red signal the PZB Override button should be pressed.

At Point C the guarding signal has the third and final type of magnet, which is a 2,000Hz magnet. This magnet will *a/ways* stop the train if passed and is used to stop trains that pass the signal while it is at danger.

Pressing and holding PZB Override button will stop the PZB system from reacting to the 2,000Hz magnet.

Example Run Graph

This is a graphical representation of the example, indicating the magnets, speed limits and the expected PZB indications.



6 SIFA

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

The SIFA vigilance alerter is disabled at startup, but can be activated or deactivated by pressing ‘Shift+Enter(Numpad)’. While activated the SIFA light on the cab dashboard is normally switched off. While the train is moving the driver is required to confirm an alarm every 30 seconds.

When the 30 second alarm is triggered the SIFA light on the cab dashboard will illuminate, and after an additional 4 seconds an audible alert will sound.

After a further 2.5 seconds the emergency brake will be applied. This can be avoided by acknowledging the alarm at any stage by pressing the ‘Enter (Numpad)’ key.

7 Manual Door Control

The BR474.3 features optional Manual Door Control. If activated this allows the Driver to manually control the opening and closing of the coach doors.

The system is toggled by pressing Ctrl-Shift-T. Once activated the doors can be opened by pressing the T key. However the doors will no longer close after the passenger pick up timer has expired. Instead the Driver must press Ctrl-T after the timer to manually close the doors.

If the doors are open the Driver will not be able to pull away as the system will not allow power to be applied until the doors have been closed.

8 Scenarios

*****For driving tutorials, please visit the Academy from the main TS2016 menu screen*****

8.1 1. [474.3] Strange-bahn

Deutsche Bahn have requested some extra services on the lines today as there's been an increase in commuters. The only available stock comes in the form of S-bahn BR474.3s. Start at Hamburg and head down to Harburg.

Duration: 15 Minutes
Difficulty: Easy
Route: Hamburg-Hanover

8.2 2. [474.3] Strange-bahn: The Return

Now that you have arrived at Harburg, and the train has been shunted onto Platform 3, the return trip to Hamburg is required of you. You're lowest priority on the lines at the moment, so keep a look out for danger signals.

Duration: 20 Minutes
Difficulty: Medium
Route: Hamburg-Hanover

8.3 3. [474.3] Even More Strange-bahn

With additional services added to the lines today at the request of Deutsche Bahn, start at Hannover and run a stopping passenger service to Celle, in the form of a DB BR474.3.

Duration: 35 Minutes
Difficulty: Easy
Route: Hamburg-Hanover

8.4 4. [474.3] Replacement Shuttle: Part 1

Emergency engineering works have closed the S-Bahn station at Hamburg and a shuttle service has been introduced between Hamburg Hbf and Hasselbrook. Drive one of these services to Hasselbrook during the mid-afternoon.

Duration: 15 Minutes
Difficulty: Easy
Route: Hamburg-Lübeck

8.5 5. [474.3] Replacement Shuttle: Part 2

The S-bahn station at Hamburg is still shut due to emergency engineering work. Deutsche Bahn have ordered shuttle services to continue. Run an evening shuttle between Hasselbrook and Hamburg Hbf.

Duration: 15 Minutes

Difficulty: Easy

Route: Hamburg-Lübeck

9 Acknowledgements

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