

DB BR261 - Voith Gravita 10BB



1 BACKGROUND	3
1.1 Loco	3
1.2 Design & Specification	3
2 ROLLING STOCK	4
2.1 DB BR261 Voith Gravita	4
2.2 Zacns 95m Tanker	4
2.3 Rnoos 644	5
2.4 Cab Controls	6
2.5 Locomotive Keyboard Controls	7
2.6 General Keyboard Controls	7
3 SIFA	8
4 PZB SIGNALLING SYSTEM	9
4.1 PZB Track Interface	9
4.2 Cab Controls	9
4.3 Key Controls	9
4.4 Example	10
5 SCENARIOS	12
5.1 [261] 01. Cold Evening in Karlsruhe	12
5.2 [261] 02. Top of the Morning	12
5.3 [261] 03. The Great Marshall	12
6 ACKNOWLEDGEMENTS	13

1 Background

1.1 Loco

The BR261 Voith Gravita is the newest member to the Voith Turbo Lokomotivtechnik GmbH & Co. KG family and is available in a variety of configurations from 4 to 6 axles. This locomotive is primarily designed for shunting and light to medium freight operations. Deutsche Bahn chose the 10BB variant of the BR261 as a replacement to its DB Class 290 locomotives, and placed an order of 130 locos in 2008.

Voith, a well-known manufacture of hydraulic transmissions and other locomotive components, entered the locomotive building business in 2006 with the launch of the Voith Maxima locomotives. The Gravita series was launched at the 2008 International Trade Fair for Transport Technology (InnoTrans) event, with a new plant being constructed in Kiel for their production.

The key features of the Voith series, includes large fuel tanks and modular construction (which allows interchangeability of parts between different classes). Further features include multi-traction (or consisting) with other Voith Locomotives, manual or report operation and air conditioned driver cabins.

1.2 Design & Specification

Power Type	Diesel-Hydraulic
Locomotive Weight	72.5 tonnes (160,000 lbs)
Vehicle Length	15.7metres (51ft 6in)
Build Date	2008-Present
Power Output	1,200kW (1,600bhp)
Fuel Capacity	3,300L (725 imp gal)
Top Speed	100km/h (62mph)

2 Rolling Stock

2.1 DB BR261 Voith Gravita



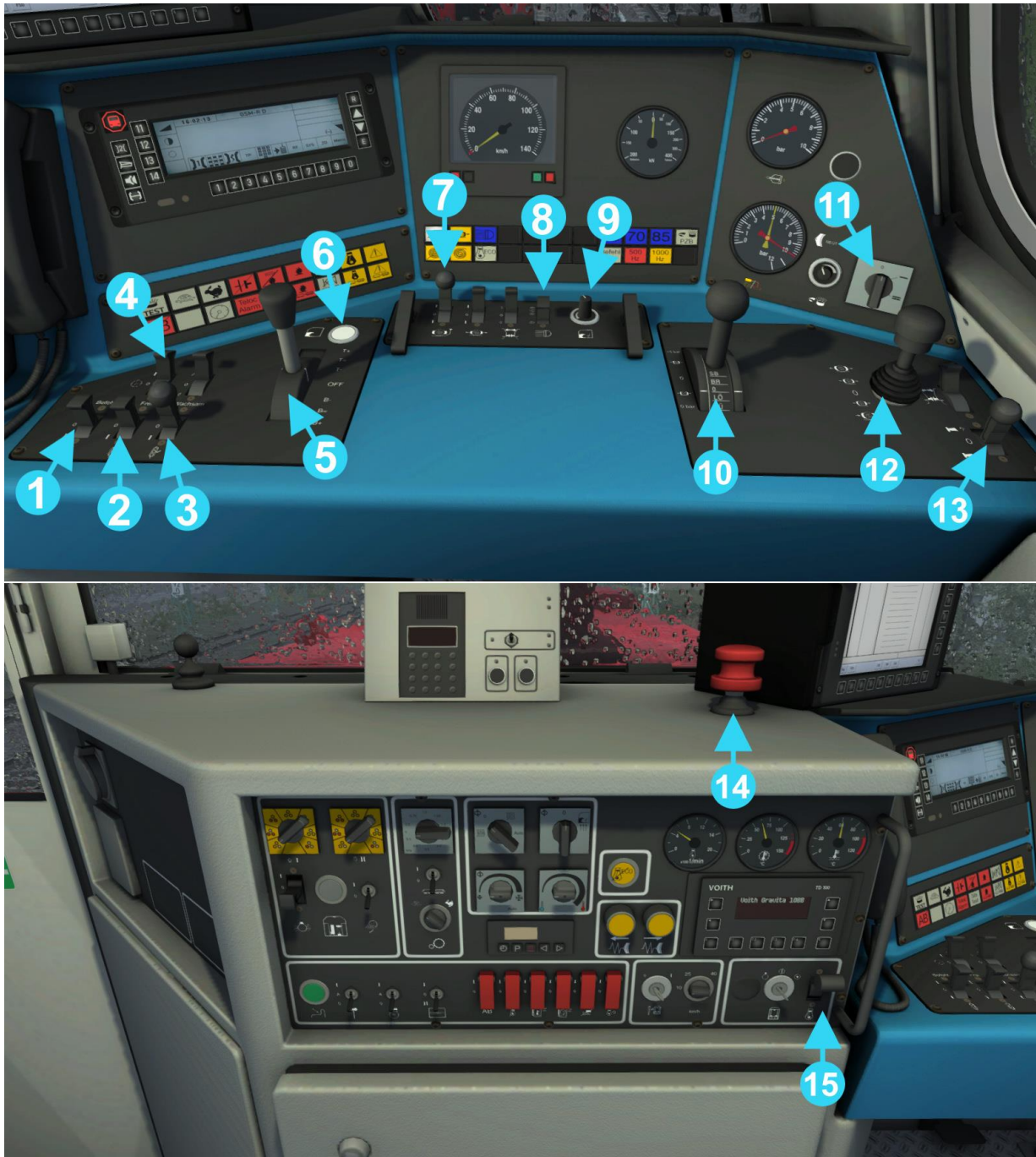
2.2 Zacns 95m Tanker



2.3 Rnoos 644



2.4 Cab Controls



- | | |
|---|-------------------------|
| 1 | Override |
| 2 | Free |
| 3 | Acknowledge |
| 4 | Display Lights |
| 5 | Combined Throttle/Brake |
| 6 | Forward/Reverse |
| 7 | Sander |
| 8 | Headlights |

- | | |
|----|-------------------|
| 9 | Cab Light |
| 10 | Train Brake |
| 11 | Windscreen Wiper |
| 12 | Independent Brake |
| 13 | Horn |
| 14 | Emergency Brake |
| 15 | Engine Start/Stop |

2.5 Locomotive Keyboard Controls

Key Equivalent	Action
D and A	Decrease or Increase throttle
S and W	Move reverser control Forward or Backward
; and '	Decrease or Increase the Train brake
[and]	Decrease or Increase the Locomotive brake

2.6 General Keyboard Controls

Key Equivalent	Action
T	Load/unload passengers or freight
H	Lights. Repeatedly pressing will cycle through headlight states where appropriate.
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.
Q	(Expert) Alerter. The Alerter is a system used on some trains to ensure that the driver has seen a signal. If the alert sounds (a black/yellow striped symbol is shown on the Driver's display), this must be acknowledged by pressing the Alerter button or the emergency brakes will be applied.
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. Sound the horn's low tone.
/	Handbrake on/off. This icon is displayed in the Coupling view
Ctrl/Shift/C	Couple manually.

3 SIFA

SIFA is short for Sicherheitsfahrschaltung 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 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, 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.

4 PZB Signalling System

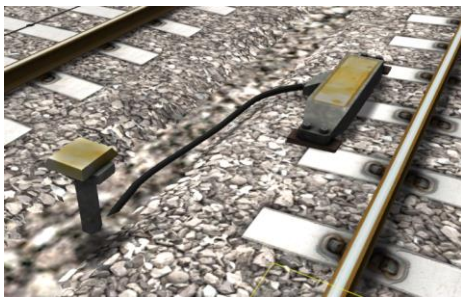
PZB stands for Punktförmige Zugbeeinflussung, translated to English this means “Intermittent Train Protection”.

Safe distances between trains are managed conventionally through the use of block-based systems. 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. While a train is present in a block the signal permitting entry is set to red, preventing any more trains to enter.

As railways have developed, more complex control systems and in-cab signalling have been implemented. This was to improve the safety of the railways and to ensure that drivers are fully aware of what is happening around them. In order to ensure this is the case, the driver is required to react in certain ways depending on the situation.

PZB is a complex system that requires a thorough understanding of the varying speed limits, and necessitates a prompt response to the signalling system.

4.1 PZB Track Interface



The PZB system incorporates in-cab signalling. This is where the control desk has indicators, alarms and buttons that will react according to the signalling status on the railway. The mechanism that is involved includes a series of balise magnets which are placed on the side of the track. An example of one of these magnets is shown in the image on the left.

4.2 Cab Controls

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

These three controls, as shown in item 5 on the cab control diagram are identified below:

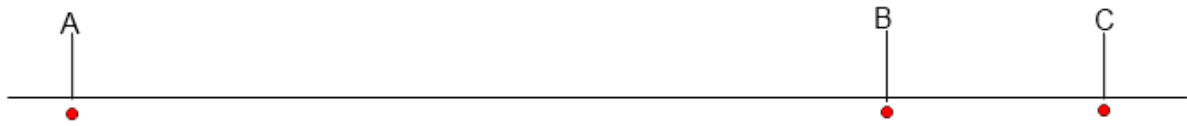
Override
Release
Acknowledge

4.3 Key Controls

Function	Keyboard
Activate/Deactivate	Ctrl+Enter(Numpad)
Acknowledge	Page Down
Release	End
Override	Del

4.4 Example

For this example, we are driving a passenger train. The speed limits indicated in this example are specific to a Type O service and will be different to the two other services.



There are three primary points noted in the diagram above:

A – The Distant Signal, usually some 1.2km from the hazard (such as a converging junction).

B – A point usually about 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. We 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 light to let you know that the signal at C is a red light, 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 at anything other than a green light, the magnet will energise and the PZB system on-board the train will sense its presence. As the train passes over the 1000hz magnet, the driver has up to 4 seconds in which to press the PZB Wachsam/ Acknowledge key (Page Down). If the driver fails to do this, the PZB system will apply the emergency brakes in order to stop the train.

Note that there is no alert in the cab when we pass over the 1000hz magnet. This is because the driver is expected to be aware that they have passed a Distant Signal and react accordingly. Once the PZB Wachsam/ Acknowledge control is pressed, the display will update to indicate that the locomotive is now in a monitored state. As we are a Type O train, the 85 light and the 1000hz light will be activated.

We must not be exceeding 165km/h (103m/h) as we pass the 1000hz magnet, regardless of the line speed. If we are, there is a good chance we will not be able to fully stop before the signal at point C. Therefore, the PZB system will apply the emergency brakes.

We now have 23 seconds in which to decrease our speed to 85km/h (53m/h). If after 23 seconds we are exceeding this speed then the PZB system will apply emergency brakes.

We now continue on towards the Guarded Signal at no greater than 85km/h (53m/h).

After 700 meters, the 1000hz lamp will go out and we will no longer be monitored. Now the driver can make a decision based on what they can see. Can you see the Guarded Signal and is it still red, indicating danger?

If it is, then we must continue slowing down to a stop. If the signal is now showing a clear aspect, because the hazard has cleared, the driver has the option to release the locomotive from monitoring. They will then be permitted to return directly to line speed. Press the PZB Frei / Release button to do this before the train reaches point B or further restrictions are put in place.

Caution: Be careful to ensure that you only release 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 locomotive and will apply the emergency brakes.

Assuming the signal is still at danger and we haven't released from monitoring, we will then reach Point B. At Point B there is another track magnet; the 500hz magnet.

As we pass the 500hz magnet, we must have slowed down to 65km/h (40m/h) or else we might not be able to stop in time for the signal. If that's the case, the PZB system will apply the emergency brakes. There is no need to acknowledge the 500hz magnet. At this point, the 500hz light on the control desk will activate, indicating the current restriction.

After passing the 500hz magnet, we must now decelerate to 45km/h within 153 meters.

Having slowed down to 45km/h, we can draw up safely to the red signal and stop.

If the signal changes to a clear aspect while we are approaching, we must continue with the 45km/h speed limit, as we are still being monitored. It is not possible to release (PZB Frei) from monitoring while under a 500hz restriction. This restriction will continue for 250 meters, taking you past the guard signal, after which you will be able to return to line speed. This is the primary reason for releasing from monitoring before Point B (if and only if the signal is seen to be clear), otherwise you would be tied to running past the clear signal at the much reduced speed limit for an extra 250 meters, instead of being able to return to normal line speed earlier.

If you pull up to the signal and stop because it is still red, you may seek to obtain permission from the controller to pass it at danger. If you need to pass a signal that is still showing a red aspect, you will need to use the Befehl40 (Override) key to do so as you approach the red signal.

At Point C the Guard Signal has the third and final type of magnet, a 2000hz 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 Befehl40 (Override) key *stops* the PZB system from reacting to the 2000hz magnet. Once the 2000hz magnet is detected, the Befehl40 lamp comes on and you will then be restricted to a speed limit of 40km/h. You should remain at this speed until either you have travelled for 2km, or you have passed a signal showing a clear aspect. Once either of these conditions pass you can press PZB Frei to release from monitoring and return to line speed.

5 Scenarios

*****For driving tutorials, please visit the Academy from the main TS2015 menu screen*****

5.1 [261] 01. Cold Evening in Karlsruhe

After a long day of work assembling consists, your last job of the day is to run an assembled freight from Karlsruhe yard up to Schwetzingen

5.2 [261] 02. Top of the Morning

You're tasked with assembling a consist of wagons in Mannheim Rbf to drop off in Schwetzingen. Visibility is poor due to bad weather, so you'll need to stay on your toes. This scenario starts off with 1000 points.

5.3 [261] 03. The Great Marshall

It's time for the Great Marshall! Today you have been tasked with marshalling together three rakes of log wagons and delivering them to an empty siding. The weather isn't brilliant today and it may affect the visibility. Can you keep the 1000 points you start with? Good luck!

6 Acknowledgements

Dovetail Games would like to thank the following people for their contribution to the development of the BR261 locomotive.

Beta Testing Team

