



HAMBURG S1 AIRPORT SHUTTLE

dovetail
GAMES



1 ROUTE INFORMATION	3
1.1 History.....	3
1.2 The Route.....	5
1.3 Focus Time Period	5
1.4 Rolling Stock	5
2 GETTING STARTED	6
2.1 Recommended Minimum Hardware Specification	6
3 DB BR474 PLUS	7
2.1 Cab Controls.....	8
2.2 Locomotive Keyboard Guide	9
2.3 General Keyboard Guide	9
2.4 Using Destination Boards	9
4 DB BR218.....	11
3.1 Cab Controls.....	13
3.2 Keyboard Guide	14
5 S SIGNALLING	15
6 SIFA	23
6.1 Key Controls	23
7 PZB SIGNALLING SYSTEM.....	24
7.1 PZB Track Interface	24
7.2 In-Cab Indicators	24
7.3 Cab Controls.....	25
7.4 Train Types	25
7.5 Key Controls	25
7.6 Example	26
8 LZB SIGNALLING SYSTEM.....	29
11 SCENARIOS.....	31
11.1 [BR474Plus] 01. Touring the S1	31
11.2 [BR474Plus] 02. Hitting the Hamma	31
11.3 [BR474Plus] 03. Oktoberfest Contribution.....	31
11.4 [BR474Plus] 04. Overnight to Altona	31
11.5 [BR474Plus] 05. Hansa Time	31
11.6 [BR474Plus] 06. Just in Time for Christmas	31
11.7 [BR474Plus] 07. Out of Stock.....	31
RAILFAN MODE SCENARIOS.....	32
11.8 [RailfanMode] Altona	32
11.9 [RailfanMode] Blankenese	32
11.10 [RailfanMode] Poppenbüttel	32
13 CREDITS.....	33

1 ROUTE INFORMATION

1.1 History

The Hamburg S-Bahn is an important component of the public transport within the city due to its dense schedule and wide coverage of the metropolitan region. Unlike Berlin and Hanover, the S-Bahn is of little importance for regional traffic since the network lies mostly within city limits. However, in 2007, the southwestern S3 route was extended an additional 20 miles (32km) into Lower Saxony and required the building of seven new stations.

The term S-Bahn was originally first used in Berlin in 1930, where a similar system was in operation on the City, Ring and Suburban lines (in operation since 1924). The term was also used to describe non-electric services on lines with the local suburban tariff. However, since 2002, lines not served by S-Bahn trains have been designated as Regional lines.

After almost 30 years of service, it was deemed necessary to renew the trains and infrastructure of the Hamburg routes. Since the DC system had proved itself for more than a decade on the Berlin S-Bahn, the German Imperial Railway decided to adopt the same system for Hamburg in 1937. However, unlike Berlin, Hamburg would utilise the 1200 volt system to improve acceleration. As a consequence of this decision, Berlin and Hamburg S-Bahn equipment were entirely incompatible. New trains, the ET 171 consisting of three four-axle coaches with four sliding double-doors per side, were delivered in 1939 with daily service beginning in July 1940.

In 1940 the DC S-Bahn was extended along the single-track suburban line from Bankenese to Sülldorf, and to Wedel in BACKGROUND 1954. The mainline route between Berlin and Hamburg was also converted to utilise the third-rail system due to the low traffic use and the division of Germany, in 1959 and represented the first section of mainline where both main line and S-Bahn trains shared occupancy on the track; and formed the second S-Bahn line from Bergedorf via Berliner Tor to Altona.

The S-Bahn continued to be extended over the following years up until 2008 when the S1 line to Hamburg Airport was opened. The unique service from Wedel separates at Ohlsdorf with forward section travelling onward to the Airport and the rear section to Poppenbüttel.

The entirety of the Hamburg S-Bahn Network operates over some 91 miles (147 km) of track and serves a total of 68 stations, consisting of two trunk routes crossing the city in an east-west direction with six connecting routes. Operating four main routes (S1, S21, S3 and S31), with two additional routes during peak hours (S11 and S2). Lines with single-digits operate the City-S-Bahn via Jungfernstieg and those with two-digits the Verbindungsbahn via Dammtor.

Our route follows the original S1 S-Bahn route from Wedel and includes the S11 diversion and the 2008 extension link to Hamburg Airport. The route is served by modern BR 474 Plus units, which are accompanied by Regional services on the separated regional lines, served by BR 218 and BR 143 with Doppelstockwagen vehicles.



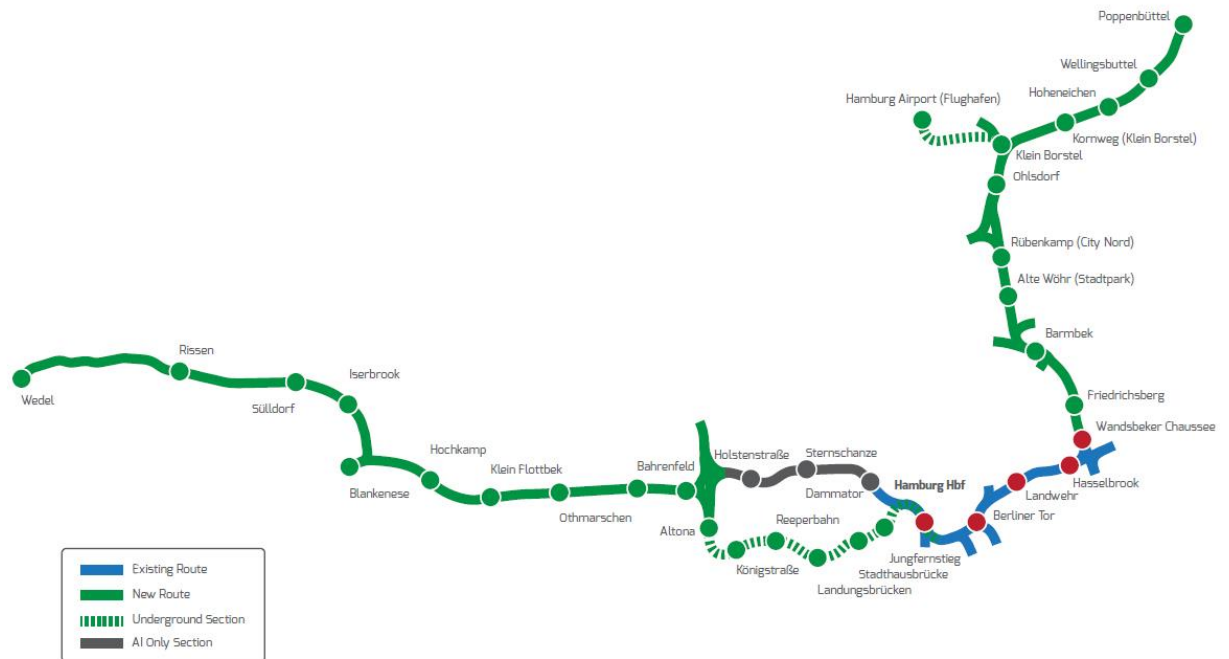
1.2 The Route

The DLC product recreates the 28 mile S1 section of the Hamburg S-Bahn, as well as the key extension to Hamburg Airport, as it operates today. The route features 29 stations including Hamburg Hauptbahnhof in the centre of the route, Wedel to the West, Poppenbüttel to the North East and the Hamburg Airport shuttle link.

The route will also feature the additional 3 miles of trackwork of the S11 configuration for AI traffic.

There are 30 stations located along the length of the S1 Line.

MAP & LANDMARKS



1.3 Focus Time Period

The time period for this Route DLC is based around the present day (2016).

1.4 Rolling Stock

Included with the route will be the S-Bahn BR 474 Plus in DB Traffic Red Livery

2 GETTING STARTED

2.1 Recommended Minimum Hardware Specification

The Hamburg-Lübeck route is highly detailed, feature rich and incorporates detailed night lighting. Therefore, it will benefit from a higher PC specification.

- Windows Vista / Windows 7 / Windows 8
- Processor: 2.8 GHz Core 2 Duo (3.2 GHz Core 2 Duo recommended), AMD Athlon MP
- RAM - 4.0GB
- GFX - 512 MB - 1GB with Pixel Shader 3.0 (AGP PCIe only)
- SFX - Direct X 9.0c compatible

3 DB BR474 PLUS



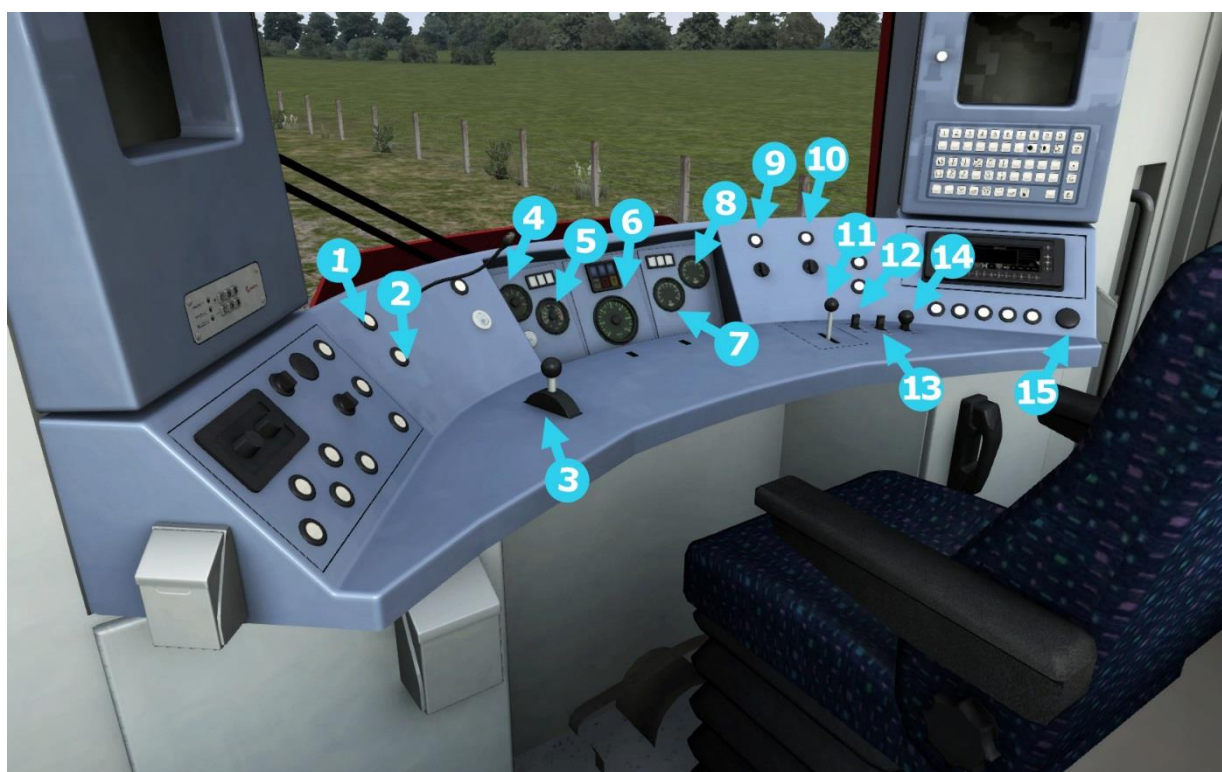
The BR474 Plus is a modernized variant of the BR474.3, three car multiple unit.

This new unit has improved passenger comforts such as: a digital information display and air conditioning, as well as being able to move freely between carriages using the passageways.

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)

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		

2.2 Locomotive Keyboard Guide

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.

2.3 General Keyboard Guide

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.

2.4 Using Destination Boards

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 PLUS are –

- a-Wedel
- b-Blankenese
- c-Altona
- d-Eldgaustarbe
- e-Stade
- f-Harbury Rathaus
- g-Bergedorf

h-Sondezug
i-Aumuhle
j-Pinneburg
k-Nicht Einsteigen
l-Ohlsdorf
m-Airport
n-Airport/Poppenb
o-Poppenbutter

Service Codes

p-S1
q-S2
r-S3
#-Blank Destination

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.

4 DB BR218



The DB BR218 (before 1968 the DB BR V 164) are a class of 4 axle, diesel hydraulic locomotives acquired by the Deutsche Bundesbahn for use on main and secondary lines for both passenger and freight trains.

The class represents the final major revision of the DB V 160 family of locomotives; retaining preferred features of the antecedent locomotives including a hydrodynamic brake and a single engine, which provides electrical train heating via a generator as well as tractive power. The class was also the most numerous of the family, providing the backbone of the Deutsche Bundesbahn's main-line diesel locomotive traction from the 1970s up to the reunification of Germany.

Despite being displaced from many workings by DMUs, electrification, and inherited DR BR 130s, as recently as 2009 a significant number of the class remained active throughout Germany.

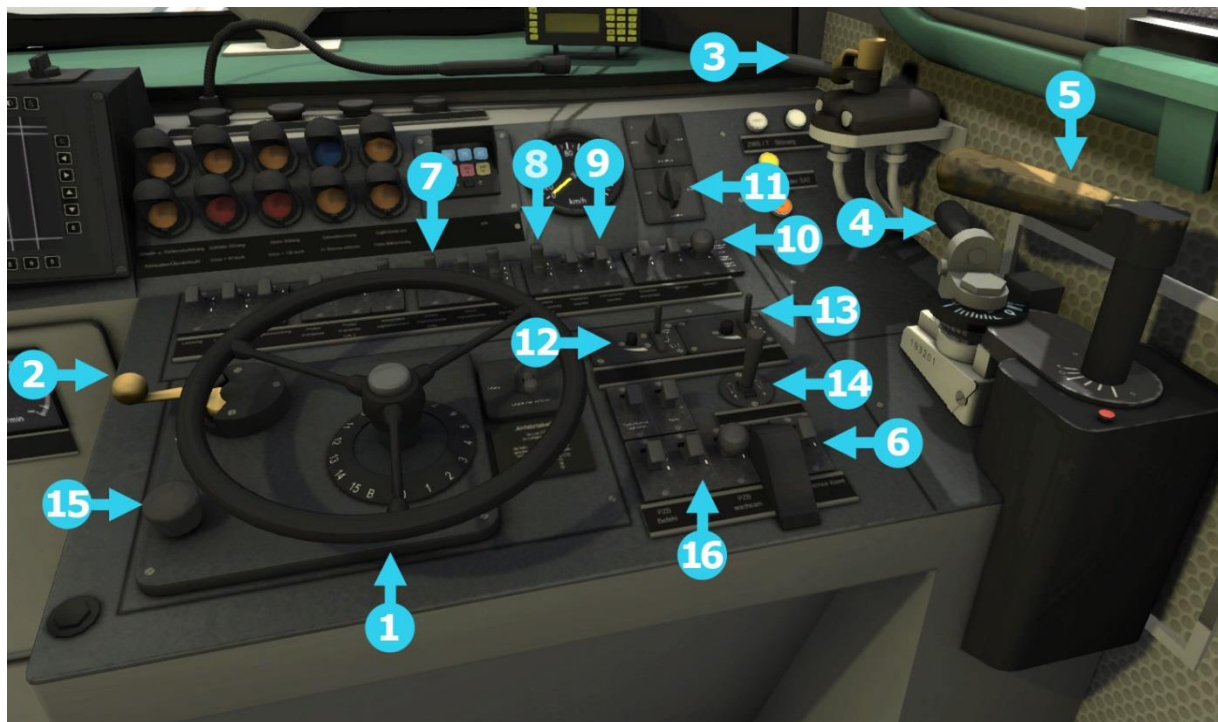
The design of the series is fundamentally the same as the rest of the V 160 family. All four axles are driven via cardan shafts by a Voith two speed hydraulic transmission which in turn is driven by a diesel engine with fuel and oil tanks. This engine is located between the bogies under the main frame on either side of the centrally located transmission.

Externally these locomotives are very similar to the other members of the class such as the superstructure is made from sheet steel, forming a shell. The tractive and braking forces are transmitted to the main frame of the locomotive via transverse beams attached to the main longitudinal supporting beams. The framework is supported on coil sprung bogies.

TECHNICAL DATA

Power Type	Diesel-Hydraulic
Weight	79.5t
Length	53ft 9.7" (16.4m)
Engine Power	2,764bhp (1,840kW)
Max Speed	87mph (140km/h)
Brake Types	Hydrodynamic Brake
Tractive Effort	Maximum: 53,000lbf (235kN)

3.1 Cab Controls



1	Throttle Wheel	10	Sander
2	Direction Controller	11	Startup/Shutdown
3	Straight Air Brake Handle	12	Wiper and Wiper Speed (Left Side)
4	Train Brake Handle	13	Driver Wiper and Wiper Speed
5	Dynamic Brake	14	Horn Lever
6	Train Brake Release	15	SIFA Reset
7	Headlight Control	16	PZB Controls
8	Cab Light Switch		
9	Instrument Lights		

3.2 Keyboard Guide

Key Equivalent	Action
A / D	Throttle. Increase or Decrease Throttle.
; / '	Train Brake. Increase or Decrease Train Brake.
[/]	Direct Brake. Increase or Decrease Direct Brake.
, / .	Dynamic Brake. Increase or Decrease Dynamic Brake.
W / S	Reverser. Move reverser control Forward or Backward.
Tab	Signals. Request Permission to Pass Signal Ahead.
Ctrl + Tab	Signals. Request Permission to Pass Signal Behind.
G or Shift + G	Junction. Change state of Junction Ahead / Behind.
Space	Horn. Press once to sound the Horn.
T	Load/Unload. Press once to load/unload passengers or freight.
H or Shift + H	Headlights. Turn headlights On / Off.
Backspace	Emergency Brake
V	Windscreen Wipers. Press once to switch on and again to switch off.
Ctrl + Shift + C	Couple manually
Shift + Enter	SIFA Toggle
Enter	SIFA Acknowledge
Ctrl + Enter	PZB Toggle
Page Down	PZB Wachsam / Acknowledge
End	PZB Frei / Release
Delete	PZB Befehl40 / Override
L	Cab Lights. Toggle the Cab lights on and off.
/	Handbrake. Press to toggle the train Handbrake on and off.
X	(Expert) Sander. Causes sand to be laid on the rails next to the wheels to assist with adhesion. Press and hold to activate sander, let go to stop.

The BR218 has two selectable gear ratios which can be changed using the E key as long as the reverser is in the neutral position (there is no in-cab control). Low ratio should be used for lower speed freights and will allow a maximum speed in the region of 90 km/h (60mph), and the high ratio should be used for higher speed freights to allow a maximum speed of 140 km/h (90mph).

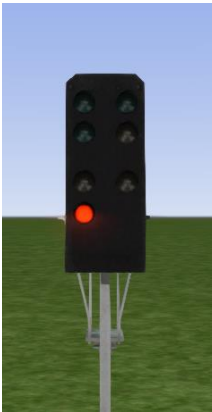
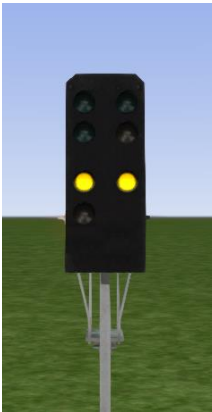
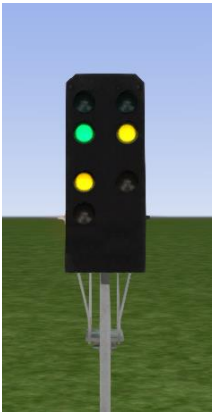
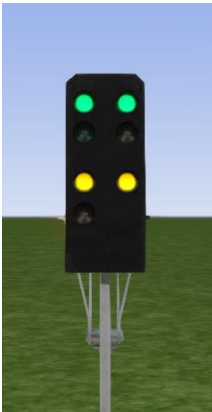
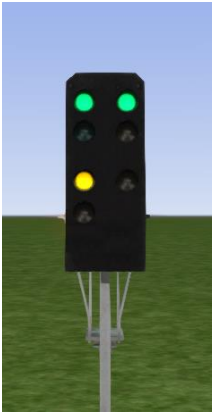
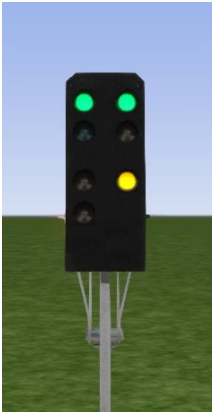
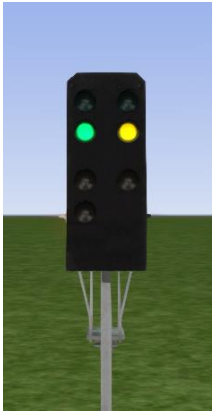
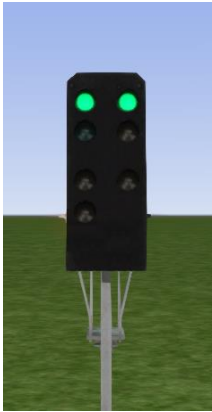
5 S SIGNALLING

The signalling system employed on German Railways is extremely complex to understand at first; however, in reality each signal you encounter will be composed of one or more straight forward signals to give the final aspect.

This manual doesn't attempt to cover all the possible signal types and variations, but it should provide sufficient background as to let you work out what each signal post you come across is telling you by explaining the component parts. Note that any signal of a given type that you see should be interpreted the same whether it is on a post, on the ground, on a gantry or in any other position.

Driving around the Hamburg S-Bahn network, you will encounter 3 main styles of signal system - Sv, Hp semaphore and Ks. Hp and Ks signals are commonplace across the entire German railway network, while Sv signals which were introduced in 1928 are only in use on the Berlin and Hamburg networks. The Sv and Ks systems are similar as they are capable of displaying a distant signal announcing the next signals state and their own state on the one head. Sv signals show their main aspect on the left while the distant aspect is shown on the right.

The combinations you will encounter are shown in the following tables.

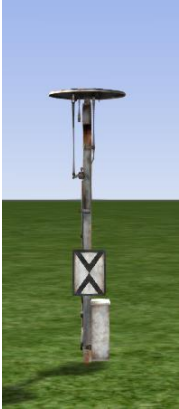
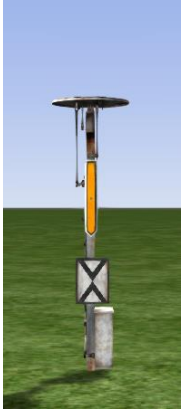

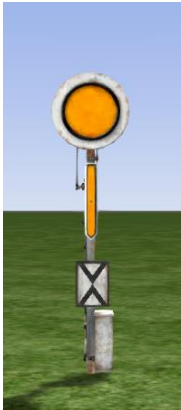
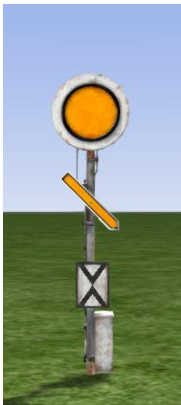
Sv	Description	Sv	Description
	<p>Hp 0 : Absolute stop</p> <p>The line ahead is blocked. Do not proceed pass this signal.</p>		<p>Sv 0 : Stop, proceed on sight</p> <p>Stop at this signal then proceed no faster than 30kmh.</p>
	<p>Sv 6 : Slow, expect stop</p> <p>Proceed past the signal no faster than 40kmh, expecting an Hp 0 aspect at the next signal.</p>		<p>Sv 5 : Slow, expect slow</p> <p>Proceed past the signal no faster than 40kmh, expect a slow aspect at the next signal.</p>
	<p>Sv 4 : Slow, expect clear</p> <p>Proceed past the signal no faster than 40kmh, expect a clear aspect allowing line speed at the next signal.</p>		<p>Sv 3 : Clear, expect slow</p> <p>Proceed past the signal at line speed, approach the next signal travelling no faster than 40kmh.</p>
	<p>Sv 2 : Clear, expect stop</p> <p>Proceed past the signal at line speed, expecting to stop at an Hp 0 aspect at the next signal.</p>		<p>Sv 1 : Clear, expect clear</p> <p>Proceed past the signal at line speed, expecting the same at the next signal.</p>

The line between Othmarschen and Sülldorf uses Hp mechanical semaphore signalling. An Hp semaphore will always be announced by a distant signal before it

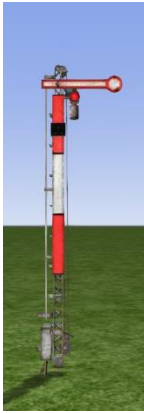

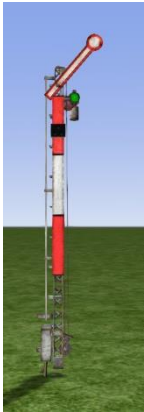

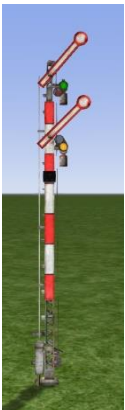
There are two types of this style of signal you will encounter – a single arm capable of showing stop and clear and a two arm signal capable of showing stop, clear and slow clear.

These will display one of the following aspects.

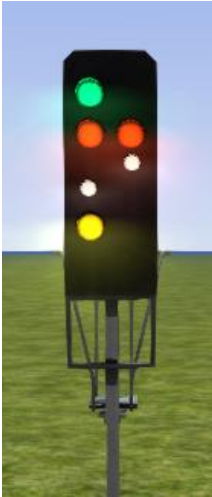
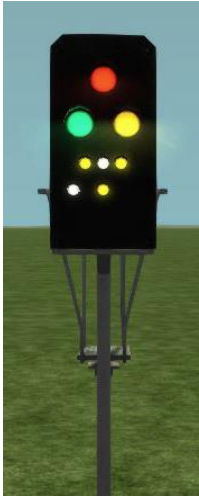

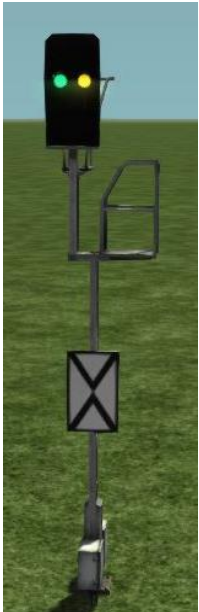
Hp Semaphore Distant

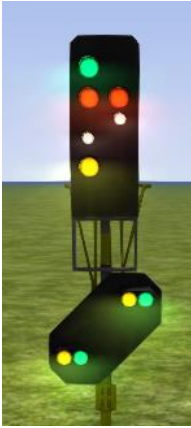


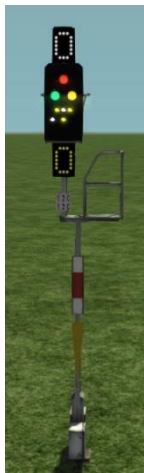

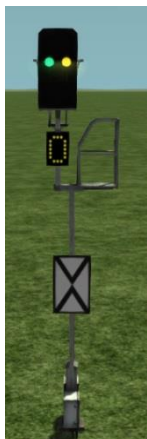

Single Arm	Double Arm	Aspect Description
		<p>Vr 0 : Caution</p> <p>The next signal is displaying an Hp 0 stop aspect. Prepare to stop at the next signal.</p>
		<p>Vr 1 : Expect clear</p> <p>The next signal is displaying a clear aspect. Approach the next signal at line speed.</p>
		<p>Vr 2 : Expect slow</p> <p>The next signal is displaying an Hp 2 slow aspect. Approach the next signal at slow speed, no faster than 40kmh.</p>

Hp Semaphore

Single Arm	Double Arm	Aspect Description
		<p>Hp 0 : Absolute stop</p> <p>The line ahead is blocked. Do not proceed pass this signal.</p>
		<p>Hp 1 : Line clear</p> <p>Proceed past the signal at line speed.</p>
		<p>Hp 2 : Slow clear</p> <p>Proceed past the signal at slow speed, no faster than 40kmh.</p>

In the examples below, the image shows the signal with all lights on so that you can clearly see where they are. The description of the signal describes the various combinations of lights and what they mean when lit. The small code before the description is the technical name by which that combination of lights is known.

HP	KS	Description
		<p>Signal Type: Hp/Ks</p> <p>This signal protects entry to a block.</p> <p>Hp0 – Red, Stop - do not proceed Hp1 - Green: Clear to proceed Hp2 – Yellow and Green: Caution, Proceed at 40km/h Sh 1 – Red and Double White: Shunting permitted</p>
		<p>Signal Type: Hp/Ks Vr</p> <p>Vr signals are Distant Signal types and indicate to you what you should expect the <i>next</i> active signal to be showing.</p> <p>Vr0 – Two Yellow – Caution, expect stop Vr1 – Two Green – Expect Clear Vr2 – Green/Yellow – Expect Caution with 40km/h restriction</p> <p>Note the “X” post board at the bottom, any signal which has this board is indicating that the signal is to be interpreted as a Distant Signal. If this sign is not present the signal is at a reduced distance for braking and will display a white light on the top left edge.</p>

HP	KS	Description
		<p>Combined Signal Type: Hp/Ks Vr</p> <p>This is an example of a combined signal; in this case the example shown is an “Hp Vr” combination. The functions of the individual signal heads are identical to those explained above but they are placed on the same post.</p>
		<p>Combined Signal Type: Hp/Ks Vr Zs3 Zs3v</p> <p>An example of how the signalling can begin to look very complex; however this is simply four signal types combined on to one post. Here you can see:</p> <ul style="list-style-type: none"> • permission to enter the next block on the Hp signal • indication of the signal state for the next signal on the Vr signal • speed restriction starting from this signal via the Zs3 at the top • speed restriction in place from the next signal via the Zs3v at the bottom
		<p>Combined Signal Type: Hp/Ks Vr Ks Zs3v</p> <p>This signal combination combines the distant Vr signal with the speed at the next signal in the Zs3v signal.</p>
		<p>Signal Type: Hp Shunt</p> <p>This very simple signal will often be found as a ground frame or on a small post and is frequently used in yards and sidings. It has two indications:</p> <p>Two Red lights – Stop, do not proceed Two White Lights – Proceed</p>



Post Type: Ne4 Chessboard

The Ne4 Chessboard is used to tell you that a signal that would normally be at this position has been placed in an alternative location; this could be further away from the track or on the other side of the track.

The Ne4 board is always located where the signal would normally expect to be positioned.



Post Type: Lf6 Advance Warning Speed Post

This speed post provides advance warning that a speed limit change is going to take place. In the example shown, the speed will soon be changing to 40km/h. Following an Lf6 you can expect an Lf7 to mark the start of the new speed limit.



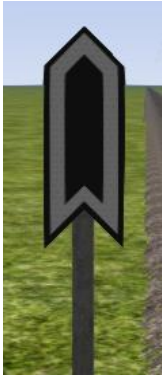
Post Type: Lf7 Speed Post

This speed post marks the beginning of a change in speed limit. The example indicated marks the beginning of a 40km/h speed limit and you should not be exceeding this speed as you pass the post.



Post Type: Arrow Indicator

Where there might be confusion about which track a sign is associated with, a small arrow is placed to indicate which line the information applies to. In this example the Lf7 speed restriction applies to the track on the left of the post.



Post Type: Zs10 End of Speed Restriction

This post indicates the end of a speed restriction started by a Zs3.



Post Type: Zs3 Speed Post

New speed limit takes effect immediately from this point. Shows one white number indicating the tenth the speed allowed from this point. This is normally used in conjunction with main signals. Permanent speed restrictions are instead indicated using Lf type signs.



Post Type: Zs3v Distant Speed Post

Shows one yellow number indicating the tenth of the speed allowed from the point where the following Zs3 signal is found. This plate is normally used in conjunction with distant (e.g. Vr) signals.



Post Type: Zs6 Wrong Line Working

This track change display is used to indicate that wrong line running (left hand) is to be used from this signal. It is only used in combination with main signals and only on lines where wrong line working is frequent.

6 SIFA

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

The SIFA vigilance alarm is disabled when starting a scenario, but can be activated (or deactivated) by pressing ‘Shift+Enter (Numpad)’. While activated, the SIFA light on the cab dashboard is switched off. The driver is required to acknowledge the alarm every 30 seconds if the train is moving.

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

6.1 Key Controls

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

7 PZB SIGNALLING SYSTEM

PZB stands for Punktförmige Zugbeeinflussung. Loosely translated to English, this means “intermittent train protection”.

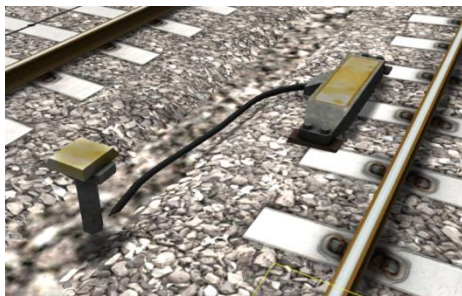
Safe distances between trains are managed conventionally through the use of block-based systems.

A given line is broken up 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.

As railways have developed, more complex control systems and in-cab signalling have been implemented to improve the safety of the railways. To ensure that drivers are fully aware of what is happening around them, they are required to react to various alert systems depending on the situation.

PZB is a complex system that demands a very good understanding of the varying speed limits and the requirements to respond promptly to the signalling system.

7.1 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 by which this works is a series of “balise” magnets placed on the side of the track. An example of one of these magnets is shown in the image on the left.

7.2 In-Cab Indicators

Inside the cab, there are lights indicating the current state of the PZB system (as shown in the diagram below):



Take a look at the picture above. The section inside of the white dashed box shows the lights related to the PZB. It would be worth noting that the controls in the DB BR474 are similar but are not identical.

7.3 Cab Controls

There are also three controls on the cab desk that you can use to interact with the PZB system.



PZB controls on the Cab Desk of a BR474 (other locomotive controls would be similar but not identical)

These three controls, to the left of the control desk on the BR474, are named as follows:

- 1 – German: Befehl40 / English: PZB Override
- 2 – German: PZB Frei / English: PZB Release
- 3 – German: PZB Wachsam / English: PZB Acknowledge

7.4 Train Types

The type of train you are driving is important in understanding how the PZB system works. It's also important to have a good understanding of the impact the PZB system has on the various speed limits.

There are three types of train that PZB deals with:

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

The implementation of the PZB system within locomotives on the Hamburg S1 route automatically identifies the correct type of train. This is based on the train type configurations in the scenario. Once PZB is active you can see this in the PZB lamps as follows:

- Type O – Lights up the 85 lamp
- Type M – Lights up the 70 lamp
- Type U – Lights up the 55 lamp

7.5 Key Controls

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

7.6 Example

For this example, we are driving a passenger train. The speed limits indicated in this example are therefore 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 is usually around 1.2km from the hazard (such as a converging junction).
- B – A point usually about 250m before the Guarding Signal.
- C – The Guarding Signal is 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 indicating that you should stop.



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 1000 Hz 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 continue slowing down to 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 and 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 500 Hz 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 (28m/h) within 153 meters.

Having slowed down to 45km/h (28m/h), we can draw up safely to the red signal and stop.

If the signal changes to a clear aspect while we are approaching, then we must continue with the 45km/h (28m/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 then 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 *always* 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 (25m/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.

Alternately Flashing PZB Indicators

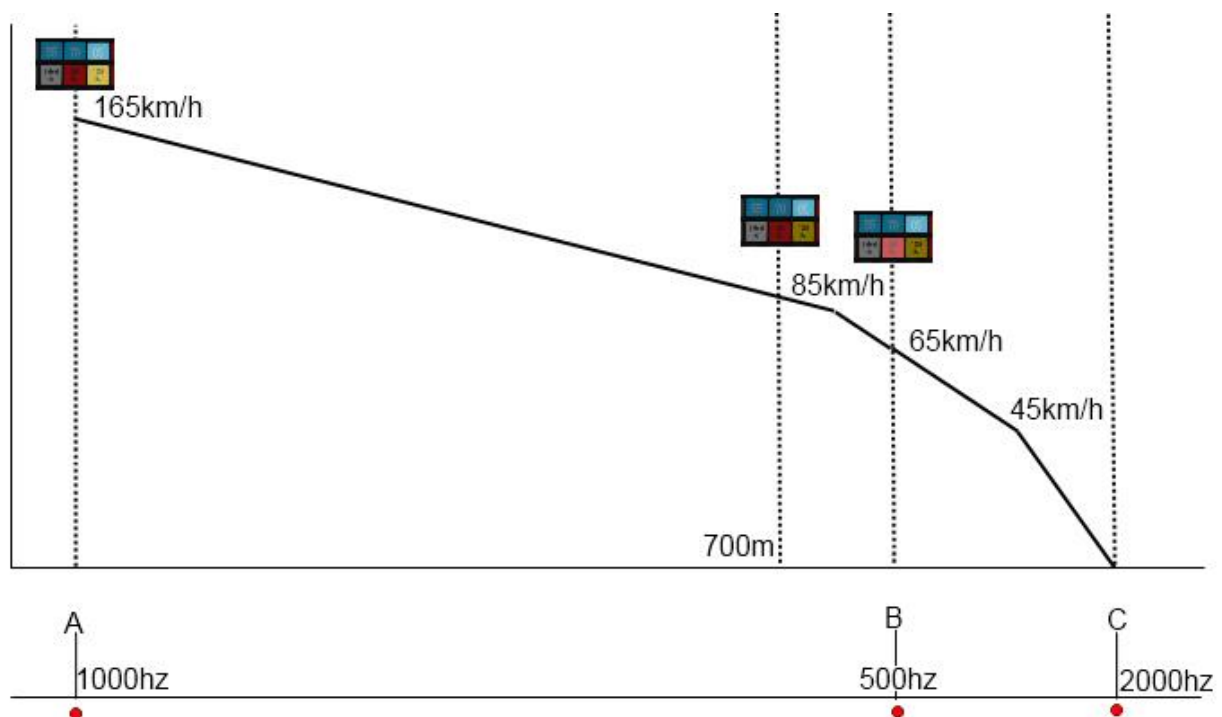
There is an additional state called Restricted Monitoring, which may engage while you are travelling under the control of either the 1000hz or 500hz magnets. If you travel below 10km/h for more than 15 seconds or you stop completely at any point, the PZB display will start alternating between two of the speed lamps such as the 70 and 85 lamps, to indicate that restricted monitoring is now in place. Under these circumstances the speed limits to be imposed are reduced further. Full details about speed limits for all types of trains in both normal and restrictive monitoring are below.

PZB Speed Restrictions by Train Type

Type of Train	Normal Monitoring		Restrictive Monitoring	
	1000hz	500hz	1000hz	500hz
O (Obere)	165km/h -> 85km/h In 23 seconds	65km/h -> 45km/h In 153 meters	45km/h constant	45km/h -> 25km/h in 153 meters
M (Mittlere)	125km/h -> 75km/h in 26 seconds	50km/h -> 35km/h In 153 meters	45km/h constant	25km/h constant
U (Untere)	105km/h -> 55km/h In 34 seconds	40km/h -> 25km/h In 153 meters	45km/h constant	25km/h constant

Example Run Graph

Here's a graphical layout of what happened in our example run, indicating the magnets, speed limits and what you would expect to see in the PZB indicator lamps.

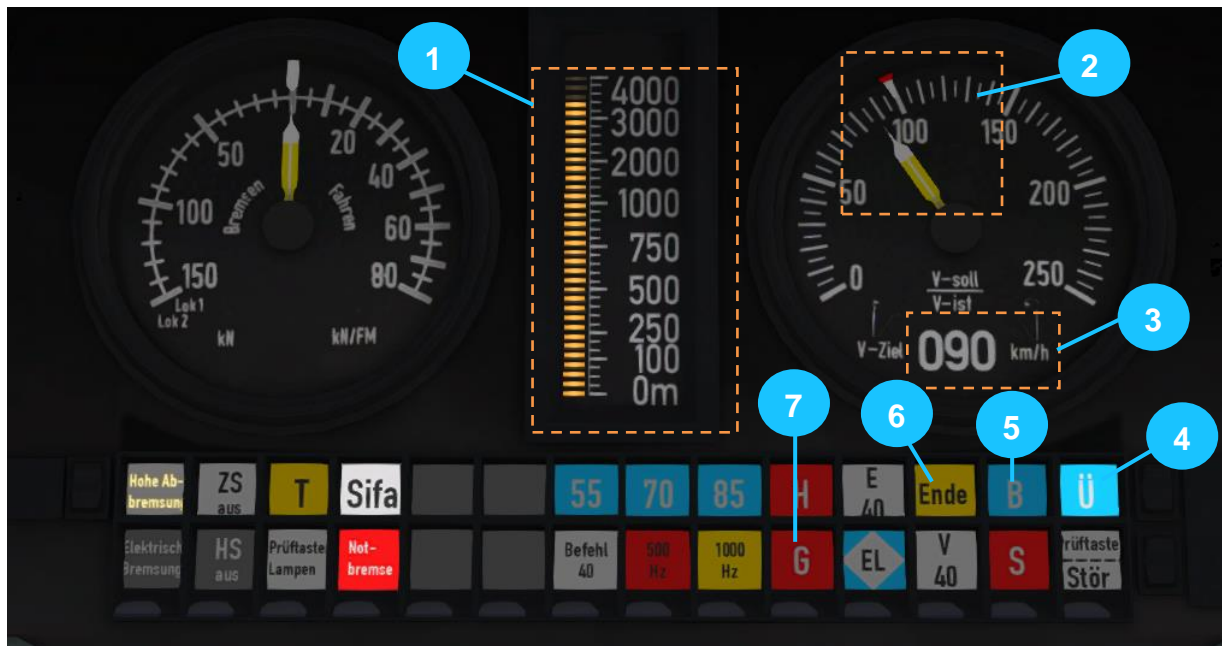


8 LZB SIGNALLING SYSTEM

The restriction of conventional block signalling is based on the amount of time taken by trains to ensure they can stop from their first notification of a signal at danger. This affects the maximum speed that trains can operate. The speed is determined by the length of the block. Unfortunately, while lengthening the block can allow trains to run faster, it means that fewer trains can run as the gaps between them get progressively longer.

The modern solution to this problem is to change from fixed block signalling to a dynamic sliding block that protects a range in front of the locomotive, which changes as the locomotive moves.

LZB is controlled by a central control station; each one monitors approximately 100 kilometres of line and informs the on-board LZB computer what speed is being imposed. The following image shows the displays related to LZB functionality on a BR101 locomotive cab dashboard. Note that the displays are standard across all LZB capable locomotives.



In the above example, LZB has been enabled and we can see the following:

- 1 – Distance to next speed change
- 2 – Target speed taking in to account LZB speed restrictions
- 3 – Target speed in digit form
- 4 – Indicator that LZB mode is enabled
- 5 – Automatic Brake Intervention enabled if lit
- 6 – LZB mode terminating if illuminated
- 7 – Overspeed Indicator



LZB is automatically enabled as you pass one of the LZB posts, as shows in the picture on the left.

If PZB is being used then it is automatically disabled and LZB gets switched on automatically.

If your AFB control is set to 0 (disabled) then the LZB system is simply there to instruct you on what to do. If AFB is being used then the target speed will be the lowest of your AFB setting and the current LZB speed restriction.

LZB mode will be automatically disabled when the train passes over an LZB termination balise such as the one shown in the picture on the right. If the PZB system was enabled previously, it will be switched back on when the LZB system is switched off.

You get an in-cab warning that LZB mode is terminating approximately 1.7km before it actually ends, with the “Ende” light illuminating and an audible alarm. This warning must be acknowledged by pressing the PZB Frei / Release button or the “End” key on the keyboard – if you do not and LZB Automatic Brake Intervention is enabled then the emergency brakes will be applied.



11 SCENARIOS

*****For driving tutorials, please visit the Academy from the main TS2017 menu screen*****

11.1 [BR474Plus] 01. Touring the S1

Time to get to grips with the S1 line and experience the western part of the route. You'll be at the controls of an S1 service from Hamburg Hbf to Wedel.

Duration: 45 Minutes

Difficulty: Easy

11.2 [BR474Plus] 02. Hitting the Hamma

Time to get these passengers home from their holidays! Starting at Hamburg Airport, you'll be operating this S1 service as far as Hasselbrook.

Duration: 20 Minutes

Difficulty: Medium

11.3 [BR474Plus] 03. Oktoberfest Contribution

It's Oktoberfest! There are a high number of travellers on the line today! You'll be operating an S1 service from Wedel to Hamburg, stopping at all stations on the way, to ensure passengers catch the high speed down to Munich.

Duration: 45 Minutes

Difficulty: Hard

11.4 [BR474Plus] 04. Overnight to Altona

Welcome to the S1 after dark! You'll be operating the last passenger service of the day. Your journey will begin from Blankenese and end at Altona.

Duration: 20 Minutes

Difficulty: Medium

11.5 [BR474Plus] 05. Hansa Time

S1 services haven't been perfect this morning and it's over to you this afternoon to make it right! You'll be taking this S1 service from Hasselbrook to Altona.

Duration: 25 Minutes

Difficulty: Easy

11.6 [BR474Plus] 06. Just in Time for Christmas

The final flights are leaving to take the excited travellers home to their families just in time for Christmas! You have been rostered in for the first trip of the day from Altona to the Airport.

Duration: 45 Minutes

Difficulty: Hard

11.7 [BR474Plus] 07. Out of Stock

Due to overrunning maintenance, rolling stock is out of place for today's services. Transfer this 3 car unit to Poppenbüttel from Altona.

Duration: 45 Minutes

Difficulty: Medium

12 RAILFAN MODE SCENARIOS

Railfan Mode provides a unique chance to observe and enjoy the operations of trains without the pressure and involvement of driving them. Railfan Mode scenarios are positioned at various key points along the route and provide camera functionality to sit back and watch the action unfold.

These scenarios are located on the Drive screen under the Career tab.

11.8 [RailfanMode] Altona

- **Duration** 10 Minutes

11.9 [RailfanMode] Blankenese

- **Duration** 10 Minutes

11.10 [RailfanMode] Poppenbüttel

- **Duration** 10 Minutes

13 CREDITS

Dovetail Games would like to thank the following people for their contribution to the development of Hamburg S1:

Beta Testing Team

Artists:

Lee Wallace
Lauren McKellan
Laura McConnachie
Matthew Price
Duncan McCafferty
Finlay Pearston
Gemma Craig
Janine Feerick
Ross McCafferty
Sam Bruce

Track:

Rob Payne

Scenarios:

Rob Payne
Jordan Searle
James Amey-Drew

Signals:

Jeffrey Douglas

Sounds:

Adam Rose

Special Thanks:

Peter Why
Chris Luck
Adam Lucas
Scott Barker
Steve Dark
Craig Fowler

