

Add-on for Train Simulator Classic

Ringbahn Berlin

Circle Line Berlin: A city tour in 59 minutes.



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Ringbahn Berlin

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Introduction

When the Ringbahn began to be built around Berlin in the 1870s, the idea was to connect the terminus stations of the various railroad lines. Hardly anyone thought about how rapidly the metropolis of Berlin would develop within the ring and beyond. When the Ring was built, it ran through villages and small towns in the province of Brandenburg. Stralau, Lichtenberg, Weißensee, Moabit, Charlottenburg, Schmargendorf, Wilmersdorf, Rixdorf, to name but a few. The tracks ran across fields and through barely built-up land.

Things look very different today. Since 1920, Berlin has become Greater Berlin, the villages and small towns have become city districts or even boroughs. The Ringbahn somewhere in the middle. It has changed in the 150 years of its existence. It certainly had its heyday before the Second World War, when there were huge track systems along the Ring.

In the past, every major ring station also had a freight station to the side, from which goods were transported into or out of the city. Moabit, Charlottenburg,

Wilmersdorf, Tempelhof, Neukölln, Treptow, Frankfurter Allee, Zentralviehhof to name but a few.

Freight traffic has almost disappeared. And with it the freight yards. Brownfield sites like those in Charlottenburg and Wilmersdorf will certainly soon be built on; in Wilmersdorf, the "Friedenauer Höhe" residential area was created in a very short time. When I photographed there in 2022, it was a sandy wasteland.

However, the importance of the Ringbahn for travel remains unbroken. Important transfer hubs from the S-Bahn to regional and long-distance trains are located on the Ring: Ostkreuz, Gesundbrunnen, Südkreuz, but the Berlin subway system is also well connected to the Ringbahn. Almost 100 years after its first journey with electrified trains, the S-Bahn is still a modern and above all ecological means of transport.

Regional and long-distance rail services run along parts of the Ring. Regional trains join the Ostring from the Görlitzer Bahn at Treptower Park station and leave it at the Nordring near Gesundbrunnen in the direction of the Stettiner Bahn and Jungfernheide on the Lehrter Bahn. Long-distance trains are provided via the ring from Rummelsburg, Blankenburg and Grunewald. As part of the reconstruction of the Stammbahn, there are plans to run regional trains from Ostkreuz via the Südring to Schöneberg, where they would meet the Stammbahn tracks. That would be exciting because the ring

would then also be closed off from the main line. There is currently a gap - still a consequence of the construction of the Berlin Wall in 1961 - at the crossing structure over the Görlitzer Bahn near the Treptower Park S-Bahn station.

The long history of the Ringbahn determines its appearance. Old things stand side by side with new ones throughout the city. Platforms with roofing from the early 20th century with LED screen displays and a modern new office building next door. Picturesque old station buildings next to new buildings from recent years. That's what makes the Ringbahn so special. That's Berlin, say the locals.

I have tried to capture this flair in the simulation and hope you enjoy driving this add-on and discovering my home city of Berlin.

Jan Bleiß

Wandlitz, 17.11.2023

Contributors and thanks

The following were involved in the construction of the add-on:

Track construction:	Jan Bleiß
Vehicle construction:	Benjamin Ebrecht, Ulf Freudenreich, Matthias Gose, Nick Zimmermann
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Skydome:	cgskies.com
various objects:	Moritz Buckow, turbosquid.com, 3dtotals.com
Scenarios:	Jan Bleiß, Marcel Templin
Manual:	Jan Bleiß, Dr. Birgit Wolf-Bleiß
Scripts:	Benjamin Ebrecht, Jan Bleiß, Maik Goltz
Speakers:	Ingo Ruff, Jan Bleiß
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Cover photo:	Jan Bleiß
Image research:	Ralf Zimmer, Sven Riebsch, Marcel Templin
Organizational support:	Robin Gottschlag

I would like to thank Robin Gottschlag for his support, his critical eye on what was just finished and his encouragement when things didn't go as planned!

I would also like to thank my wife Birgit for her patience, for listening and encouraging me!

Description

The add-on depicts the Berlin S-Bahn and long-distance rail ring as it was in 2022. A branch line leads north to Pankow. The mainline railway can be used from Treptower Park to Treptow freight station (after a loop around the ring). Signals, safety equipment and track markings are available on the S-Bahn and mainline tracks. The S-Bahn signals are still secured with track stops.

The authors have gone to great lengths to make the cityscape as recognizable as possible. Garbage, dirt and graffiti are only hinted at. We were of the opinion: the model is dirty enough, it doesn't have to be simulated like this. If you want to see dirt, go to Berlin.

Tempelhof Airport is an exception in the temporal representation. It is still used in the simulation. Some signal boxes that have already been demolished (Frankfurter Allee B2, Ostkreuz OKO) have been given a virtual memorial, contrary to the prototype. The signal boxes that are no longer in use do not look as rancid as they do in reality, but appear well maintained and preserved.

Technical requirements

To be able to play the add-on for Train Simulator Classic, you need:

Software:

- Train Simulator Classic,
- European Loco and Asset Pack.

The recommended hardware is a computer with at least this configuration:

- CPU: Intel i5 or better,
- Memory: 16 MB or more,
- Hard disk for simulator and add-on: SSD-M2 min. 256 GB,
- powerful graphics card with at least 4MB memory.

The "Ringbahn Berlin" route runs entirely within the Berlin city limits, so the computer requirements are quite high.

Notes

In the event of performance problems on less powerful computers, the simulator settings can be used to counteract this. The following are recommended:

- Visibility: one level less than maximum (optical effect hardly noticeable in the simulation, brings up to 6-8 additional FpS),
- Scenery density: one level less than maximum (the 3D vegetation is set so that it disappears at a scenery density of 9, which adds approx. 4 FpS),
- Shadow quality one below maximum (3 FpS),
- Water quality two below maximum (brings up to 5 FpS near the water).

Scenarios

1 At dawn

Take the first S42 of the day. The journey starts and ends at the platform in Ostkreuz. Dirty fall weather awaits you outside. Who knows if that's where the word "dawn" comes from.

2 At dawn (2)

The journey also starts at Ostkreuz in the early morning, only it goes the other way around the Ring on the S41. Unfortunately, the weather still hasn't changed. Dawn is breaking...

3 Full ring on the S41

They take over the S41 at Ostkreuz and travel once around the Ring, probably not without disruptions. But it's a beautiful summer morning.

4 Insertion on the S42

A train that is used at certain times to increase the frequency of services is called a "Einsetzer". On a beautiful fall day (yes, there are those too), the Greifswalder Straße train starts and circles the ring once.

5 Roadworks between Halensee and Beusselstraße (S42)

First-hand experience: points have to be changed in Westend. Due to the location of the track changes, the trains end in Halensee or In der Beusselstraße. This means that trains sometimes run "on the wrong side". If you miss Zs6 there: these sections are defined as "twice single-track". Therefore, you always drive on the right track, regardless of which side you are on. Only the point where the side is changed is decisive. The change is indicated there with Zs3 and Zs2. The tour starts in Halensee, the weather couldn't be better.

6 Roadworks between Halensee and Beusselstraße (S41)

Anyone familiar with Berlin knows that roadworks can sometimes take much longer than previously announced. Here, parts for the switch installation were probably missing. So it's now winter, it's snowing heavily and we're doing the round in a clockwise direction.

7 Neck and rail breakage (1)

Timetable change on the S85. From 10.12.2023, it will only run to Pankow at weekends. And as with every changeover, there is plenty of chaos. In addition, the line between Treptower Park and Baumschulenweg is closed due to broken rails. The journey begins on a clear winter afternoon in Greifswalder Straße and ends in Pankow.

8 Broken neck and rails (2)

The chaos continues. Only two minutes (in which the driver has to open and close the rear, run from the rear to the front, open the front and switch on). The train has to prepare for departure and make its way to Treptower Park.

9 Broken neck and rails (3)

Now it has started to snow. Bring the freight from Treptower Park to Pankow.

10 Construction material for the A100

The 16th construction phase has already been completed in the add-on. But gravel also needs to be brought in for the 17th. This morning, a freight train derailed at Köllnische Heide and is blocking the access road to Neukölln. So we have to ship the gravel once around Berlin. And since you're not alone on the mainline ring, you'll encounter what every driver in Berlin knows: lots of red lights.

11 At a crawl

The freight train has been unloaded and is heading to Westhafen to be reloaded. However, the route leads over long stretches of track on which it is not allowed to drive faster than 60 km/h. And where it could be 100 km/h, a red light greets you in the distance.

12 Through the night in a Mini

On weekends at night, class 483 quarter trains also run as S85s on the Berlin S-Bahn network. It's winter, it's freezing cold and the heating is broken, so we hurry to Ostkreuz, where a replacement train is waiting.

Notes for scenario creators

Unlike usual, the LUA scripts for the scenarios are included in the add-on and can be read openly. Anyone can use them. Of course, anyone can also copy them and make their own stuff out of them. That is in the nature of things. The scripts interact with the vT scenario markers that are permanently installed in the route. However, you can also use your own in the scenario.

Basic prerequisite: the player train is coded as a local train. If the train is not to play announcements (e.g. class 481 from TTB, which has its own announcements), the script must not be used! The script can do the following:

1. automatically play the announcements "next station...",
2. automatically upgrade the train (TTB 481, 483 and 484) by entering a "Trigger event" in the scenario. Entry: ACTIVE;\$\$\$;3
3. trigger a message window in the current scenario by making an entry in a "Trigger event". Entry: MSG;INTRO;3 INTRO is the name of the HTML file in the de/en folders of the scenario WITHOUT the ending .html in the entry. INTRO.HTML is expected for the file NOT .HTM.
4. trigger your own announcement: place vT_Scenario trigger in the track and enter in the properties flyout: MEINSOUND;LI. The sound file must then be stored in the folder Assets\virtualTracks\Ringbahn\Audio\Ansagen and have the file name MEINSOUNDLI.WAV. The LI (and also RE) distinguishes the exit side of the station announcements. You can also use MEINSOUND;RE, in which case the file must be named MEINSOUNDRE.WAV. Remember that it must be a stereo file, otherwise you won't hear anything.

Operation of the 483/484 series

Authors:

- 3d model: Nick Zimmermann
- Driving physics, programming: Benjamin Ebrecht
- Sound: Linus Follert, Benjamin Ebrecht
- Thanks for support to: Denny Göring, Michael Pabst, Marcel Templin, TRAXX-Driver

Note on vehicle repaints:

Mods and repaints may only be released after approval by the development team. The vehicle of the 483/484 series is a complex development that will be continuously adapted until the final release of the add-on on Steam (version 1.x). Since adjustments to the basic model are still to be expected after the release of version 1.0, we ask you to refrain from mods and repaints until the Steam version is released in order to avoid versioning problems. It is to be expected that no release will be given by the development team until then.

After the release of the Steam version, mods/repaints can be sent to the development team for approval. The aim is to make approved additions available in the form of bonus packs that are easy to integrate for all users.

Further information on the BonusPack initiative:

<https://trainteam.berlin/forum/index.php?/topic/1514-railworks-bonuspack-programm/>

Requests for the publication of mods/repaints can be sent to ebrecht@trainteam.berlin.

Overview of the vehicle's functions:

The 483 / 484 series has the following features in the delivered version:

- Detailed models:
 - o Automatically attached, changeable vehicle numbers on the front, side walls, driver's cab and interior,
 - o Highly detailed driver's cab with switchable perspectives,
 - o Interior with various perspectives,

- "Headout" view from the perspective of the door monitoring camera.
- Realistic driving dynamics that are matched with simulations of the original vehicles.
- Extensive script framework („TTB MESFET“):
 - incl. language selection for outputs,
 - Log files to be able to trace operating actions and any errors,
 - Train naming for clear allocation, recording and monitoring of all vehicles in your own train formation.
- Battery switch:
 - With influence on the status of the indicator lights and monitors.
- Master key:
 - Locking and unlocking the control panel.
- Spring-applied brake:
 - Original implementation with flashing illuminated buttons and delayed application/release.
- Brake system:
 - True-to-original implementation of the various braking systems beyond the game standard.
 - Service braking is essentially electric,
 - The electro-pneumatic brake is applied below 7 km/h,
 - Holding brake applied automatically when stationary,
 - Integration of any emergency and emergency braking with traction lock and forced zero position,
 - Additional operation of the driver's brake valve possible,
 - Appropriate pressure indicators for the air tanks and lines as well as brake cylinders C1 and C2.
- Cruise control:
 - Realistic implementation of cruise control with toggle switch activation and preselection,
 - Preselection of the target speed in 5 km/h increments with influence on the drive/brake control,
 - Incl. skid and skid protection.
- Lighting:
 - Tip lighting
 - Prototypical coupling to the state of the direction reverser,
 - Three positions possible when driving forwards: signal light, low beam, high beam,
 - Matching light cones and lens flares as well as indicator lights in the driver's cab,
 - Console lighting infinitely variable,
 - Driver's cab lighting with fluorescent tube effect at the start,
 - Instrument lighting is switched automatically with battery switch.

- Passenger doors:
 - Monitoring of the door status in the entire train set with traction lock and indicator light display,
 - Randomly offset opening and closing door animation for true-to-life visuals and acoustics,
 - Side-selective selection for door opening by the player.

- Indicator lights in the driver's cab:
 - Various indicator lights functional, including traction lock, green loop, head signal, sander, main switch, spring-loaded brake.

- Main monitor with functional outputs:
 - Display of time and vehicle number,
 - Presetting of a fixed date possible,
 - Display of mains voltage per vehicle unit,
 - Display of tractive/braking force and mains current, each with actual value and target or maximum value,
 - Realistic display of grid current consumption based on dynamic driving ,calculation model: current drawn from and fed back to the busbar as well as net consumption,
 - Starting values for power consumption as well as assumed auxiliary power can be defined to enable "power saving competitions".

- FIS monitor partially functional:
 - Selection of the train destination display with display of the currently selected destination,
 - Display of the current station based on trackside triggers.

- Train destination display:
 - Four separate optics of the train destination display on the front, side walls, in the interior and on the driver's cab display in original resolution for each train destination,
 - Realistic, pixel-perfect implementation of the display fonts,
 - Various train destinations of the S41, S42, S45, S46 and S47 lines can be switched through for loop operation.

- SiFa:
 - Realistic request sifa, which is path- and time-controlled,
 - (De)activation possible in the driver's cab,
 - Start status can be preselected in option file.

- Travel lock:
 - Implementation of the mechanical travel lock with reaction to the route stops in the add-on,
 - Forced braking when triggered and "Intended pass-by" mode,
 - Can be (de)activated in the driver's cab,
 - Start status can be preselected in option file.

- Sander:
 - Manual operation and automatic activation in the event of emergency/forced braking,
 - Deactivation below 25 km/h in automatic mode.

- Windshield wiper:
 - 3 different modes switchable: interval, duration, duration/fast.

- Conductor rail gaps:
 - Vehicle reacts to track-side conductor rail ends,
 - Audible unthreading and rethreading of the pantograph,
 - Tear-off sparks depending on the frequency preset in the option file.

- Automatic upgrade:
 - Vehicle can be automatically upgraded in real time,
 - Pre-equipped scenario start in various states also possible.

- Extensive original sound:
 - True-to-original driving noise with inverter, motor and rolling sounds,
 - Numerous different turnout and curve noises as well as brake squeal,
 - Voice output in the driver's cab,
 - Audible threading and unthreading of the pantographs at the ends of the conductor rails and tear-off sparks,
 - Passenger doors with TSI-compliant beeps,
 - Lots of details such as sounded flasher relays and flashing fluorescent lights.

Übersicht über die Führerstandselemente:



Nr.	Element	Tasten-kürzel	Nr.	Element	Tasten-Kürzel
1	"Emergency brake" impact button	Backspace	19	HMI: Grid power consumption - actual and maximum	-
2	"Drive lock" illuminated button	Enter (Num)	20	HMI: Electricity meter - consumed, fed back and net	-
3	"Apply spring mechanism" illuminated button	N	21	Main air duct needle (yellow)	-
4	"Release spring mechanism" illuminated button	Shift + N	22	Main air reservoir needle (red)	-
5	Drive/brake lever	A / D	23	Needles brake cylinder C1/C2	-
6	Driver's brake valve	, / .	24	SiFa indicator light	-
7	SiFa foot switch	Shift + Leertaste	25	Console lighting	Strg+L/ Strg+Shift+L
8	Cruise control toggle switch	Shift + W/ Shift + S	26	Microphone	M
9	Direction switch	W / S	27	Driver's cab lighting	J / Shift + J
10	"Sand" button incl. indicator light	X	28	Windshield wiper	V / Shift + V
11	Headlight	H / Shift + H	29	Unlock doors left	P
12	"Main switch" toggle switch incl. "off" indicator light	Strg + Z/ Strg + Shift + Z	30	Close doors	Ü

13	Red needle Set speed (cruise control)	-	31	Release doors on the right	*
14	Speedometer needle	-	32	SiFa hand switch	Leertaste
15	HMI: Vehicle number	-	33	Green loop indicator light	-
16	HMI: Date / time	-	34	Traction lock indicator light	-
17	HMI: Mains voltage	-	35	Master key	K
18	HMI: Tractive force - preselection and actual	-			



Nr.	Element	Tasten- kürzel	Nr.	Element	Tasten- Kürzel
36	FIS: Touch button train destination up	.	38	FIS: Display current train destination	-
37	FIS: Touch button train destination down	0	39	FIS: Display current station	-



Nr.	Element	Tasten-kürzel	Nr.	Element	Tasten-Kürzel
40	SiFa on/off	Strg + Leert. / Strg+Shift+Leert.	42	Battery button	B / Shift + B
41	Mech. Drive lock on/off	Strg + Enter (Num) / Strg+Shift+Enter (Num)			

Quick start:

To get a non-upgraded vehicle moving quickly, carry out the following steps:

1. switch on the battery switch (B),
2. unlock the console (K),
3. insert main switch (Ctrl + Z) (illuminated ring on button goes out),
4. set train destination (0 or `),
5. release the spring brake (Shift + N) (illuminated ring on the apply button flashes and goes out),
6. set direction of travel reverser to forward (W),
7. deflect the drive/brake lever (A),
8. confirm SiFa when prompted (space bar),
9. release door at platform (P for left, * for right),
10. close the doors on the platform at the end of the passenger change (Ü).

Keyboard shortcuts:

Battery on -> B

Open/close control panel -> K

Main switch on / off -> Ctrl + Z / Ctrl + Shift + Z

Automatic set-up: Z

Create spring mechanism -> N

Release spring mechanism -> Shift + N

Direction switch: W/S

Combination lever -> A/D

Driver's brake valve -> , / .

Emergency brake button: Return

Cruise control on/off & VSoll preselection: Shift+W / Shift+S

Sanding: X

Release doors right: * (or T)

Release doors on the left: P (or T)

Close doors: Ü

Headlights signal light/dipped beam/high beam: H / Shift + H

Driver's cab lighting on / off: J / Shift + J

Console light: Ctrl + L / Ctrl + Shift + L

Windshield wipers up/down: V / Shift+ V

Sifa on/off: Ctrl + spacebar / Ctrl + Shift + spacebar

Sifa impact button: Space bar

Sifa foot pedal: Shift + space bar

Drive lock on/off: Ctrl + Enter (Num) / Ctrl + Shift + Enter (Num)

Activate travel lock: Enter (Num)

Macrophone: M

Switch train destination display off/on: 0 / `

Upgrade:

1. switch on the battery switch (B),
2. unlock the console (K),
3. engage main switch (Ctrl + Z) (illuminated ring on button goes out),
4. release the spring brake (Shift + N) (illuminated ring on the apply button flashes and goes out).

Main air line is only filled when the control panel is unlocked,

Instrument lighting switches automatically when the control panel is closed,

The drive and brake lever can only be deflected when the control panel is unlocked,

The above steps can also be triggered by the "Automatic set-up" (Z button).

Driving operation:

- Set the direction reverser with W / S.
- Release the spring-loaded brake (release process completed when the contact button no longer flashes red): Shift + N.
- Without cruise control:
 - o Drive with drive / brake lever: A / D,
 - o An internal speed limit of 100 km/h applies,
 - o Acceleration is also limited to 1.0 m/s².
- With cruise control:
 - o Cruise control takes over tractive force preselection and brakes.
 - o It is possible that the Vmax is briefly exceeded.
 - o To activate cruise control: press increase for 2 seconds: Shift + W (illuminated ring on the button lights up when activated)
 - If cruise control is activated while driving, the current speed is preselected (regardless of the otherwise valid 5 km/h steps)
 - o Increase/decrease VSoll: Shift + W / Shift + S

- Briefly press the button: increase/decrease to the next 5 km/h level
- Press and hold button: increase/decrease in 5 km/h increments
- Switch off cruise control: Increase/decrease button positions V_{soll} several times in quick succession (illuminated ring on the button goes out)
- After switching off, traction lock takes effect (forced zero setting)

Braking system:

- When braking with the accelerator/brake lever, the brake computer automatically controls the systems involved
 - As a rule, only the e-brake is used as far as possible
 - If the speed falls below 7 km/h, the ep-brake is automatically applied until the vehicle comes to a standstill.
 - If a drive command is given, the ep-brake is released again, otherwise it brakes to a standstill.
- Holding brake
 - When stationary, the holding brake is applied automatically
 - If a drive command is given, the holding brake is released
- Driver's brake valve
 - Can be operated with . and ,
 - Brake commands are implemented if the HLL venting is greater than specified by other systems (e.g. ep brake below 7 km/h, holding brake)
 - Bleeding the HLL in cruise control mode deactivates the cruise control
 - Emergency braking initiated with the driver's brake valve can be released while driving (forced zero position of the drive/brake lever)
- Emergency/forced braking
- Emergency/forced braking can be triggered in the following ways:
 - with the drive/brake lever,
 - with the driver's brake valve,
 - with the emergency stop button,
 - by the SiFa,
 - by the travel lock.
- If they have not been triggered by the travel lock, emergency/force brakes can be released again while driving
- To release the emergency/speed brakes, move the drive/brake lever to the center position and operate the respective safety system if necessary

Train protection

- Safety driving switch (SiFa)
- The SiFa is activated at the start of the game when the add-on is delivered
- During the journey, the system first prompts you to confirm with the indicator light, followed by voice output.
- During this request phase, the SiFa must be operated with the manual button or the foot pedal.
- Otherwise, emergency braking is initiated
- In the file ..\railworks\Assets\virtualTracks\Ringbahn\Rollmaterial\TTB_BR483-484\Scripts\Options\TTB_BR483-484_Options.lua you can preset that the SiFa is deactivated at the start of the game
- Drive lock
- The BR 483/484 is equipped with two train control systems in parallel: mechanical train stop and ZBS
- The ZBS is permanently in the "Standby X" state during operation and is not active
- The mechanical train blocking system, on the other hand, is activated at the start of the game when the add-on is delivered
- When driving over a signal indicating a stop, the travel lock must first be activated in order to activate the mode "intended pass-by" for 6 seconds
- If a signal indicating a stop is not passed in "Deliberate pass-by" mode, emergency braking is triggered until the vehicle comes to a standstill
- At standstill, the emergency braking can be released by moving the drive/brake lever to the center position and activating the travel lock
- In the file ..\railworks\Assets\virtualTracks\Ringbahn\Rollmaterial\TTB_BR483-484\Scripts\Options\TTB_BR483-484_Options.lua, you can preset the drive lock to be deactivated at the start of the game

Door control

- The TSI-PRM-compliant door control of the original was implemented with the characteristic flashing and the door noises (also during the opening time of the doors)
- When reaching a station, the doors on the platform side must be released - all doors open with a time delay
- Due to functional limitations of the Train Simulator, the doors do not close again automatically (passengers would run into the doors, no linking possible)
- After the passenger changeover time has elapsed, the door closing command must be given at the push of a button - the doors close with a time delay with a corresponding warning tone

- The train is always dispatched by the driver. Any announcements are to be realized via scenario scripts.

Lighting

- Headlights
- When the battery switch is active, the train's headlights can be used; the signal lights are automatically switched on when the battery switch is activated
- The switch for the headlights has 3 positions
 - o Signal light
 - o Low beam
 - o High beam
- The headlights are switched accordingly depending on the selected direction of travel. If the direction reverser is in the middle position, both ends of the train show the end of train signal.
- Instrument lighting
- Switches on automatically when the console is unlocked if the battery switch is on.
- Console lighting
- Can be operated continuously with the rotary knob in the driver's cab when the battery switch is activated.
- Driver's cab lighting
- Can be switched on/off with the switch in the driver's cab when the battery switch is activated.

Windshield wiper

- There is a windshield wiper rotary switch with 4 positions:
- Off
- Interval
- Continuous wipe
- Fast continuous wipe
- The V or Shift + V buttons can be used to switch up or down between the switch positions

Train destination indicator

- Almost 60 train destinations matching the Ringbahn are prepared in the player train, whereby various texts can be displayed on the front of the vehicle, the side windows and in the interior

- The currently selected train destination is also displayed in the driver's cab on the FIS screen (right)
- Up/downshifting is done with the O or ` buttons
- Any announcements are to be realized via scenario scripts.
- List of available train destinations:

S41 Ring	S45 Südkreuz
S41 Gesundbrunnen	S45 Tempelhof
S41 Beusselstraße	S45 Hermannstraße
S41 Westend	S45 Neukölln
S41 Halensee	S45 Schöneweide
S41 Bundesplatz	S45 Grünau
S41 Südkreuz	S45 Flughafen Schönefeld
S41 Tempelhof	S45 BER T1-2
S41 Hermannstraße	S46 Gesundbrunnen
S41 Neukölln	S46 Beusselstraße
S41 Ostkreuz	S46 Westend
S41 Greifswalder Straße	S46 Halensee
S41 Schönhauser Allee	S46 Bundesplatz
S41 Schöneweide	S46 Südkreuz
S42 Ring	S46 Tempelhof
S42 Gesundbrunnen	S46 Hermannstraße
S42 Beusselstraße	S46 Neukölln
S42 Westend	S46 Schöneweide
S42 Halensee	S46 Grünau
S42 Bundesplatz	S46 Zeuthen
S42 Südkreuz	S46 Königs Wusterhausen
S42 Tempelhof	S47 Tempelhof
S42 Hermannstraße	S47 Hermannstraße
S42 Neukölln	S47 Neukölln
S42 Ostkreuz	S47 Schöneweide
S42 Greifswalder Straße	S47 Spindlersfeld
S42 Schönhauser Allee	Bitte nicht einsteigen
S42 Schöneweide	[Leere Anzeige]
S45 Bundesplatz	

HMI

- Passenger Information System (FIS)
- Right monitor
- Displays the currently selected train destination
- Main screen (central console, right-hand side)
- Displays vehicle number, date and current time
- The date is selected according to the time of year or can be explicitly determined by vehicle parameters
- The mains voltage is displayed for each unit in the train set
- The traction/braking force is displayed
 - o The arrow on the scale shows the preselected value
 - o The color bar shows the value actually reached
 - o Blue bar = acceleration
 - o Pink bar = braking
 - o It is normal that the target value is not always reached, especially during braking. For example, the ep brake, which is automatically applied below 7 km/h, and the holding brake may request different values than those selected by the driver
- The current drawn from the conductor rail (of the train set) is also indicated.
 - o Blue bar = power drawn from the conductor rail
 - o Pink bar = feed back to the conductor rail
 - o The mains current limit in the Berlin S-Bahn network is predominantly 4,000 A. This value can be reached for full trains with less than 100 % power, in which case it must be regulated accordingly.
 - o A current drawn when stationary (= small blue bar) results from the supply of auxiliary systems (electronics, lighting, heating/air conditioning) and varies seasonally
 - o Converted braking energy is initially used to supply the auxiliary systems - if there is a surplus, this is fed back into the grid
- A counter counts the energy drawn for its own multiple unit in three values (= quarter train for BR 483, half train for BR484)
 - o "Absorbed": Drawn from the conductor rail
 - o "Fed back": Proportion that could be fed back into the grid via the conductor rail.
 - o "Net": Difference between "absorbed" and "fed back" energy, i.e. energy effectively consumed by the vehicle. The vehicle can achieve energy recovery rates of around 50 %. This depends, among other things, on driving style and weather conditions.
 - o The auxiliary power consumption is randomly selected within a range depending on the season.
 - o An explicit specification of the auxiliary power consumption can be made by using the parameter "_AUX=<XX>" in the vehicle number of the leading vehicle per scenario, where <xx> must be replaced by the power to be

specified for the entire train set in kW. It is recommended not to set more than 30 kW per vehicle body.

- FASSI
- An empty FASSI timetable is displayed. The system has not been reproduced in detail in the game.
- Video monitor
- During door release, the monitor displays a disturbed video image.
- The system has not been reproduced in the game.

Changing driver's cab

- Drive/brake switch in center position
- Direction of travel switch to neutral
- Apply the spring-loaded brake
- Lock the control panel (main switch and battery switch can remain engaged)
- Change driver's cab (Ctrl + "+" or Ctrl + "-")
- Unlock the driver's desk
- Release the spring-loaded brake
- Select direction of travel
- Deflect the drive/brake lever

Vehicle numbers

- The vehicle numbers assigned in the scenario editor are displayed in various places via the "Dynamic Numbering" function of Train Simulator
- On the front and center of the vehicle: Operator number
- In the passenger compartment at the front and rear: Operator number
- In the driver's cab at the top: Operator number
- On the longitudinal member of the frame at the end of the vehicle: NVR number
- Please note that two different vehicle numbers are used per vehicle for the same vehicle
- NVR number
 - o Indicates the designation in the national vehicle register (NVR) and uses the four-digit series number.
 - o Example: 94 80 0484 002-1 D-DB
- Operator number
 - o Specifies vehicles with reference to trainsets (via letters) and uses the same serial numbers per unit, even if these do not match the NVR serial number
 - o Example: Operator number 483 021 B belongs to NVR number 94 80 0483 521-1 D-DB
- Matching numbers are assigned automatically in the scenario editor, but the ordinal numbers and control digits must be adjusted manually to represent a related unit.
- Numbering scheme in the game: 9480_0484_509-5D

- Deviating operator number is automatically displayed correctly

Language selection, options and logger

The modules of the script system for the BR483/484 offer the possibility to set various options by the end user. This means that every user can customize the vehicle according to their own ideas within a certain framework - where it is useful for the fun factor, even outside realistic limits.

The setting is made in the options file TTB_BR481_Options.lua, which is located in the folder

..\railworks\Assets\virtualTracks\Ringbahn\Rollmaterial\TTB_BR483-484\Scripts\Options

is located. All preselections are made in this file, each setting is explained again in the file itself and the possible value range is specified.

- Language selection
- In the options file mentioned below, you can select the language in which output is made in the game and in the log files.
- The language packs German and English are supplied, German is the default setting.
- Further language packs can be created and integrated via the options file.
- Options
- The file ..\railworks\Assets\virtualTracks\Ringbahn\Rollmaterial\TTB_BR483-484\Scripts\Options\TTB_BR483-484_Options.lua contains some option entries including explanations, which can be customized if required.
- The options determine how the vehicle behaves during the game and which default settings are implemented at the start of the game
- Examples of the setting options
 - o Language pack for output
 - o Log mode:
- Should log files be recorded?
- (De)activate real-time outputs in the game?
 - o Sifa activated at game start?
 - o Driving lock activated at game start?
 - o Typical sander stock
 - o Frequency of demolition sparks
- Logger

- For the player train formation, a log file is stored in the RailWorks\Assets\virtualTracks\Ringbahn\Rollmaterial\TTB_BR483-484\Scripts\Logs folder for each individual vehicle per game
 - o In addition, messages from the currently occupied vehicle can be output in real time in the game. These are activated by default, but can also be suppressed in the options file for each log mode.
 - o Log files are stored with the name of the respective vehicle number and deleted when the next scenario with the BR 483/484 is started. If any special features are to be recorded, the log files must be saved in a different location before the next start of the game.
- The log files record not only the status of the vehicle (e.g. train running) but also influences (on the track side or by other vehicles in the train formation) as well as the player's operating actions.

Final notes on the vehicle

At this point, further valuable information should be collected which may be important for the smooth operation of the vehicle and freedom from faults.

Computer-controlled traffic

TrainTeamBerlin pursues a strict separation of vehicles that are used in player operation from those that are controlled exclusively by the computer in the course of a scenario ("AI traffic", "AI" as an abbreviation for "artificial intelligence").

The richly equipped player vehicle is correspondingly resource-intensive and neither suitable nor equipped for pure, mass operation in AI traffic. It is therefore strongly recommended to only use the additionally supplied AI vehicles in AI traffic. They are specially designed to be used in large quantities and at the same time do not put nearly as much strain on the computer as the same number of player vehicles. In addition, for most AI vehicles there are further instructions in the corresponding manuals on how to configure their additional functions quickly and easily in the scenario (e.g. train destination display).

Control mode

This vehicle is designed to be as faithful a simulation of the original as possible within the scope of the "Train Simulator Classic" ("Railworks") simulation platform. It is therefore not intended to control the vehicle in simplified control mode (HUD, F3/F4 buttons, gamepad).

It is possible to deactivate many of the new, complex functions for a simple and purely fun driving mode. However, this should always be done using the expert control mode.

Saving a scenario/rolling start

This vehicle is not intended for saving scenarios. In principle, it is possible to use the save function, but the context of the scripts executed in the background will most likely no longer match the state saved in the game - malfunctions or at least confused behavior of individual systems is to be expected. The same applies to the "Rolling start" function. As the scenarios with this vehicle usually have a limited length, this should not be a major problem.

Changing driver's cab

No special instructions need to be followed when changing the driver's cab. The second, newly entered driver's cab may have to be (partially) refitted according to the instructions. In the interests of driving true to the original, it is nevertheless advisable to lock the driver's desk again before leaving a driver's cab.

Build your own scenarios

As presented in the manual, numerous additional functions have been programmed for the BR483/484 that require special handling when creating your own scenarios. Many of these functions are controlled via triggers, which are explained in detail in the respective sub-chapters. The supplied route minimizes the effort involved in setting these triggers, as they have already been set in advance - insofar as this makes sense for all scenarios. It is conceivable that further "scenario templates" for additional routes will appear after the release of the vehicle add-on. It is therefore worth keeping yourself informed at www.trainteam.berlin if required.

Instructions for hobbyists

Integrate your own language files

Almost all script outputs made by the script system (whether in the game or in the log file) are taken from a language file that is stored in the folder

```
..\railworks\Assets\virtualTracks\Ringbahn\Rollmaterial\TTB_BR483-484\Scripts\Language
```

is located. Initially, ready-made files for German and English are supplied. Each user can add further language files without having to change the script system.

The language selection is made in the options file, which is located in the folder

```
..\railworks\Assets\virtualTracks\Ringbahn\Rollmaterial\TTB_BR483-484\Scripts\Options
```

is located. Further preselections can be made in this file, all of which are explained again in the file itself.

The language is selected in the options.LANGUAGE field. "GERMAN" and "ENGLISH" can be preselected. If the user adds another language file, this must also be in the language folder as <language>.lua. To select this, the entry "<language>" is made in the language option field of the option file. Incorrect integration of a language file leads to the "Language Unknown" error in the game output: "##LU##". If individual entries of an edited language file are missing, the "String Unknown" error is output in their place: "##SU##".

Enter vehicle parameters

To assign additional, scenario-specific properties to a vehicle in the scenario editor, a parameter is transferred to it via the vehicle number. Several parameters are appended to the vehicle number, separated by underscores:

Bsp. 9480_0484_509-5D _<Parameter 1>_<Parameter 2>

When the game starts, the parameter is read out and the vehicle number is automatically truncated so that functions such as "Dynamic Numbering" work with an automatically written vehicle number. However, this means that no correctly written number can be recognized on the model in the scenario editor when using the number including parameter! Furthermore, when specifying the vehicle number in scenario instructions (e.g. "Shunting"), the vehicle number must be specified WITHOUT parameters! These parameters are processed at the start of the game and the vehicle number is shortened to the usual length. There are parameters that have a fixed text sequence, others allow additional numbers, see the following list:

- **SANDERRES=<X>**
 - o Supply of the sand container. <x> is replaced by the duration in seconds that can still be sanded
- **DATE=<YYYYMMDD>**
 - o Specify the date display of the HMI: The placeholder <YYYYMMDD> is replaced by a date in the format YYYYMMDD
- **KWHC=<X>**

- Start value of the energy meter "Recorded": <X> is replaced by the start value in kWh.
- **KWHR=<X>**
 - Start value of the energy meter "fed back": <X> is replaced by the start value in kWh. The regenerated value should be smaller (usually half as large or even smaller) than the "Absorbed" value.
- **AUX=<X>**
 - Determination of auxiliary power consumption per wagon body": <X> is replaced by the value in kW. Values below 30 kW are recommended.
 - Logger
 - If the option is activated in the options file (see above), the vehicle has the option of recording outputs for the journey in the game and/or in a log file
 - Outputs in the game are made via text windows at the top right of the screen
 - File outputs are made in txt files, which are named according to the vehicle number under ..\RailWorks\Assets\TrainTeamBerlin\TTB_BR483-484\Scripts\Logs
 - If there are problems operating the vehicle, it can be helpful to trace the actions from the log files
 - Logs from previous journeys are automatically deleted when another scenario is started

Activation of the vehicle via scenario script

It is possible to influence the vehicle by using scenario scripts when building your own scenarios. The automatic upgrading of the vehicle can be triggered.

Trigger auto upgrade via scenario script

The automatic upgrade process can also be triggered automatically via a scenario script if desired. To do this, you must ensure that this line is performed:

```
SysCall ( "PlayerEngine:SetControlValue", "AutoSetupByScript", 0, 1 );
```

It is also possible to start a quick auto upgrade via script, whereby the train is fully upgraded immediately after a request. To do this, you must ensure that the line is executed

```
SysCall ( "PlayerEngine:SetControlValue", "AutoSetupByScript", 0, 2 );
```

This function is useful if, for example, the train should already be fully equipped at the start of the scenario.

It is also intended to simulate situations in which the train is upgraded by a colleague but is taken over with the driver's desk locked and the spring-loaded brake applied (corresponds to a change of personnel). This state can also be created in fractions of a second (e.g. at the start of the scenario) by triggering it via a scenario script. To do this, you must ensure that the line is executed:

SysCall ("PlayerEngine:SetControlValue", "AutoSetupByScript", 0, 3);

Triggering actions via track-side triggers

The add-on comes with numerous triggers that can be installed in routes and scenarios to trigger various actions when the player train passes over them. The following table provides a compact overview:

Trigger	Funktion
<i>TTB Trigger Stromschienenlücke ANFANG</i>	Marks the start of a gap in the conductor rail in the direction of travel, already (partly) permanently installed in the track for "Ringbahn" and "S25 Südast". Requires additional entries (see below).
<i>TTB Trigger Stromschienenlücke ENDE</i>	Marks the end of a gap in the conductor rail in the direction of travel, for "Ringbahn" and "S25 Südast" already (partly) permanently installed in the track. Requires additional inputs (see below).
<i>TTB Trigger Station Announcement</i>	Triggers a station announcement independent of the vehicle. Requires additional inputs, a suitable scenario script and an announcement database. Explanation in the route section of the manual.
<i>TTB Trigger Platform Marker</i>	Marks the next station/track for display in the FIS monitor. Requires entry of the station abbreviation and track (see below). Trigger already set in Ringbahn route.

Marking gaps in conductor rails

These mark the start/end of a gap in the conductor rail for each direction of travel. This means that two triggers are required for the end of a conductor rail and at least four for a gap. In the selection list, these are marked as

"TTB Trigger Stromschienenlücke ANFANG" und
"TTB Trigger Stromschienenlücke ENDE"

An "R" or "L" must be entered in the signal flyout to indicate on which side (in the direction of travel of the signal link) the end of the conductor rail is located.

For the "Ringbahn" route, these triggers are/will be permanently installed on the track side.

Mark the next platform track

The marking ensures a corresponding display in the FIS monitor (right-hand side) of the driver's cab. The following code must be entered in the trigger in the signal flyout in the right-hand text field:

„XXXXX000“

XXXXX" stands for a station abbreviation standardized to 5 digits. The track number is always given as a three-digit number instead of "000". The following stations can be displayed:

Kürzel	Stationsname
BPKW_	Pankow
BBOF_	Bornholmer Straße
BSAL_	Schönhauser Allee
BGSS_	Greifswalder Straße
BLST_	Landsberger Allee
BSTO_	Storkower Straße
BFAL_	Frankfurter Allee
BOK_	Ostkreuz
BTP_	Treptower Park
BSO_	Sonnennallee
BNK_	Neukölln
BHER_	Hermannstraße
BTHF_	Tempelhof
BSKR_	Südkreuz
BSGR_	Schöneberg
BIP_	Innsbrucker Platz
BBUP_	Bundesplatz
BHEI_	Heidelberger Platz
BHO_	Hohenzollerndamm
BHAL_	Halensee
BWKRR	Westkreuz
BMN_	Messe Nord / ICC
BWES_	Westend
BJUN_	Jungfernheide

BBEU_	Beusselstraße
BWH_	Westhafen
BWED_	Wedding
BGB_	Gesundbrunnen

KI-Fahrzeug

BR483/484



→ To be unlocked in the scenario editor: virtualTracks \ Ringbahn

→ Train set of the BR483 / 484 (S-Bahn Berlin) with original sound

→ Randomly offset opening and closing doors

→ Paintwork variants:

- Tradition colors

→ Prefabricated consists enclosed

→ As with the player vehicle, the AI vehicle can process parameters attached to the vehicle number. These parameters are processed at the start of the game and the vehicle number is shortened to the usual length. Several parameters are each entered separated by an underscore "_"; there is also an underscore before the first parameter entry.

→ The parameter "PASS=0" ensures that there are no passengers in the vehicle from the start of the game, e.g. to display empty journeys. Example of the entry:
 „9480_0483_001-4A_c_PASS=0“

→ Train destination indicator can be preselected - classic preselection of a train destination via dynamic numbering

Locomotive number contains a letter in the last position (!) which preselects a train destination display

- Example: 9480_0483_001-4A_ **c**
- the marked "c" encodes the train destination display "S1 Potsdam Hbf"
- available displays are listed in the following table:

a	S1 Oranienburg	A	S45 Südkreuz
b	S1 Frohnau	B	S45 Bundesplatz
c	S1 Potsdam Hbf	C	S45 Flughafen Schönefeld
d	S1 Wannsee	D	S46 Westend
e	S2 Bernau	E	S46 Königs Wusterhausen
f	S2 Buch	F	S47 Herrmanstraße
g	S2 Blankenfelde	G	S47 Spindlersfeld
h	S2 Lichtenrade	H	S47 Schöneeweide
i	S2 Priesterweg	I	S5 Spandau
j	S2 Südkreuz	J	S5 Mahlsdorf
k	S2 Potsdamer Platz	K	S5 Hoppegarten
l	S25 Teltow Stadt	L	S5 Strausberg
m	S25 Lichterfelde Süd	M	S5 Strausberg Nord
n	S25 Lichterfelde Ost	N	S7 Potsdam Hbf.
o	S25 Priesterweg	O	S7 Ahrensfelde
p	S25 Südkreuz	P	S75 Westkreuz
q	S25 Potsdamer Platz	Q	S75 Wartenberg
r	S25 Nordbahnhof	R	S8 Birkenwerder
s	S25 Gesundbrunnen	S	S8 Zeuthen
t	S25 Schönholz	T	S8 Grünau
u	S25 Tegel	U	S85 Waidmannslust
v	S25 Hennigsdorf	V	S85 Grünau
w	S3 Erkner	W	S9 Pankow
x	S3 Ostbahnhof	X	S9 Flughafen Schönefeld
y	S41 Ring	Y	S9 BER T1-2
z	S42 Ring	Z	S9 Spandau
:	S1 Zehlendorf	O	S85 Pankow
;	S1 Potsdamer Platz	I	S85 Frohnau

@	S7 Wannsee	2	S8 Hohen Neuendorf
!	S25 Velten	3	S8 Wildau
„	S26 Teltow Stadt	4	S75 Spandau
\$	S26 Lichterfelde Süd	5	S75 Warschauer Straße
%	S26 Potsdamer Platz	6	S5 Westkreuz
&	S26 Waidmannslust	7	S5 Charlottenburg
(S26 Blankenburg	8	S5 Warschauer Straße
)	S3 Spandau	9	S5 Ostbahnhof
?	S3 Westkreuz	+	S86 Grünau
{	S3 Charlottenburg	-	S86 Buch
}	S3 Ostkreuz	*	S6 Hauptbahnhof
[S3X Ostbahnhof	/	S6 Gartenfeld
]	S3X Friedrichshagen	=	S15 Gesundbrunnen
<	S45 Hermannstr.	_	S15 Hauptbahnhof
>	S45 Gesundbrunnen	#	Nicht Einsteigen
	S45 BER T1-2	'	Pendelverkehr
\	S46 Gesundbrunnen	~	Werkstattzug
^	S47 Südkreuz	.	Sonderzug
`	S47 Gesundbrunnen	,	[leere Anzeige]

Signal book

[1]

Abbreviation	Meaning	Picture
Bü4	"Whistle." Whistle once for about 3 seconds. Not whistling causes penalty points in the career scenario.	
El 1	"Switch off" the main switch of the traction unit. For the S-Bahn this means: Release the master switch.	

El 2

"Switching on" the main switch of the electric locomotive. In the case of the S-Bahn, this means that switching on the driving switch again is permitted from here on.



Hp 0

"Stop."



HI 1

"Travel at top speed."



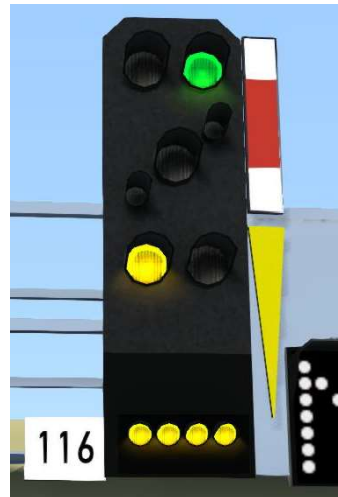
HI 3a

**"Travel at 40 km/h,
then top speed."**



HI 3b

**"Travel at 60 km/h,
then at top speed"**



HI 7

**"Reduce top speed to 40
km/h."**



(yellow light flashes)

HI 9a

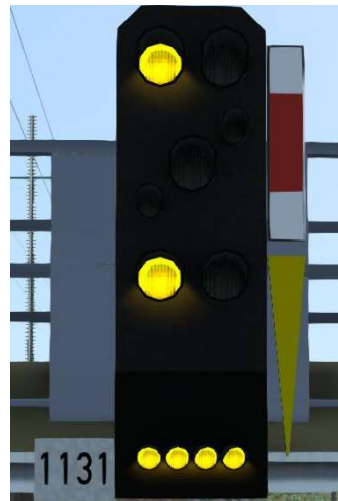
**"Travel at 40 km/h,
then at 40 or 60 km/h."**



(upper yellow light flashes)

HI 9b

**"Travel at 60 km/h,
then at 40 or 60 km/h."**



(upper yellow light flashes)

HI 10

"Expecting hold."



HI 12a

"Traveling at 40 kilometers an hour, expecting a stop."



HI 12b

"Travel at 60 km/h, expect stop"



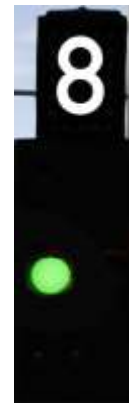
HI 13/ Hp0 **"Train stop."**



Ks 1 **"Ride free."**



Ks 1 + Zs 3 **"Drive freely with (display x 10) km/h.":**
The indicated (digits x 10 in Km/h) speed must not be exceeded by the signal in the following switch area.



Ks 1 flashing
+ Zs 3v

"Drive freely, expect drive with (yellow display x 10) km/h."
(possibly in connection with Zs3!) Signal Zs3 is to be expected (with the displayed speed)



(green light flashing)

Ks 2

"Expect stop" (if necessary in connection with Zs3).



Lf 1

"Slow speed disc": A temporary slow speed section follows (at the standard braking distance), on which no faster than (number x 10) km/h may be driven.



Lf 2

"Initial screen": Start of the temporary slow speed section.



Lf 3

"End disc": end of the temporary slow speed section.



Lf 6

"Speed announcement board": A speed signal (Lf 7) is expected, brake to the number x 10 in km/h shown in the signal.



Lf 7

"Speed table": The speed indicated on the signal (number x 10) must not be exceeded after this signal.



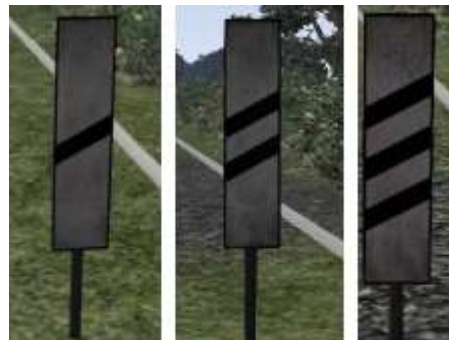
Ne 2

"Approach signal board": marking of the location of an approach signal.



Ne 3

"Advance signal beacons": An advance signal is to be expected.



Ne 5

"Stopping sign": marking of the stopping place of the head of the train for trains stopping according to schedule.



Sh0

"Stop, no driving."



Sh1

"Driving ban lifted."



Sh2

"Protect."



Zs1

"Substitute signal":

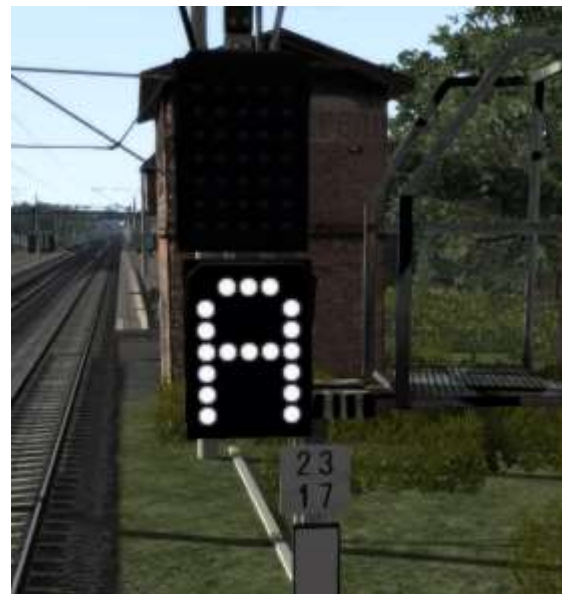
passing the "stop" showing or disturbed signal without a written command. (a flashing white light)



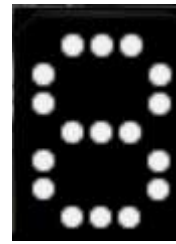
(white light flashes)

Zs2

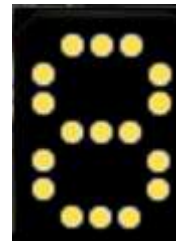
"Direction indicator": the road leads in the direction indicated



Zs3 **"Speed indicator":** The indicated (digits x 10 in Km/h) speed must not be exceeded by the signal in the following switch area.



Zs3v **"speed indicator":** signal Zs3 is to be expected (with the displayed speed)



Zs6 **"Opposite track indicator":** the track leads to the adjacent continuous main track



Zs 7 **"Caution signal":** Pass the disturbed or Hp 0 showing main signal without written command. Continue on sight.



Bibliography

[1] The signals of Deutsche Bahn Signalbuch (SB) DS/DV301 valid from 10 December 2006.