DB Class 120 and Bimdzf DTSO Expert-Line

compatible with Train Simulator 2014

Content

1 Information

1.1 DB Class 120

The DB Class 120 is considered the forerunner of all modern electric locomotives of the DB. The first pre-production models were built 1979, and the class was to be the successor of the legendary Class 103. The actual series production began in 1984 and ran until 1989. A total of 65 were built and placed in service. With its top speed of 200 km / h, it was a match for the modern demands of a high-speed train service.

The locomotive has two bogies each with two axles. Each axle is powered with a frame mounted electric motor. The max power is about 5600 kilowatts.

The machines were used for fast Intercity and Interregio passenger services up until present day. But as a modern AC loco it is also capable of hauling light and fast freight trains as well.

1.2 DB Class 120 Expert-Line - Simulation functions

The most important functions are summarised below.

- ✓ Prototypical driving behavior
- ✓ Tractive effort preselecting control
- ✓ Multiple unit control / ZWS (Version 2)
- ✓ Manual / automatic startup procedure
- ✓ Manually selectable pantographs
- ✓ AFB cruise control (only BR120)
- ✓ LZB
- ✓ prototypical PZB 90 v1.6
- ✓ Time-time SIFA
- ✓ Switchable instrument lights
- ✓ Cab light and desk light
- ✓ Wipers with speed control
- ✓ Standard TS2014 effects
- ✓ TS2014 camera positions
- ✓ automatic AI wipers with weather detection
- ✓ Headlight adjustment for player and AI
- ✓ vR ZZA compatible
- ✓ configuration file
- ✓ prototypical sound optimized for EFX

1.3 Technische Daten DB BR120

Manufacturer:	BBC, Henschel, Krauss-Maffei, Krupp	**Build dates**:	1979 - 1989
Type:	Electric	**Wheel arrangements**:	Bo-Bo
Length over Buffer:	19.20 m	**Mass**:	84,0 t
Max continuous tractive effort:	5600 kW	**Maximum speed**:	200 km/h

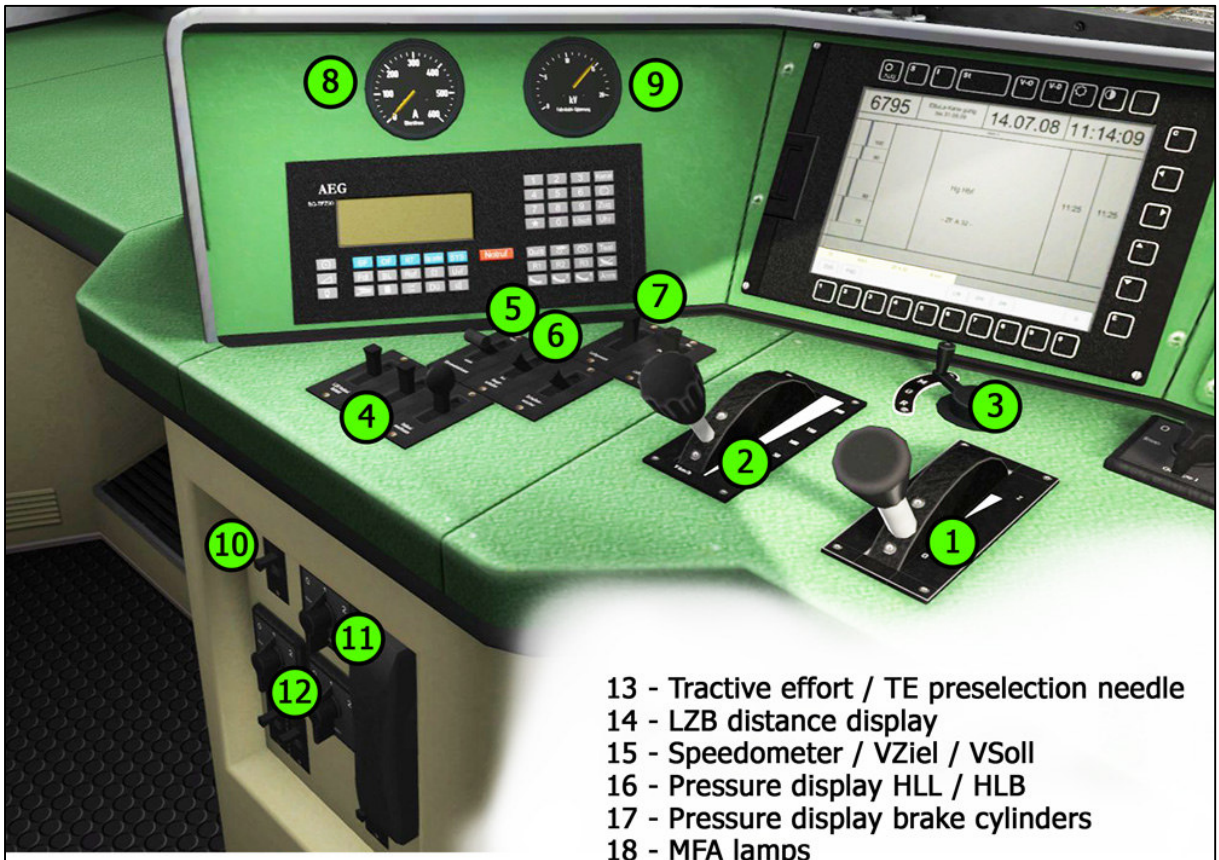
2 The Locomotive

DB Class 120 orient red (Editor naming ‘vR BR120 orientred Expert-Line’)

DB Bimdzf DTSO (Editor naming ‘vR Bimdzf IR Expert-Line’)

The class 120 is also available with dynamic numbering. The editor naming is: ‘vR BR120 ORot EL DynNr’.

3 Cab and controls



1 - Regulator
2 - Cruise control speed
3 - Reverser
4 - PZB switches
5 - Pantograph
6 - Main power switch
7 - manual Compressor start
8 - Traction motors voltage
9 - Overhead wire voltage
10 - Lamp check
11 - AFB on/off
12 - Wiper switches

13 - Tractive effort / TE preselection needle
14 - LZB distance display
15 - Speedometer / VZiel / VSoll
16 - Pressure display HLL / HLB
17 - Pressure display brake cylinders
18 - MFA lamps
19 - PZB and LZB lamps
20 - Instrument light switch
21 - Sander
22 - Headlights
23 - Brake release
24 - Cab light / desk light
25 - Trainbrake
26 - Dynamic bremse
27 - Locobrake
28 - Close doors
29 - Horn

4 How to drive and use

4.1 Expert-Line and general hints

We are happy to present you with a new locomotive from virtualRailroads for our Expert-Line range. As usual, Expert-Line models are created for customers who are looking for better and more realistic models for TS2014.

We have included some functions in the locomotive which have been seen before in our class 103 and 243 models. For example AI wiper functions recognizing the weather and fully automatic Start-Up. A Help System which shows you detailed messages about what's just happened, especially useful when errors occur. Also a new system for multiple working or push-pull configuration was created to stay compatible with the automatic fast setup.

Please read the following sections carefully to make you familiar with the locomotive and its functions.

Important: The locomotive has push-pull equipment and is able to drive in multiple within class (unfortunately it is not compatible with our old system known from DB class 111 or DB class 143 SBRE). It is possible to couple additional locomotives to your train, but only two machines in a row can pull or push the train. If there are more than two locomotives in your train, the additional machines are dead like a wagon.

TS2014 problems: If more than one locomotive is coupled to your train, the brake pressure may be reduced and some displays will show wrong or no values. Please keep that in mind when using the locomotive for multiple unit setup service. When driving in reverse with more than one locomotive coupled, there may be no tractive effort shown in the appropriate gauge.

4.2 Start-Up Procedure

Manual Start-up:

It is necessary to prepare the locomotive for driving. Each step is based on the real life procedure and needs to be done in the right order:

1. Switch on the battery <Shift+B>
2. Release the handbrake (Key </> or F4/F3 HUD coupling display)
3. Check the main pressure reservoir (HLB) it needs to show you 10 BAR
   If not use <Shift+;> for raise pressure and wait until it shows 10BAR.
4. Set the train brake to 4,7BAR (Important: HLB need to be at 10 Bar before!)
5. Reverser to M 'Cab On' <W>
6. Select a pantograph <Shift+P> (selectable: front, rear, both, both down)
7. Raise pantograph <P> (wait until kV displays a value about 15kV)
8. Switch on main power <Z> (HS light in upper displays should turn off)
9. Switch on SIFA if needed <Shift+7>
10. Switch on PZB if needed <Shift+8>
11. Switch on LZB if needed <Shift+6>
12. Reverser to V <W>
13. Switch on the headlight <H> and the instrument lights <I>

Now the locomotive is almost ready to drive.

Manual startup for multiple traction (ZDS):

To use the locomotive for multiple working it is necessary to prepare the locomotive for driving with it. Each step is based on the real life procedure and needs to be done in the right order:

1. Switch on the battery <Shift+B>
2. Switch on the battery on 2nd loco <Ctrl+Shift+B>
3. Reverser to M 'Cab On' <W>
4. Switch on multiple traction control <Shift+9> and wait for messages (while the system is engaging all controls are locked)
5. Release the handbrake (Key </> or F4/F3 HUD coupling display)
6. Check the main pressure reservoir (HLB) it needs to show you 10 BAR If not use <Shift+;> for raise pressure and wait until it shows 10BAR.
7. Set the train brake to 4,7BAR (Important: HLB need to be at 10 Bar before!)
8. Select a pantograph <Shift+P> (selectable: front, rear, both, both down)
9. Select a pantograph on 2nd loco <Ctrl+Shift+P> (selectable: front, rear, both down)
10. Raise pantographs <P> (wait until kV displays a value about 15kV)
11. Switch on main power <Z> (HS light in MFA display should turn off)
12. Switch on SIFA if needed <Shift+7>
13. Switch on PZB if needed <Shift+8>
14. Switch on LZB if needed <Shift+6>
15. Reverser to V <W>
16. Switch on the headlight <H> and the instrument lights <I>

Start-up procedure for driving from Bimdzf DTSO (ZWS):

1. Switch on the Bimdzf battery <Shift+B>
2. Switch on the battery on the pushing loco <Ctrl+Shift+B>
3. Reverser to M 'Cab On' <W>
4. Switch on multiple traction control <Shift+9> and wait for messages (while the system is engaging all controls are locked)
5. Release the handbrake (Key </> or F4/F3 HUD coupling display)
6. Check the main pressure reservoir (HLB) it needs to show you 10 BAR If not use <Shift+;> for raise pressure and wait until it shows 10BAR.
7. Set the train brake to 4,7BAR (Important: HLB need to be at 10 Bar before!)
8. Raise pantographs <P> (wait until kV displays a value about 15kV)
9. Switch on main power <Z> (HS light in MFA display should turn off)
10. Switch on SIFA if needed <Shift+7>
11. Switch on PZB if needed <Shift+8>
12. Switch on LZB if needed <Shift+6>
13. Reverser to V <W>
14. Switch on the headlight <H> and the instrument lights <I>

Automatic startup:

We have integrated an automatic Start-Up procedure to help you.
To start the procedure press <Ctrl+Z>. If you have already started the manual procedure, the automatic one will not work!
Once initiated the automatic procedure will show you a big message box and some small boxes which show you information about the progress of the procedure.
A big message box will appear at the centre of your display when the procedure has finished. The train security systems (SiFa, PZB, LZB) need to be switched on manually or activated for fast setup within the configuration file.

Important note: If you are driving in multiple unit service the second loco will also start up automatically. Like-wise for driving in push-pull configuration from the DTSO.

Shut down procedure:
Shutting down the locomotive could only be done manually.

1. Run down power and stop train
2. Set the train brake to Emergency position and TE/BF lever to 0
3. Reverser to position M
4. Switch off PZB if running
5. Switch off LZB if running
6. Switch off SIFA if running
7. Switch off main power
8. Lower pantographs
9. Switch off multiple traction system if running
10. Switch off the headlights and instrument lights
11. Switch off battery (if multiple traction then on 2nd loco too>
12. Apply handbrake </>

4.3 Message and Help system

Messages:
The locomotive has a special message and help system to give you information about events and errors which occur. You can adjust the systems level with <Ctrl+->
The system is switched on by default and has three levels: 1/only errors, 2/errors and further messages, 3/all messages and debug information for log-mate.
Messages which are absolutely necessary can´t be switched off.

Active PZB Help system:
The locomotive has a special help system for the PZB. If you get an emergency brake aplication due to incorrect operation you will get additional information in a message box.

4.4 Battery and HLB

Battery voltage:
Before you can start driving the locomotive, the battery needs to be switched on.
You do this by pressing <Shift+B>. The battery can only be switched on when the locomotive is not moving and the reverser is set to 0 (zero). The battery is always fully charged. If you are using multiple working setups you need to switch on the battery in second loco as well <Ctrl+Shift+B>.

Main pressure reservoir / HLB:
The main pressure reservoir is very important for driving the locomotive.
The braking system and several other systems make use of the HLB. If you start a scenario the HLB is randomly filled. If the pressure is beneath 8,3BAR you need to start the air compressor manually with <Shift+:> to fill the reservoir.
You can check the pressure with the HLB gauge to the right. Without sufficient pressure you can´t operate the main switch or raise the pantographs.

4.5 Pantograph and Main Switch

Pantograph pre-selection:
Before raising a pantograph you need to pre-select one or two. Press <Shift+P> to cycle through the four available options *both down*, *Pantograph 1*, *Pantograph 2* and *raise both.*
Please look at the messages displayed especially when you choose both pantographs.

Selecting a pantograph is only possible when the locomotive is not moving. If you drive in multiple you need to select the pantograph on second loco as well. Use <Ctrl+Shift+P> to do this. On the 2nd loco there are only 3 positions which are *Pantograph1*, *Pantograph2* or *both down*. When driving from the Bimdzf (DTSO) you can't select the active pantograph of the pushing loco. The rear-most pantograph will be used.

Raising and lowering the pantograph:
To raise the selected pantograph the reverser needs to be set to M and the main pressure reservoir / HLB needs enough pressure. To raise the pantograph use the switch in the cab or press <P>. Raising and lowering a pantograph is possible when driving the locomotive. This might be necessary when you reach a neutral section. If you drive in multiple the pantograph on the second loco will raise or lower as well. When driving from the Bimdzf (DTSO) the pantograph on the pushing loco will raise or lower as well.

Switching the Main switch On or Off:
After you have raised a pantograph you can turn on the main power with the appropriate switch in the cab or with <Z>. The main switch can also be operated when the locomotive is being driven. Please keep in mind: the main switch will be set to off (tripped) when the pantographs are lowered or other disturbances happen. Normally you can switch on the main switch again without any problem; if not the messages will inform you why. You can see the actual state of the main switch on the MFA display. If the lamp 'HS' is lit then the main switch is off and needs to be switched on again. If you drive in multiple or from the DTSO, the main switch on the second or pushing loco will turn on or off automatically.

4.6 Tractive effort preselection control

Regulator / electric brake lever:
With the regulator in the class 120 you only select a pre-defined tractive effort that the loco will maintain allowing for wheel slip, acceleration and gradients. You can see the selected tractive effort on the accelerometer gauge marked by a little white triangle around the scale. After selecting a TE the loco begins to raise power until the selected value is reached. The electric brake lever works in a similar way but in the negative direction on the TE gauge. Please note, that the maximum applicable TE will change with the actual speed of the train. It is not possible to select a TE value that is not reachable at the actual speed.

Regulator lock:
The regulator is locked when:

- You used a brake while the regulator was not in 0 (zero)
- An emergency brake application occurred
- A fault occurred
- The doors of the coaches are open
- The LZB End procedure has completed

If the regulator is locked you can´t apply tractive effort.

Neutral position permission:
To unlock the regulator do the following things:

- ✓ Set the regulator to notch 0 (zero)
- ✓ All brakes need to be released
- ✓ Check no emergency braking is active
- ✓ All faults are cleared
- ✓ The main switch is on
- ✓ The doors are closed

4.7 Brakes

The locomotive has three brake systems**.**

- Loco brake (direct brake)
- Train brake (automatic brake)
- Dynamic brake

Loco brake:
When you enter the cab the loco brake is released. This brake is only used to brake the locomotive and not the train. You can also use this brake when starting your train on a hill to prevent the locomotive from rolling back. When you take power, the loco brake should be released.

Train brake:
The train brake is used to brake the whole train. It is a notched brake and can be precisely controlled. Use the brake with care, according to the train weight and track conditions. When you take power the train brake needs to be released.

E-Brake:
The E-brake works on all traction motors. If both train brake and E-brake levers are in the release position they are automatically combined when the train brake is used.
To use the E-brake independently from the train brake simple move the E-brake lever.

How to brake:
Before you can make a brake application, the regulator needs to be in 0 (zero) position. If you need to brake in an emergency situation, you can do so without cutting the power first. If the AFB system is braking with the e-brake only, you can make a normal brake application without moving the regulator to 0. The AFB will suspend automatically until you set the regulator to 0 and reselect the speed for the cruise control with the VSoll-lever (see below).

4.8 AFB (cruise control)

The locomotive is equipped with AFB (cruise control system). To switch on or off the system you need to follow the steps as described below:

Switching on whilst stationary:

Requirements:
- the locomotive was started up
- the regulator is set to 0 (zero)
- the train brake is applied
- the AFB VSoll-lever is set to 0 (zero)
- there is no active emergency braking applied

Now press the keys <Shift+A> to switch on the AFB system. You will hear a ringtone, the AFB holding brake will be applied, the VZiel display on the speedometer gauge will light up with '000' and you will get a message on the right upper screen position. The AFB system now is ready to work. Set a speed you wish to reach and hold with the VSoll-lever. The VZiel display and the VSoll needle in the speedometer gauge will change and display your actual setting. To start the run you need to release all bakes and set the regulator to a value higher than 0. The AFB will release the standing brake and tries to apply some power. You can easily change the speed while driving with the VSoll-lever. To prevent the system from

wavering around the zero TE between power and brake force, select a lower regulator value to smooth it out.

Switching on whilst driving:

Requirements:
- the regulator is set to 0 (zero)
- the AFB VSoll-lever is set to 200 (the maximum value)
- there is no active emergency braking applied

Now press the keys <Shift+A> to switch on the AFB system. You will hear a ringtone, the AFB standing brake will applied, the VZiel display on the speedometer gauge will light up with '000' and you will get a message on the right upper screen position. Set a speed you wish to reach and hold with the VSoll-lever. The VZiel display and the VSoll needle in the speedometer gauge will change and display your actual setting. Set the regulator to the required value and the AFB system begins to do the work.

Switch off:

Press the keys <Shift+A>, you will hear a ringtone, the VZiel display goes dark (if LZB is not running), the VSoll display moves to 0 (if LZB is not running) and you will get a message on the upper right screen position. After that you need to set the VSoll-lever to 0 (zero) position. Now reapply power with the regulator if needed.

While LZB is running:

The AFB system is able to control the speed whilst running in LZB mode. The procedures to switch on and off are the same as described above. Note, that you can't set a speed with the VSoll-lever that is above the actual LZB maximal speed. But you can set the VSoll-lever to maximum while under LZB control. The system reads out the maximum speed that can actually be set. Of course, you can set a speed below the actual LZB speed to travel slower than the line speed (maybe for LZB controlled freight trains).

Please note:
The AFB works a bit differently under LZB control than if you use it in manual driving mode. When running under LZB and the G is lit, then the AFB VSoll speed runs underspeed by 10-20kph to avoid exceeding the speed limit. While the G is lit there will be no power applied by the AFB system.

ATTENTION:
You can't stop the train with the AFB VSoll set to 0 (zero). If you need to stop the train under LZB/AFB control, you need to use manual braking. The electric brake, that is used for braking with the AFB, will cut out under a speed of about 2kph.

4.9 Wheel-slip and Sanding

If you pull a heavy train it is very difficult to prevent the wheels from slipping. If you do not reduce the power the wheels will keep slipping and the main switch will trip. Before this happens you will hear a warning sound. To master difficult situations like climbing up a hill with a heavy train you can use the sander. Use the switch in the cab or press <X> to switch on the sander. Do not use it for too long because the sand boxes will empty. See the fault section for more information.

5 DTSO

5.1 Notes for driving the DTSO

The Bimdzf DTSO controls are identical to the class 120. But it isn't equipped with the AFB cruise control system. You need to accelerate and brake manually, even under LZB control. Apart from the start-up procedure (described above), the DTSO controls and the driving behaviour are the same as in the class 120. Note, that the Bimdzf DTSO is mostly compatible with the class 120 Expert-Line. But you can use it with other engines too. For that please use the fast setup procedure on the Bimdzf DTSO.

6 Safety systems

6.1 SIFA (vigilance alarm)

The locomotive has a working Time-time-SIFA (vigilance alarm) which can be activated or deactivated with <Shift+7> The purpose of the SIFA is to keep the driver vigilant at all times and to allow the locomotive to come quickly and safely to a stop should the driver become incapacitated or otherwise not be in proper control of the train.

If you switched on the SIFA you have to press the space bar every 30 seconds to reset it.

If you forget to reset the SIFA, the SIFA light will start glowing on the console to remind you to press the SIFA button. If you miss this, after 2 seconds you will hear a warning beep that will last for a further 2 seconds after which the train will begin emergency braking.

If you are not inside the cab when driving the loco you won't get any warning about the SIFA status but remember that SIFA ***is still working***! You will need to press the SIFA reset button outside the loco or it will eventually come to an emergency stop.

6.2 PZB 90

The locomotive has a realistic built in PZB90 V1.6 system used in Germany for the speed control of trains.

Use <SHIFT+8> to switch PZB on or off.
Change the train PZB mode with <Ctrl+8>.

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

Use the following keys to control the PZB:

- <DEL> = PZB Befehl40 / Command40
- <End> = PZB Frei / Free
- <Page down>= PZB Wachsam / Acknowledge

Important: The use of the PZB Wachsam / Acknowledge switch is different to earlier vR locomotives with PZB. The use of the switch will be registered by the PZB system when the switch is releasing! That is a prototypical behaviour and different to earlier PZB systems installed in vR locomotives or other vehicles with PZB equipped. You can switch and hold PZB Wachsam / Acknowledge switch when you pass a 1000Hz magnet, but need to release the switch in between 4sec. to avoid an emergency brake.

PZB help system:
The help system will assist you when you have no experience with the PZB.
It tells you in a message box why you have an emergency brake application when it occurs.
An additional yellow needle on the speedometer gives you information about the target speed. Switch the help system on or off with <Ctrl+->

Overview of PZB 90

The PZB 90 system is used to ensure that trains are running at correct speeds in certain controlled sections (for example, leading up to signals) and also to ensure that no train can pass a signal at danger.

There are three types of train controlled via the PZB system, these are described as:

Zugart O	Obere (Upper)	Light trains / Passenger trains
Zugart M	Mittlere (Medium)	Heavy trains / Freight trains
Zugart U	Untere (Lower)	Very heavy trains / Freight trains

When you enable PZB with Shift+8 it will start up ready for a Zugart O train.
Zugart can be read in the vR Message window to the right in the cab.
You can use Ctrl+8 to cycle between the train types until you have the one most appropriate for your train. The key differentiators are the maximum speed and the ability to stop, so a long slow heavy freight train should be a Zugart U, for example.

In the descriptions below, the process that is followed is exactly the same regardless of the train type selected, what differs is the speed limits that are enforced.

PZB is implemented by means of three kinds of magnets that are placed on the track; these are described as 500Hz, 1000Hz and 2000Hz. These magnets are only powered if their associated signal is set at a non-clear aspect, if the aspect is clear ('green / green') then the magnets have no effect on the train.

For some controlled element, such as a signal, each of the magnets will be placed in the following order:

- 1000Hz - at some remote point on the track such as the distant signal
- 500Hz - usually 250m before the main signal being checked
- 2000Hz - placed at the signal itself

For this description, a **Zugart O** train is assumed.

Note: In the speed limit descriptions below the line limit always overrides that given in the description. For example, if the description says that you must be below 85km/h and the line limit is 60km/h then this takes precedence.

1000Hz Magnet

A passing train will first meet the 1000Hz magnet and the 1000Hz lamp will light on the PZB display after pressing PZB Wachsam / key Page Down while passing the signal.
On the Train Simulator 2012 HUD, the exclamation point indicator will light up with a wasp black/yellow pattern, but there is no audible indicator. The driver now has four seconds within which to press the PZB Wachsam button (Page Down). Failure to do this will result in emergency brakes being applied.

Having acknowledged the 1000Hz magnet, the driver now has 23 seconds to drop their speed to 85km/h (Note: A different Zugart (M or U) has a different speed) or emergency brakes will apply.

After the train has passed 700m from the 1000Hz magnet the 1000Hz lamp will go out and at this point the driver *may* choose to press PZB Frei (End) to get out of the speed restriction if, and only if, they can clearly see that the controlled signal is now showing a clear aspect. If the driver presses PZB Frei and then runs over an active 500Hz magnet the train assumes the driver has made a mistake and will apply emergency brakes.

500Hz Magnet

On passing the 500Hz magnet, the train must not be exceeding 65km/h or the emergency brakes will be applied. The 500Hz lamp on the PZB display will light up. The train now has 153 meters to reduce speed to 45km/h.

The 45km/h speed limit is now in force for the next 250m. It is not possible to release from this with the PZB Frei button.

2000Hz Magnet

If the train passes an active 2000Hz magnet then it will always apply its emergency brakes as the only time this can happen is if the train is passing a signal at danger.

Other notes

If, while under the control of a 1000Hz or 500Hz magnet, the train stops or spends more than 15 seconds at less than 10km/h the enforced speed limit will be reduced by a further 20km/h and this is then called a restrictive speed limit. This is indicated on the PZB display by the speed indicators (the top row) alternating between two lamps (70 and 85).
Once the magnet lamp goes out you can press PZB Frei (END) to get out of the restrictive speed limit.

Befehl40 ('Order 40km/h')

The Befehl40 button (DEL) allows a special case that instructs the train to *ignore* a 2000Hz (red signal) magnets that it comes across. You are put in to an enforced speed limit of 40km/h while this is active, exceeding this limit will cause the emergency brakes to apply.

To pass the red signal press and hold DEL for PZB Befehl40 until the Befehl40 light lights up.

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 153m	45km/h constant	45km/h -> 25km/h In 153m
M (Mittlere)	125km/h -> 75km/h in 26 seconds	50km/h -> 35km/h in 153m	45km/h constant	25km/h constant
U (Untere)	105km/h -> 55km/h in 34 seconds	40km/h -> 25km/h in 153m	45km/h constant	25km/h constant

Further Reading

You can find more recommended reading about the German PZB90 system at these links:

- http://www.marco-wegener.de/technik/pzb90.htm
- http://www.sh1.org/eisenbahn/rindusi.htm

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6.2 LZB (In cab signaling system)

Betaversion:
Note that this implementation of the LZB system is Beta. We will try to improve the system in the future. It works right well at now. You can do a 'hands free' run from Hamburg to Hanover, but you maybe will see some strange behaviours. But we can state a significant better and prototypical behaviour against all other available LZB implementations seen on the market.

LZB:
Use <Shift+6> to switch on the LZB. Important: You need to switch on first the PZB system! The system activates automatically when you pass a LZB starting signal on the routes Munich-Augsburg, Hamburg-Hannover from RSC.

7 Other systems

7.1 Neutral section

The package includes special EL-signals. The locomotive can recognize and react to these signals. Two types of signals are included: Main switch off and Pantograph down.
If you miss one of these signals you will get a warning message. If you pass the pantograph down signal with a raised pantograph the scenario will end.

7.2 Door control

The locomotive has a programmed door control that can be used with different passenger wagons from the vR Shop. If you open the doors you will hear a beeping sound. To close the doors use <Shift+T>. You will again hear a beeping sound until all doors are closed. When

the doors are open the regulator is disabled and you can't drive. It may be necessary to engage the loco brake to prevent the train from rolling whilst doors are opened.

7.3 Destination board control

The locomotive can control coaches with the vR destination board system.
The DB class 120 itself has no destination boards but those on the coupled coaches can be switched with <0> and <Shift+0> (zero).

7.4 Faults / Observation

Driving with two raised pantographs:
Normally you use only one raised pantograph. It is allowed to use two raised pantographs in winter when the catenary is heavily iced. Max speed in this case is 110kp/h.
There are no other situations which allow the use of two pantographs.
How did we integrate this? When it is winter time and you drive with two raised pantographs below 110kp/h, nothing will happen. If you are driving much faster you will get several warnings until the scenario will be forced to end. It is not winter? You will get several warnings. If you do not obey them the scenario will be forced to end.

7.5 AI Wipers and Pantograph selection

There are some special functions for the locomotive when it is used as an AI vehicle.
If it is raining or snowing, the wipers in driving direction will start automatically.

If you write scenarios by yourself you can decide which pantograph should be lifted when the locomotive is used as AI vehicle. Use the listed code in front of the locomotive number in the editors ID field:

- „SA-00-" = no pantograph will raise up
- „SA-10-„ = pantograph No. 1 will raise uo
- „SA-01-„ = pantograph No. 2 will raise up
- „SA-11-„ = both pantographs will raise up

7.6 Configuration file (Only for experienced users!)

The following pre-selection could be made:

- Light bulb on or off
- AI wiper function on or off
- Message system on or off
- Message system level
- PZB help system on or off
- Sand box will empty on or off
- Error level for traction motor electrical protection
- Standard language for messages (German or English possible)

The configuration file can be found under Scripts\config\
Please only make changes when you really know what you are doing.
Please do not open the file with Word, Wordpad or any other text word processing editor.
Best use notepad or a LUA compatible editor or Notepad.

8 Key Layout

Function	add. Key	Key
Automatic Startup procedure	Ctrl	Z (↑)*
Battery on/off	Shift	B
Battery 2nd loco on/off	Ctrl+Shift	B
Compressor start	Shift	´
Multiple traction / pushing control system on/off	Shift	9
Preselect pantograph	Shift	P
Preselect pantograph 2nd loco	Ctrl+Shift	P
Pantograph raise/lower		P
Main power on/off		Z
Regulator		A / D
AFB on/off (only BR120)	Shift	A
VSoll-lever up/down (only BR120)	(Shift)	Y/(Y)
Reverser		W / S
Handbrake		</>
Train brake		; / ´
Engine brake		[/]
Emergency brake		Backspace (←)
Sander		X
SIFA on/off	Shift	7
SIFA reset		Space
PZB on/off	Shift	8
PZB train mode cycling	Ctrl	8
PZB Acknowledge		Page down (↑)*
PZB release from monitoring		End
PZB command 40		Del
LZB on/off	Shift	6
Horn long		B
Horn short		N
Close doors	Shift	T
Wiper right		V
Wiper right speed	Ctrl / Shift	V
Wiper left		C
Wiper left speed	Ctrl / Shift	C
Cab light / desk light	(Shift)	L
Instrument light		I
Headlight adjust	Shift	End / Pos1
ZZA position up		0
ZZA position down	Shift	0
Help system on/off	Shift	[
Message level cycle	Ctrl	]

*(↑) - Key will recognized by release

9 Notes for scenario creators

The AI locomotives run through the automatic Start-up process. This needs some time. A good time allowance to be sure that the Start-up process has finished is 30 seconds. Don't let trains with a DB class 120 start too shortly after scenario a starts. This causes the locos to drive with lowered pantographs.

Place the locomotives with the cab 1 in driving direction. This will prevent false detection of the driving direction for placing the visible driver and raising the correct pantograph.

Please take a note of the immense tractive effort of this locomotive. Since the AI control of TS201x does not care about that, you should guide the train over a few waypoints with different power proportion settings to prevent a rocket start.

10 Additional thanks

We say Thank you to all people who helped realizing this locomotive.

Your virtualRailroads Team
Ulf Freudenreich und Maik Goltz

www.virtual-railroads.de