







ET403 Intercity

Content

Content
1 Information
1.1 ET403 - Functions available in the Simulation3
1.2 Technical Data ET403 (consist of 4 wagons)3
2 The Train
3 Cab and Controls5
4 How to drive
4.1 Driving6
4.2 Braking
4.3 Message and Help system6
4.4 Pantograph and Main Switch6
4.5 AFB (cruise control)7
5 Train protection systems
5.1 SIFA (vigilance alarm)
5.2 INDUSI I60r (point based train protection & control system)
5.3 LZB (continuous line based protection & control system):
6 Key Layout10
7 Hints for scenario creators 11
8 Credits

1 Information

1.1 ET403 - Functions available in the Simulation

The most important functions are summarised below (Not all functions are listed)

- ✓ Prototypical driving behaviour
- Complex regulation system with AFB and LZB
- ✓ Prototypical INDUSI I60r
- ✓ Time-time SIFA
- Delayed and smoothly regulated e-brake with correct brake effort over all wagons (up to 12 wagon consists)
- ✓ Selectable pantographs front or back

- ✓ Switchable instrument lights
- ✓ Cab light
- ✓ Wipers with interval control
- ✓ Standard TS2018 Effects
- ✓ Passenger view for two wagons
- ✓ Scenario save function compatible
- ✓ Rolling start compatible
- ✓ Realistic sounds optimized for EFX

1.2 Technical Data ET403 (consist of 4 wagons)

Manufacturer :	LHB, MMB, MAN, SSW, BBC and AEG	Build Date:	1973
Туре:	Electric, alternating current	Wheel arrangement:	Bo-Bo-Bo-Bo- Bo-Bo-Bo-Bo
Length / buffer:	109.22 m	Mass	235.7 t
perm. Output:	3840 kW	Maximum speed:	200 km/h

2 The Train



ET403 001 Intercity



ET403 cab view

3 Cab and Controls



- 1 Throttle and Brake
- 2 Reverser
- 3 Cruise control lever
- 4 Pantograph selection
- 5 Pantograph switch
- 6 Main curquit switch
- 7 Indusi Acknowledge/Free/Command
- 8 Amperemeter
- 9 Traction motor voltage meter
- 10 Armarture and field current
- 11 Indusi lamps
- 12 SIFA lamp
- 13 Sander

- 14 SIFA/PZB/LZB on/off
- 15 SIFA reset (4x plus footpedal)
- 16 Speedometer
- 17 LZB display
- 18 Wiper switch
- 19 Headlights
- 20 Cab light
- 21 Pressure HLL
- 22 Pressure HLB
- 23 Pressure bogies
- 24 Brake state lamps
- 25 Train brake

4 How to drive

4.1 Driving

The throttle and brake lever is the main handle to use for accelerating and braking this train. It has a zero point in the middle of its movement way what is needed to be hold for some time if you switch from braking to accelerating. Also after emergency braking has applied, you need to set the lever to that zero point before you can again set up power to accelerate.

4.2 Braking

You brake this train mainly with the throttle and brake lever, so with the electric brake only. If the electric brake becomes faulty, or there is no pantograph raised, you need to use the pneumatic train brake independently. But for normal driving you don't need to use it. When the train comes to a halt, the pneumatic brake applies automatically to hold the train at its position, and releases if you set up power again.

4.3 Message and Help system

Messages:

The train 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 necessary can 't be switched off.

PZB/LZB Help system:

The train has a special help system for the security systems PZB and LZB. If you get an emergency brake due to incorrect operation you will get additional information in a message box.

4.4 Pantograph and Main Switch

Pantograph selection:

You can switch between the pantograph on the first engine, the second engine or both engines in one consist of 4 cars (or two engines with a cab). To choose the pantograph that should being raised just use the pantograph selection switch on the desk or the key command <Shift+> and <Ctrl+P>. Please note that you can switch the pantographs only when they all are lowered and the train is on a complete stop. Using both pantographs on one consist is only allowed under special circumstances like iced overhead wires.

Raising and lowering the pantograph:

To raise the selected pantograph the reverser needs to be set to Forwards or Backwards position. 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.

Switching the Main Switch on or off:

After you have raised a pantograph you can turn on the main switch with the appropriate switch in the cab or with <Z>. The main switch can also be operated when the train is being driven. Please keep in mind: the main switch will be set to off (tripped) when the pantographs were lowered or other disturbances happen. Normally you can switch on the main switch on again without any problems. If not you will be informed by messages why not.

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

Now use the AFB switch or press <Shift+A> to switch on the AFB system. The AFB parking brake will be applied, the VZiel display on the LZB display 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 bar in the LZB display will change and show your actual setting. To start the run, you need to release all brakes and set the regulator to a value higher than 0. The AFB will release the parking brake and will try 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 tractive effort 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 use the AFB switch or press the keys <Shift+A> to switch on the AFB system. The VZiel display on the LZB display will light up with '200' and you will get a message on the right upper screen position. Set then a speed you wish to reach and hold with the VSoll-lever. The VZiel display and the VSoll bar in the LZB display will change and show your actual setting. Set the regulator to the required value and the AFB system begins to do the work.

Switch off:

If you use the AFB switch or press the keys <Shift+A>, The VZiel display goes dark (if LZB is not running), the VSoll bar 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 maximum speed. But you can set the VSoll-lever to its maximum value while under LZB control. The system reads out the maximum speed that can been 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 VSoII speed runs under speed by 10-

20kph to avoid exceeding the speed limit. While the G is lit there will be no power applied by the AFB system.

5 Train protection systems

5.1 SIFA (vigilance alarm)

The train 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 always and to allow the train 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 must press the space bar under every 30 seconds to reset the timer.

If you forget to reset the SIFA timer, the SIFA lamp will light up on the desk to remind you to press the SIFA button. If you miss this, after 2 seconds you will get an audible warning that will last for a further 2 seconds after which the train will begin braking automatically. You can stop the braking each time with a press on the SIFA pedal to reset the timer. It's not a real emergency braking.

The SIFA will pause if you switch to an outside view. So, you can have it switched on even if you want to explore the route. Upon returning to the cab view the SIFA timer will reset it's 30 second countdown and resume as normal.

5.2 INDUSI 160r (point based train protection & control system)

The train has a realistic built in INDUSI I60r system used in Germany for the speed control of trains. Remember that INDUSI does not implies the restrictive modes as PZB does.

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

After switching on or changing the mode the INDUSI will start a self-test. The INDUSI 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 0.

Use the following keys to control the INDUSI:

- = INDUSI Befehl / Command40
- <End> = INDUSI Frei / Free
- <Page down> = INDUSI Wachsam / Acknowledge

<u>Important:</u> The use of the INDUSI 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 INDUSI Wachsam / Acknowledge switch when you pass a 1000Hz magnet, but need to release the switch within 4 seconds 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. You can switch the help system on or off with <Ctrl+[>.

5.3 LZB (continuous line based protection & control system):

Function of the implemented LZB:

The LZB in this train is near fully implemented. To switch on the LZB system, first make sure that INDUSI has been switched on, and then press <Shift+6>. The B in the LZB display lights up. The LZB then will activate itself if you enter an LZB enabled line.

The LZB end procedure is also implemented near prototypical. LZB end will be signaled in the cab with the LZB 'Ende' lamp within the LZB display lamps and needs to be acknowledged within 10 seconds or the emergency brakes will be applied and bring you to a stop.

Known problems:

The LZB system do not care about the trains maximal speed set for the consist it hauls. The maximum speed of the train of 200kph will be the always displayed maximum speed under LZB control, even if you are only allowed to drive 80kph. There are situations where the max speed is set to lower values on the LZB systems. The situation is a PZB train mode set to U which allows you only to drive with a max speed of 105kph.

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Function	Кеу	Key
Battery Isolating Switch on/off	Shift	В
Pantograph Selection	Shift / Ctrl	Р
Pantograph up / down		Р
Main circuit switch on / off		Z
Throttle and brake		A / D
Reverser		W / S
Cruise control speed set	(Shift)	Y
Cruise control on / off	Shift	А
Train brake		; / 1
Emergency brake		Backsp (\leftarrow)
Sander		Х
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 monitoring		End
PZB Command 40		Del
PZB system information	Ctrl+Shift	8
LZB on/off	Shift	6
Horn high		В
Horn low		Ν
Wipers	(Ctrl)	V
Cab light		L
Instrument lights		1
Help system on or off	Shift	[
Message level	Ctrl	[

7 Hints for scenario creators

Please place the train so that engine A cab points into the driving direction and engine B to the opposite direction at the end of the consist. This will prevent a false detection of the driving direction for placing the driver and raising the correct pantograph.

This train is able to follow the save and resume function of TS. All the important system states are saved, so you can save your scenario and resume it later. Please note that some system values are not stored like an active INDUSI or LZB monitoring.

8 Credits

We say Thank You to all people who helped realizing this package.

Your virtualRailroads Team