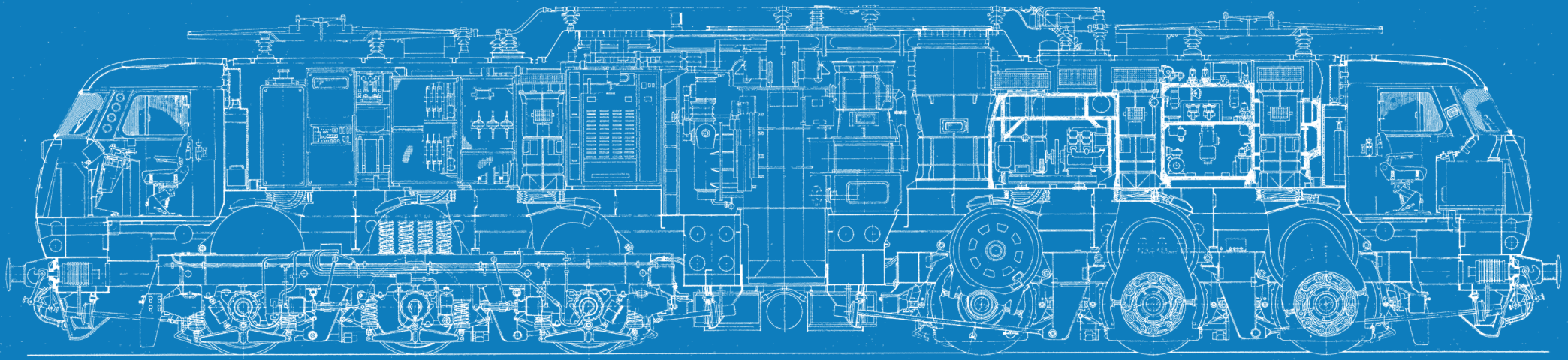
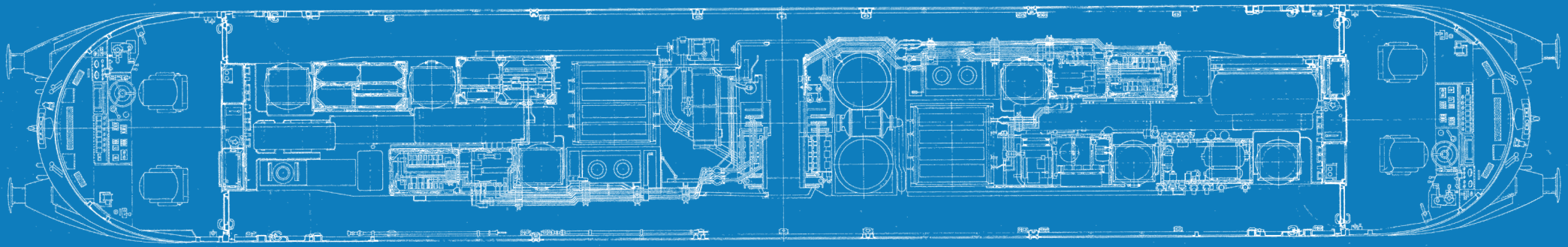
New items 2017





Dear ESU friends,

Isn't it amazing how time flies! In 2017 we at ESU celebrate the 20th anniversary of our company! After the initial "Storm and Stress" years around the millennium, ESU has been established as a reliable partner for model train enthusiasts and the model train industry as a whole. Numerous innovative ideas and products originated from these times and have been successfully introduced to the market. And, only because these products – starting with the classic LokSound decoder – have been received so well by you, we are now in a position to present even more exciting products of the year 2017:

Our ECoS digital command station will get an internal facelift and will be upgraded to 6A power output and a new power pack. Of course, we will also continue to advance the software in order to be able to provide new functions for the ever increasing number of ECoS users.

In addition, we have launched a new LokPilot V4.0 M4 MKL with 6 amplified function outputs for the more recently introduced Märklin® locomotives.

Our highlight of the year will certainly be a complete new design and construction of the electric locomotive E03 / class 103.1. In our opinion this cult locomotive can only be done justice by a prototypical, up to date implementation!

In order to provide even more diversity we are also introducing a number of shape and livery variants for the V200, class 265, class 245 and the "Ludmilla".

Since the "Deutz" set of tank cars, which were introduced last year, has been received so well we are pleased to announce new sets with different road numbers as well as some single cars to add to your fleet.

The re-issued RhB panorama style coaches in G scale are also worth mentioning; for the first time they will be supplied with integral interior lighting including a decoder.

As always, it is a great pleasure to wish you plenty of fun in the model year 2017!

Your ESU-Team

ECoS

The ECoS 50210 is already the second generation of our successful ECoS command station. With the latest ECoS command station, ESU continues to offer state-of-the-art digital technology combined with contemporary functional range and easy handling all this for a fair price-performance ratio. The ECoS has - like most of the recent central stations - a large coloured display with high resolution. In combination with its ground-breaking and easily operated user interface and excellent contrast values of the colored screen, ECoS reaches unprecedented ergonomics: unlike all the other central stations, the ECoS can be also operated without a stylus - all symbols and writings are hugely marked and clearly structured.

What ECoS can do

As a multi-protocol command station, ECoS supports:

- **DCC with RailCom® and RailComPlus®** (up to 9999 addresses, 128 speed steps, 24 functions)
- **Märklin® Motorola®** (up to 255 addresses, up to 8 functions)
- **Selectrix®** (Driving operation and programming of decoders)
- **M4** (mfx® compatible, with automatic recognition of the locos)

Run locos

The ECoS command station has two control panels on which the locos can be controlled independently of one another. The ECoS comes with two cabs with motorized throttle knobs and 9 function keys each, plus a two-axis, center-click joystick each. The big throttle knob is considered especially comfortable by many customers since the highest speed can still be set during 128 speed steps without much effort in terms of cranking. A loco selection key helps to select the respective locomotive, which enables you to call up all in all 24 functions per loco.

The ECoS command station can manage up to 16384 locos. Each loco´s characteristics are memorized by the loco database, so in the future you can call each engine by name. Also you can assign a loco symbol and these symbols keep you abreast of the function of each loco, regardless of whether it's latching or non-latching. The operation of locos with RailComPlus® and the mfx®-compatible M4 protocol is much easier. Within these operational modes the information between ECoS and loco will be exchanged automatically.

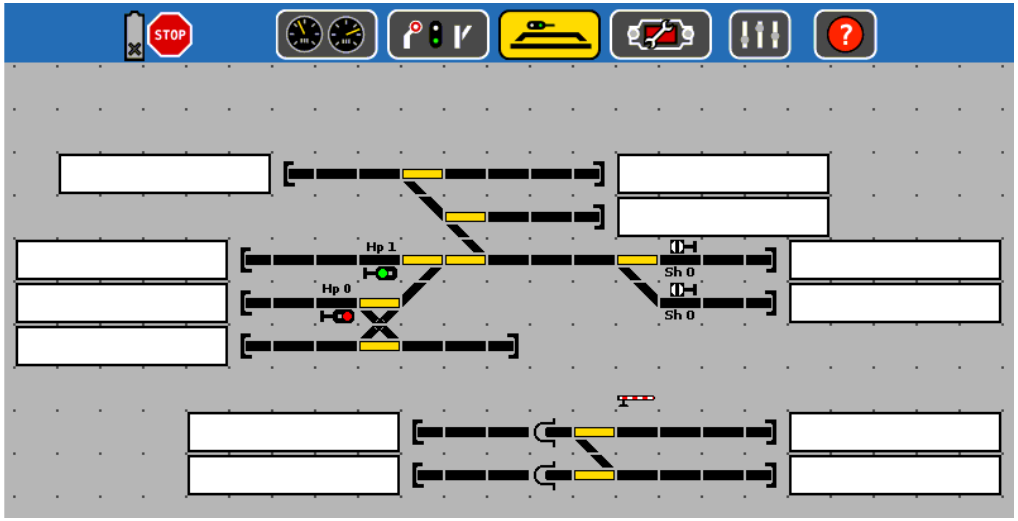
A navigation menu with substantial sorting and filtering options make fast finding and immediate control of your locos possible. Of course, ECoS supports all DCC addresses (up to 9999) and 128 speed steps, during Motorola® operation up to 255 addresses and 27 speed steps are possible, depending on the decoder´s features. Locos equipped with an mfx® decoder will be recognized automatically by the ECoS and can be driven without any restrictions.

Operate turnouts and magnetic accessories

Just like with locos, you can name turnouts and magnetic accessories. The large signal box on the screen of your ECoS shows you all turnouts and their switch-position. You can put turnouts in the depot area and assign its exact function to each magnetic accessory, so you can tell simple-, double or 3-way turnouts apart from de-coupler tracks or even streetlights, etc.

Track diagrams

By drawing a track diagram on the screen you can represent the topology of your layout fully graphical. You can switch any turnouts or signals simply by touching the appropriate symbol. Even larger layouts can be displayed on the 16-page track diagram. By using the link element you can directly switch between connected pages of the track diagram. To make the allocation simple you can give each page its own name. The accessories shown in the track diagram correspond in function and state (track switch position) with the signal box, so that a new data entry or configuration of the accessories is not necessary. It is also possible to link elements with feedback outputs. By doing so you will quickly recognize in the track diagram, which tracks are occupied.



Routes

Several magnetic accessories can easily be grouped as routes. Routes can then be switched like singular turnouts or they can be tied to an occupancy detector: Thus extensive block-control management is already possible. ECoS can manage up to 1024 routes with up to 256 magnetic accessories each. Hereby, the logic for controlling routes is ground-breaking: Up to 8 single conditions (feedback contacts, but also the setting of turnouts and other routes) can be linked and thus be used for route triggering. This makes a real start-destination operation possible as well as a (simple) control of fiddle yards!

Shuttle train control

The integrated shuttle train control enjoys big popularity due to its simple handling: here you only need an occupancy detector at each end of the track, which you assign via Software to a loco: length of layover, acceleration - and deceleration, or in-between stops can easily be programmed on the ECoS screen. You are, of course, able to define stopovers. This works with any decoder because the brain of the system sits in the central unit.

Turntable control

It is possible to control the well-known Märklin® turntables graphically with the ECoS command station; ECoS is able to control the specific Märklin® decoder, respectively compatible decoders, directly. When it comes to turntable control the ECoS is not limited to one turntable alone, theoretically you may create up to 75 turntables.

Decoder programming

Programming a decoder means to adjust it in the best way possible: your ECoS will try to simplify this rather unpopular procedure for you, as the programming often turns out to be very complex and is likely to be sensitive for errors.

The classic solution for programming a decoder is to place it onto a separate programming track. This track is connected to the ECoS via a special programming track output and works independently from your main track. Therefore the operation of your layout will continue whilst programming. If you use an ESU decoder you will be able to read out all CVs and features of the decoder directly in the next step and adjust it full-graphically on the screen. If you prefer to program the CVs of your decoders directly, the ECoS offers you an appropriate solution: via the comfortable programming menu you get direct access to all CVs. The ECoS also offers a possibility to ascertain the addresses of your old Motorola® decoders automatically - never again do you have to take your engines apart and check the DIP switch. Programming your decoders is even more simple when they are RailCom®-compatible: In most cases you can do it without a programming track and change all CVs on the main track via POM („Programming on the Main"). You can also read out current values!

Integrated Booster

Every ECoS command station comes with an integrated booster that offers a permanent output current of 6A. ESU supplies a stabilised 150VA power supply with every ECoS. This can be easily adjusted to give an output of between 15 and 21 volts.

Expandibility

If all the features and functions shown so far are not suffient, it is possible to expand your ECoS command station with further modules at any time.

Feedback

ECoS offers a factory built-in galvanically isolated (!) s88 feedback interface for up to 31 of the very popular s88-modules. They serve as track occupancy detectors and may be used for controlling routes and shuttle train operations.

ECoSBoost

Of course all DCC conform boosters can be connected to the ECoS command station, as well as Märklin® 6017 boosters (or compatible products). There is a corresponding socket.However, we recommend to use our ECoSBoost devices. They are directly connected via the ECoSlink bus which has an integrated M4 and RailComPlus® feedback module/function making an automatic recognition of all locomotives everywhere on the layout possible. Every ECoSBoost will show the current booster voltage in the current monitor.

L.Net converter

With the L.Net converter you can use existing handheld throttles and feedback modules fully and bi-directionally integrated in the ECoS system. Thus nothing more should stand in the way of using Daisy®-, Fred®- or ProfiBoss® handheld throttles!

Mobile Control II

The Mobile Control II is perfectly tuned for the interaction with the ECoS command stations: the ECoS synchronises all data with the radio controlled throttle. Therefore you do not have to enter any data locally. Of course, the correct names and symbols will also be displayed for accessories and routes.

Keep using old systems

We have made your transfer to ECoS as comfortable as possible, simply keep using your "old" system. This is made possible through the built-in ECoSniffer: The rail output of your present digital command station is simply connected to the input of the ECoSniffer module. The module listens to all DCC and Motorola® packets and translates them for the ECoS command station.

ECoSlink Terminal

ECoSlink is high-performance bus which is based on the CAN industrial standard. You may connect (up to 128!) external handheld unit throttles. It offers a transmission rate of 250 kBit (and is therefore 10 times faster than e.g. LocoNet®) and is „hot-plug" capable. All devices report automatically to the system and can be removed or reconnected during operation. To wire the ECoSlink devices 6-, 7-, 8-, 9- or 11-pin circular connectors or sockets are used, which are protected against polarity reversal. The differing amount of pins is to ensure error-free wiring. You can basically connect a device at any spot of the ECoSlink. Thanks to the "plug&play" technology it will be automatically recognized and integrated into the system by the command station and will be directly configured on screen. Programming is not necessary. ECoSlink devices will receive automatic software updates if required.

ECoS PowerPack

The newly developed and very powerful power pack 50119 is intended as THE power pack for all ESU ECoS command stations and the ECoSBoost booster. Due to its performance data it is also the ideal power source for any electric accessories for your model trains that require DC power.

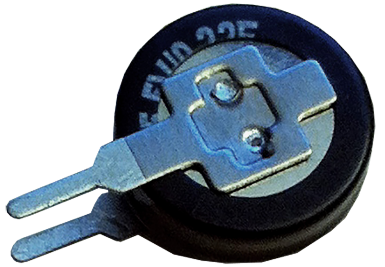
The output voltage can be continually adjusted between 15V and 21V and remains stable under load. The output current may be as high as 7A. An integral, temperature controlled fan provides cooling, if necessary. The power pack automatically switches off in case of a short circuit or overload and restarts once the overload has been eliminated. The power pack is suitable for well ventilated interior spaces.

Technical data ECoS PowerPack

Input	110V ~ 240V AC, 50 – 60 Hz
Output	Adjustable, 15V – 21V DC, max. 7A
Voltage input	IEC 60320 C8 2-pin plug
Voltage output	Fixed cable harness 1.8 m with DC socket 5.5 mm / 2.1 mm
Dimensions	180 x 90 x 45 mm
Included in delivery	PowerPack, Power cord with EURO plug

50119, Power supply Input 100-240VAC, Output 15-21VDC/7A, 150VA, EURO + US power cord

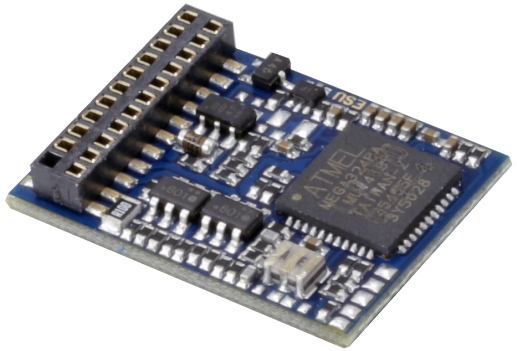
PowerPack for coach lighting



The new PowerPack super capacitor may be connected to our coach lighting modules 50700, 50702, 50708 and 50709 and reliably prevents any flicker in case of poor contact. Despite the fact that it is more compact than its predecessor it has twice the capacity (0.22F/5.5V).

50710, Interior lighting, PowerPack energy store 0,22F, double pack, gauge N, TT, H0

LokPilot V4.0 M4 MKL



This LokPilot decoder is a true quad protocol decoder and besides DCC with RailComPlus® it also supports Motorola®, Selectrix and M4. It will only be available with the 21-pole interface with 6 amplified function outputs and is specifically designed for recently introduced Märklin® locomotives. Thus this decoder is the first choice for all Märklin® friends, who do not want to forego the mfx® compatibility.

Operating modes

The LokPilot V4.0 M4 MKL supports DCC as well as Motorola®, Selectrix® and M4. In DCC mode it supports 14-128 speed steps as well as 2- and 4-digit addresses and up to 28 functions. Due to RailComPlus® the decoders register automatically at suitable command stations.

The LokPilot V4.0 M4 MKL supports all DCC programming modes and can be operated as well as programmed with suitable command stations: Thanks to RailComPlus® one can read out CV values on the main with matching command stations. There are utility registers for all command stations that can only program CVs 1-255.

Motorola® users profit from up to 28 speed steps for 255 addresses. Three additional Motorola® addresses facilitate the use of 16 functions. An integral programming mode also facilitates programming with the venerable Control Unit 6021.

The M4 protocol allows for automatic registration to mfx® compatible command stations (e.g. Mär¬klin® Central Station or Mobile Station). Programming with these command stations (central units) can be accomplished in the same manner as you know it from the original Märklin® decoders.

The LokPilot V4.0 M4 MKL decoder detects Märklin® braking sections just as well as ZIMO® HLU braking commands or the Lenz® ABC system. Braking with DCC braking modules or with DC power is also possible. In addition, this decoder also responds to Selectrix® braking diodes. The LokPilot V4.0 M4 MKL decoder may be used in analogue DC and AC powered layouts. The decoder automatically switches "on-the-fly" between the different operating modes. In most cases one does not have to adjust anything.

Motor control

The LokPilot V4.0 M4 MKL is equipped with 5th generation load control. The performance may be adapted to different motor types by means of 6 parameters. Alternately the decoder sets its parameters to the optimum value once a test run in "Auto tune" mode has been conducted. Adapting a decoder to the motor characteristics has never been easier. ESU decoders control all types of motors, no matter if its Märklin® motors, Fleischmann round motors, coreless motors (e.g. Faulhaber) or a centrally mounted motor with flywheel(s). With the aid of Dynamic Drive Control (DDC) you are able to limit the influence of load control, which allows you to control your locomotives with smooth speed settings in the yard area while the locomotive predotypically slows down going up the hill. SoftDrive® sine motors, such as in many Märklin® models, may also be controlled by the LokPilot V4.0 decoder. Thanks to SUSI this also works with Trix® locomotives.

Functions

The LokPilot V4.0 M4 MKL decoder has six amplified function outputs connected to the 21 pole interface. This decoder has been developed for more recent Märklin® locomotives, because they deviate from the NEM 660 respectively VHDM RCN-121 norm and have amplified outputs AUX3 and AUX4 (instead of the logic level outputs). All important lighting functions are available. The brightness of each output may be adjusted independently. The decoder supports the automatic push and pull movements in conjunction with digital couplers by ROCO®, Krois® and Märklin Telex®.

Operational reliability

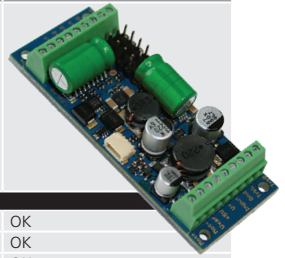
If so desired, you may connect a PowerPack (ESU part No. 54671) to the LokPilot V4.0 M4 MKL in the same manner as with all other 4th generation ESU decoders.

Protection

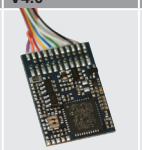
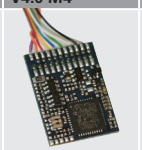
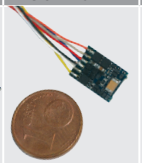
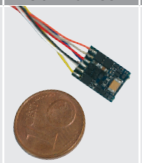
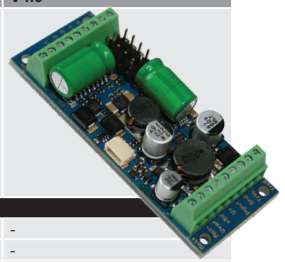
Of course, all function outputs as well as the motor output are protected against overload.

64618, LokPilot V4.0 M4, multi protocoll MM/DCC/SX/M4, 21MTC interface MKL, 6 AUX

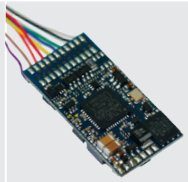
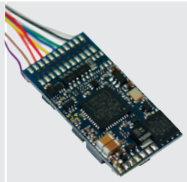
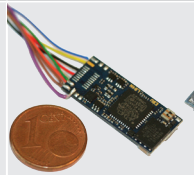
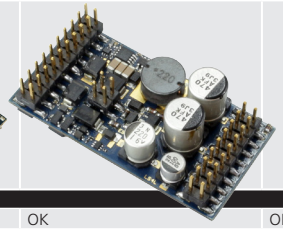
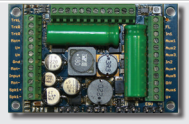
ESU Decoder: Overview LokPilot

	LokPilot Standard	LokPilot Fx V4.0	LokPilot Fx Nano	LokPilot V4.0	LokPilot V4.0 DCC	LokPilot V4.0 M4	LokPilot V4.0 M4 MKL	LokPilot micro V4.0	LokPilot micro V4.0 DCC	LokPilot Nano Standard	LokPilot XL V4.0
											
Operational modes											
DCC 14, 28, 128 speed steps	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
DCC long and short addresses	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
DCC traction address (Consist Mode)	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
DCC LGB pulse control	-	OK	-	OK	OK	OK	OK	OK	OK	-	OK
Automatic speed stEra detection	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Lenz® LG 100, ROCO® brake unit	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Lenz® ABC brake unit	-	OK	-	OK	OK	OK	OK	OK	OK	-	OK
ZIMO® HLU commands	-	OK	-	OK	OK	OK	OK	OK	OK	-	OK
DC analogue operation	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Motorola® 14 speed steps	-	OK	OK	OK	-	OK	OK	OK	-	-	OK
Motorola® 28 speed steps	-	OK	OK	OK	-	OK	OK	OK	-	-	OK
Motorola® address 1 - 80	-	OK	OK	OK	-	OK	OK	OK	-	-	OK
Motorola® address 1 - 127	-	OK	OK	OK	-	OK	OK	OK	-	-	OK
Motorola® address 1 - 255	-	OK	OK	OK	-	OK	OK	OK	-	-	OK
M4 data protocol (mfx® compatible)	-	-	-	-	-	OK	OK	-	-	-	OK
Selectrix®	-	OK	-	OK	-	OK	OK	OK	-	-	OK
Märklin® brake unit	-	OK	OK	OK	-	OK	OK	OK	-	-	OK
AC analogue operation	-	OK	-	OK	-	OK	OK	-	-	-	OK
Automatic detection of operational mode	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Throttle											
DC and coreless motors, AC motors with magnet	OK	-	-	OK	OK	OK	OK	OK	OK	OK	OK
PWM frequency	20,00 kHz	-	-	40,00 kHz	40,00 kHz	40,00 kHz	40,00 kHz	40,00 kHz	40,00 kHz	20,00 kHz	40,00 kHz
Load control in digital operation	OK	-	-	OK	OK	OK	OK	OK	OK	OK	OK
Load control in analogue operation	-	-	-	OK	OK	OK	OK	OK	OK	-	OK
Adj. start / maximum speed in analogue operation	-	-	-	OK	OK	OK	OK	OK	OK	-	OK
Mass simulation for 14 speed steps operation	OK	-	-	OK	OK	OK	OK	OK	OK	OK	OK
»Autotune« function for load control	-	-	-	Ok	Ok	OK	OK	Ok	Ok	-	Ok
DDC (Dynamic Drive Control)	-	-	-	OK	OK	OK	OK	OK	OK	-	OK
Continious motor current	0,9A	-	-	1,1A	1,1A	1,1A	1,1A	0,75A	0,75A	0,75A	4,0A
Short circuit protection	OK	-	-	OK	OK	OK	OK	OK	OK	OK	OK
Function outputs											
Amplified function outputs with short-circuit protection	4	6	6 (no protection)	4	4 / 9 (PluX22)	4 / 9 (PluX22)	6	2	2	4 (no protection)	8
Current of each output	250mA	250mA	150mA	250mA	250mA	250mA	250mA	150mA	150mA	150mA	500mA
Logic level outputs	2	2 (switchable)	-	(4) 21MTC	(4) 21MTC	4 (21MTC)	2	2	2	-	-
Servo outputs	-	-	-	-	-	-	-	-	-	-	4
Output dimming	separately	separately	separately	separately	separately	separately	separately	separately	separately	separately	separately
Light effects like Blinking lights, Marslight, Fire box flickering etc.	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Time-controlled function outputs	-	OK	-	OK	OK	OK	OK	OK	OK	-	OK
Function Mapping according to ESU (F0 - F20)	OK	-	OK	-	-	-	-	-	-	OK	-
Function Mapping V4.0 ESU (F0 - F28)	-	OK	-	OK	OK	OK	OK	OK	OK	-	OK
Function Mapping M4® compatible	-	-	-	-	-	OK	OK	OK	OK	-	OK
Shunting mode (de-selectable)	OK	-	-	OK	OK	OK	OK	OK	OK	OK	OK
ABV (de-selectable)	OK	-	-	OK	OK	OK	OK	OK	OK	OK	OK
Serial protocol (for SUSI)	-	OK	-	OK	OK	OK	OK	-	-	-	OK

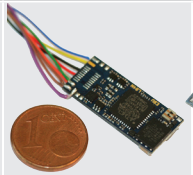
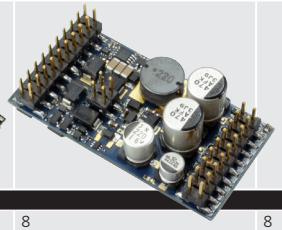
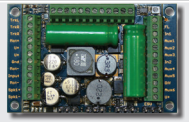
ESU Decoder: Overview LokPilot

	LokPilot Standard	LokPilot Fx V4.0	LokPilot Fx Nano	LokPilot V4.0	LokPilot V4.0 DCC	LokPilot V4.0 M4	LokPilot V4.0 M4 MKL	LokPilot micro V4.0	LokPilot micro V4.0 DCC	LokPilot Nano Standard	LokPilot XL V4.0
											
Sound											
Polyphonic Sound. Number of channels	-	-	-	-	-	-	-	-	-	-	-
Flash memory for sound data	-	-	-	-	-	-	-	-	-	-	-
Power of BTL amplifier (sinus)	-	-	-	-	-	-	-	-	-	-	-
Programming											
DCC service mode programming modes (Register Mode, Address Only, Direct Mode)	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
DCC POM (Programming On the Main)	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Programming mode for Märklin® 6021	-	OK	OK	OK	-	OK	OK	OK	OK	-	OK
M4® configuration on the main track	-	-	-	-	-	OK	OK	-	-	-	OK
Specials											
M4® feedback system	-	-	-	-	-	OK	OK	-	-		OK
RailCom® feedback system	OK	OK	OK	OK	OK	OK	OK	-	OK	OK	OK
RailComPlus® automatic recognition	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Storage of current operational state (memory)	-	OK	-	OK	OK	OK	OK	OK	OK	-	OK
Motorola® wrong-direction bit	-	OK	-	OK	-	OK	OK	OK	-	-	OK
»PowerPack« energy storage	-	OK	-	optional	optional	optional	optional	optional	optional	-	integrated
Construction											
Dimensions in mm	25,5x15,5x4,5	17,5x15,5x5,5	8,0x7,0x2,8	21,4x15,5x5,5	21,4x15,5x5,5	21,4x15,5x5,5	21,4x15,5x5,5	10,5x8,1x2,8	10,5x8,1x2,8	8,0x7,0x2,8	55,0x25,0x10
8-pin plug NEM652 with cable harness	53611	54620	53620	54610	54611	64610	-	54683	-	53661	-
6-pin plug NEM651 with cable harness	-	-	-	54612	54613	64613	-	54687	54684	53664	-
6-pin plug NEM651	-	-	-	-	-	-	-	54688	54685	53665	-
21MTC interface	53614	54621	-	54614	54615	64614	64618	-	-	-	-
Screw terminals	-	-	-	-	-	-	-	-	-	-	54640
PIN connector	-	-	-	-	-	-	-	-	-	-	-
PluX12 interface NEM658 on cable harness	-	-	-	54616	-	64616	-	-	-	-	-
PluX12 interface NEM658 (14.5x8.3x2.4mm)	53616	-	-	-	-	-	-	-	-	-	-
PluX16 interface NEM658	-	-	-	-	-	-	-	-	-	-	-
PluX22 interface	-	-	-	-	54617	64617	-	-	-	-	-
Next18 interface	-	-	-	-	-	-	-	54689	54686	-	-

ESU Decoder: Overview LokSound

	LokSound V4.0	LokSound V4.0 M4®	LokSound micro V4.0	LokSound L V4.0	LokSound XL V4.0
					
Operational modes					
DCC 14, 28, 128 speed steps	OK	OK	OK	OK	OK
DCC long and short addresses	OK	OK	OK	OK	OK
DCC traction address (Consist Mode)	OK	OK	OK	OK	OK
DCC LGB pulse control	OK	OK	OK	OK	OK
Automatic speed stEra detection	OK	OK	OK	OK	OK
Lenz® LG 100, ROCO® brake unit	OK	OK	OK	OK	OK
Lenz® ABC brake unit	OK	OK	OK	OK	OK
ZIMO® HLU commands	OK	OK	OK	OK	OK
DC analogue operation	OK	OK	OK	OK	OK
Motorola® 14 speed steps	OK	OK	OK	OK	OK
Motorola® 28 speed steps	OK	OK	OK	OK	OK
Motorola® address 1 - 80	OK	OK	OK	OK	OK
Motorola® address 1 - 127	OK	OK	OK	OK	OK
Motorola® address 1 - 255	OK	OK	OK	OK	OK
M4 data protocol (mfx® compatible)	-	OK	-	OK	OK
Selectrix®	OK	OK	OK	OK	OK
Märklin® brake unit	OK	OK	OK	OK	OK
AC analogue operation	OK	OK	-	OK	OK
Automatic detection of operational mode	OK	OK	OK	OK	OK
Throttle					
DC and coreless motors, AC motors with magnet	OK	OK	OK	OK	OK
PWM frequency	40,00 kHz	40,00 kHz	40,00 kHz	40,00 kHz	40,00 kHz
Load control in digital operation	OK	OK	OK	OK	OK
Load control in analogue operation	OK	OK	OK	OK	OK
Adj. start / maximum speed in analogue operation	OK	OK	OK	OK	OK
Mass simulation for 14 speed steps operation	OK	OK	OK	OK	OK
»Autotune« function for load control	Ok	Ok	Ok	Ok	Ok
DDC (Dynamic Drive Control)	OK	OK	OK	OK	OK
Continious motor current	1,1A	1,1A	0,75A	3,0A	4,0A
Short circuit protection	OK	OK	OK	OK	OK
Function outputs					
Amplified function outputs with short-circuit protection	6 (21MTC: 4)	6 (21MTC: 4)	4	9	12
Current of each output	250mA	250mA	180mA	500mA	500mA
Logic level outputs	4	4	2	-	-
Servo outputs	-	-	-	2	4
Output dimming	separately	separately	separately	separately	separately
Light effects like Blinking lights, Marslight, Fire box flickering etc.	OK	OK	OK	OK	OK
Time-controlled function outputs	OK	OK	OK	OK	OK
Function Mapping according to ESU (F0 - F20)	-	-	-	-	-
Function Mapping V4.0 ESU (F0 - F28)	OK	OK	OK	OK	OK
Function Mapping M4® compatible	-	OK	-	OK	OK
Shunting mode (de-selectable)	OK	OK	OK	OK	OK
ABV (de-selectable)	OK	OK	OK	OK	OK
Serial protocol (for SUSI)	OK	OK	-	OK	OK

ESU Decoder: Overview LokSound

	LokSound V4.0	LokSound V4.0 M4®	LokSound micro V4.0	LokSound L V4.0	LokSound XL V4.0
					
Sound					
Polyphonic Sound. Number of channels	8	8	8	8	8
Flash memory for sound data	32 MBit	32 Mbit	32 Mbit	32 Mbit	32 Mbit
Power of BTL amplifier (sinus)	1,8W	1,8W	1,8W	3,6W (Dual)	13W (Dual)
Programming					
DCC service mode programming modes (Register Mode, Address Only, Direct Mode)	OK	OK	OK	OK	OK
DCC POM (Programming On the Main)	OK	OK	OK	OK	OK
Programming mode for Märklin® 6021	OK	OK	OK	OK	OK
M4® configuration on the main track	-	OK	-	OK	OK
Specials					
M4® feedback system	-	OK	-	OK	OK
RailCom® feedback system	OK	OK	OK	OK	OK
RailComPlus® automatic recognition	OK	OK	OK	OK	OK
Storage of current operational state (memory)	OK	OK	OK	OK	OK
Motorola® wrong-direction bit	OK	OK	OK	OK	OK
»PowerPack« energy storage	optional	optional	optional	optional	integriert
Construction					
Dimensions in mm	31,0x15,5x6,5	31,0x15,5x6,5	25,0x10,6x3,8	25,4x51,8x14,0	51,0x40,0x14,0
8-pin plug NEM652 with cable harness	54400	64400	56899	-	-
6-pin plug NEM651 with cable harness	56499	66499	54800	-	-
6-pin plug NEM651	-	-	-	-	-
21MTC interface	54499	64499	-	-	-
Screw terminals	-	-	-	-	54500
PIN connector	-	-	-	54399 (with adapter)	54599
PluX12 interface NEM658 on cable harness	55400	65400	55800	-	-
PluX16 interface NEM658	56498	66498	-	-	-
PluX22 interface	56497	66497	-	-	-
Next18 interface	-	-	54898	-	-

Type	Description	LokSound micro V4.0	LokSound V4.0	LokSound V4.0 M4	LokSound L V4.0	LokSound XL V4.0
Austria						
Diesel	ÖBB 2016 Hercules - ER20	54856	54456	64456	54356	54556
Diesel	ÖBB 2043	55817	55417	65417	55317	55517
Diesel	ÖBB 2050 **Q1/17**	56809	56409	66409	56309	56509
Electric	ÖBB 1016 "Taurus" **Q1/17**	54873	54473	64473	54373	54573
Electric	ÖBB 1042	56818	56418	66418	56318	56518
Electric	ÖBB 1044	54875	54475	64475	54375	54575
Electric	ÖBB 1116		56424	66424		
Electric	ÖBB 1216 - SŽ 541		56425	66425		
Belgium						
Diesel	SNCB DMU 41	55808	55408	65408	55308	55508
Diesel	SNCB HLD 59 / Reeks 59	55811	55411	65411	55311	55511
Diesel	SNCB HLD77 / HLR77	56886	56486	66486	56386	56586
Diesel	SNCB HLR73	56884	56484	66484	56384	56584
Diesel	SNCB Reeks 55	55810	55410	65410	55310	55510
Diesel	SNCB Reeks 62	55809	55409	65409	55309	55509
Electric	SNCB HLE 13	55801	55401	65401	55301	55501
Electric	SNCB HLE 15	55802	55402	65402	55302	55502
Electric	SNCB HLE 16	55803	55403	65403	55303	55503
Electric	SNCB HLE 20	55804	55404	65404	55304	55504
Electric	SNCB HLE 21	55805	55405	65405	55305	55505
Electric	SNCB HLE 23	55806	55406	65406	55306	55506
Electric	SNCB HLE 28 (Type 120) **Q1/17**	57813	57413	67413	57313	57513
Electric	SNCB Reeks 11, 12. 21, 27 (21MTC)		55424	65424		
Electric	SNCB Reeks 15 (21MTC)		55423	65423		
Switzerland						
Steam	RhB G 4/5	56861	56461	66461	56361	56561
Diesel	RhB Gmf 4/4 242-243	56873	56473	66473	56373	56573
Diesel	RhB Tm 2/2 20	56874	56474	66474	56374	56574
Diesel	SBB Bm 4/4	56893	56493	66493	56393	56593
Diesel	SBB Bm 4/4 II	55849	55449	65449	55349	55549
Diesel	SBB BM 6/6	57804	57404	67404	57304	57504
Diesel	SBB TEE RAm	54843	54443	64443	54343	54543
Electric	BLS Ae 6/8 **Q1/17**	57832	57432	67432	57332	57532
Electric	BLS Ce 4/4 311	55851	55451	65451	55351	55551
Electric	BLS RABe 515	56853	56453	66453	56353	56553
Electric	BLS Re 4/4	55847	55447	65447	55347	55547

Type	Description	LokSound micro V4.0	LokSound V4.0	LokSound V4.0 M4	LokSound L V4.0	LokSound XL V4.0
Electric	FO/BVZ HGe 4/4 I **Q1/17**	57814	57414	67414	57314	57514
Electric	FO/BVZ HGe 4/4 II **Q1/17**	57815	57415	67415	57315	57515
Electric	FO/MGB Deh 4/4 I / Deh 4/4 II **Q1/17**	57828	57428	67428	57328	57528
Electric	RhB Abe 4/4 II	56872	56472	66472	56372	56572
Electric	RhB ABe 4/4 III	56876	56476	66476	56376	56576
Electric	RhB ABe 8/12 Allegra				56347	56547
Electric	RhB Ge 2/4 **Q1/17**	57831	57431	67431	57331	57531
Electric	RhB Ge 4/4 I	55818	55418	65418	55318	55518
Electric	RhB Ge 4/4 II	56854	56454	66454	56354	56554
Electric	RhB Ge 4/4 III	55850	55450	65450	55350	55550
Electric	RhB Ge 4/6	56826	56426	66426		56526
Electric	RhB Ge 6/6 I	56859	56459	66459	56359	56559
Electric	RhB Ge 6/6 II	56860	56460	66460	56360	56560
Electric	RhB Re 4/4 II	54872	54472	64472	54372	54572
Electric	SBB Ae 3/6 I	55845	55445	65445	55345	55545
Electric	SBB Ae 3/6 II	55846	55446	65446	55346	55546
Electric	SBB Ae 6/6	54874	54474	64474	54374	54574
Electric	SBB Ae 8/14	56879	56479	66479	56379	56579
Electric	SBB BDe 4/4	56850	56450	66450	56350	56550
Electric	SBB Ce 6/8 III - Be 6/8 III	54871	54471	64471	54371	54571
Electric	SBB Ee 3/3	57807	57407	67407	57307	57507
Electric	SBB RABDe 500 / ICN	56804	56404	66404	56304	56504
Electric	SBB RABe 511	56831	56431	66431	56331	56531
Electric	SBB RBDe560 / NPZ-Domino	56830	56430	66430	56330	56530
Electric	SBB Re 460	54868	54468	64468	54368	54568
Electric	SBB Re 6/6	55848	55448	65448	55348	55548
Electric	SBB TEE RAe II - Gottardo	54897	54497	64497	54397	54597
Electric	Stadler FLIRT	55829	55429	65429	55329	55529
Czech REaublic						
Electric	ŽSR/ZSSK350 / SD ES499.0	56878	56478	66478	56378	56578
Germany						
Steam	Universal Schmalspur BR99	54801	54401	64401	54301	54501
Steam	Steam Universal 3 Zylinder	54802	54402	64402	54302	54502
Steam	2 - 4 Zylinder Universal	54803	54403	64403	54303	54503
Steam	BR 01	54806	54406	64406	54306	54506
Steam	BR 01.10 Kohle	54814	54414	64414	54314	54514
Steam	BR 01.10 Oel	54826	54426	64426	54326	54526

Type	Description	LokSound micro V4.0	LokSound V4.0	LokSound V4.0 M4	LokSound L V4.0	LokSound XL V4.0
Steam	BR 03	54807	54407	64407	54307	54507
Steam	BR 03.10 DR-Reko **Q1/17**	57823	57423	67423	57323	57523
Steam	BR 03.10 Öl **Q1/17**	54827	54427	64427	54327	54527
Steam	BR 05	54818	54418	64418	54318	54518
Steam	BR 06	54817	54417	64417	54317	54517
Steam	BR 18 201 **Q1/17**	54819	54419	64419	54319	54519
Steam	BR 18.3 (Badische IVh)	56836	56436	66436	56336	56536
Steam	BR 18.5 (Bay. S3/6)	54805	54405	64405	54305	54505
Steam	BR 23	54808	54408	64408	54308	54508
Steam	BR 23 - KM1®					56581
Steam	BR 24 / 64	54821	54421	64421	54321	54521
Steam	BR 38	54804	54404	64404	54304	54504
Steam	BR 38 -Märklin®				56364	56564
Steam	BR 38.4	56849	56449	66449	56349	56549
Steam	BR 39	56812	56412	66412	56312	56512
Steam	BR 41 Kohle	54824	54424	64424	54324	54524
Steam	BR 41 Öl	54825	54425	64425	54325	54525
Steam	BR 43	56813	56413	66413	56313	56513
Steam	BR 44 Öl	54828	54428	64428	54328	54528
Steam	BR 50 **Q1/17**	54810	54410	64410	54310	54510
Steam	BR 50 - KM1®				56329	56529
Steam	BR 50.35 / BR 50.50 **Q1/17**	57822	57422	67422	57322	57522
Steam	BR 52 **Q1/17**	56846	56446	66446	56346	56546
Steam	BR 52 Kondenstender	54815	54415	64415	54315	54515
Steam	BR 53	55858	55458	65458	55358	55558
Steam	BR 55	54820	54420	64420	54320	54520
Steam	BR 58 / BR 58.3	55833	55433	65433	55333	55533
Steam	BR 61 Stromlinie **Q1/17**	57824	57424	67424	57324	57524
Steam	BR 62	56841	56441	66441	56341	56541
Steam	BR 64 - Piko				56344	56544
Steam	BR 65	56842	56442	66442	56342	56542
Steam	BR 65 - KM1®					56582
Steam	BR 71	56890	56490	66490	56390	56590
Steam	BR 76	56805	56405	66405	56305	56505
Steam	BR 78 **Q1/17**	54822	54422	64422	54322	54522
Steam	BR 80	54813	54413	64413	54313	54513
Steam	BR 86	54829	54429	64429	54329	54529

Type	Description	LokSound micro V4.0	LokSound V4.0	LokSound V4.0 M4	LokSound L V4.0	LokSound XL V4.0
Steam	BR 89	54877	54477	64477	54377	54577
Steam	BR 91	55853	55453	65453	55353	55553
Steam	BR 93	54823	54423	64423	54323	54523
Steam	BR 94.5 pr.T16.1 **Q1/17**	56867	56467	66467	56367	56567
Steam	BR 95	55857	55457	65457	55357	55557
Steam	BR 96 "Mallet"	54809	54409	64409	54309	54509
Steam	BR 98 "Lokalbahn"	56827	56427	66427	56327	56527
Steam	BR 98.10	56840	56440	66440	56340	56540
Steam	BR 98.3 "Glaskasten"	55819	55419	65419	55319	55519
Steam	BR 99.51-60 "Sächsische IV K"	54888	54488	64488	54388	54588
Steam	Kittel Steamtriebwagen	55843	55443	65443	55343	55543
Steam	T18.002 "Steamturbine"	56891	56491	66491	56391	56591
Diesel	Blue Tiger	54858	54458	64458	54358	54558
Diesel	Bombardier Diesel	54834	54434	64434	54334	54534
Diesel	BR 119 DR - 12KVD	56856	56456	66456	56356	56556
Diesel	BR 119 DR - M820	56855	56455	66455	56355	56555
Diesel	BR 119 DR "U-Boot" (BR 219 DB)	55820	55420	65420	55320	55520
Diesel	BR 120 (DR)	54859	54459	64459	54359	54559
Diesel	BR 210	56863	56463	66463	56363	56563
Diesel	BR 218	54833	54433	64433	54333	54533
Diesel	BR 219 / V169	56862	56462	66462	56362	56562
Diesel	BR 232 DB (BR 130 / 131 / 132 DR)	54842	54442	64442	54342	54542
Diesel	BR 245 "Traxx DE ME"	56868	56468	66468	56368	56568
Diesel	BR 246 "Traxx P160 DE"	56820	56420	66420	56320	56520
Diesel	BR 247 "Vectron DE"	56896	56496	66496	56396	56596
Diesel	BR 261	56848	56448	66448	56348	56548
Diesel	BR 265 **Q1/17**	57826	57426	67426	57326	57526
Diesel	BR 605 "ICE VT"	54849	54449	64449	54349	54549
Diesel	BR 643 "Talent"	54878	54478	64478	54378	54578
Diesel	BR 650	54852	54452	64452	54352	54552
Diesel	BR Kö I	55859	55459	65459	55359	55559
Diesel	BR Köf II	54889	54489	64489	54389	54589
Diesel	Class 66 / Class 77	56828	56428	66428		56528
Diesel	Desiro	54894	54494	64494	54394	54594
Diesel	DE 1002 (MWM TBD 604B V12) **Q1/17**	57829	57429	67429	57329	57529
Diesel	DE 1002 (MTU 12V 396) **Q1/17**	57830	57430	67430	57330	57530
Diesel	DHG 500 C (Henschel Werkslok)	56838	56438	66438	56338	56538

Type	Description	LokSound micro V4.0	LokSound V4.0	LokSound V4.0 M4	LokSound L V4.0	LokSound XL V4.0
Diesel	Feuerwehrlok	55826	55426	65426	55326	55526
Diesel	G1200 MaK Vossloh	54880	54480	64480	54380	54580
Diesel	G1700	56814	56414	66414	56314	56514
Diesel	G2000BB (MTU Motor)	56845	56445	66445	56345	56545
Diesel	KEG 2100 / PKP ST434	54879	54479	64479	54379	54579
Diesel	Kleindiesel (Feldbahn-Lok)	54891	54491	64491	54391	54591
Diesel	LINT	55828	55428	65428	55328	55528
Diesel	LINT 27	56871	56471	66471	56371	56571
Diesel	LINT 41	56807	56407	66407	56307	56507
Diesel	ME 26 / NSB Di6 21MTC	55895	55495	65495	55395	55595
Diesel	O&K MV9B / WHL19	56835	56435	66435	56335	56535
Diesel	SchienenzErapelin	55839	55439	65439	55339	55539
Diesel	V100 DB (BR 212)	54832	54432	64432	54332	54532
Diesel	V100 DR	54837	54437	64437	54337	54537
Diesel	V15 / BR 101 DR	56883	56483	66483	56383	56583
Diesel	V160	55840	55440	65440	55340	55540
Diesel	V180 DR (BR 118)	54876	54476	64476	54376	54576
Diesel	V200.0	54846	54446	85855	54346	54546
Diesel	V200.1	56832	56432	66432	56332	56532
Diesel	V300	55842	55442	65442	55342	55542
Diesel	V320	54848	54448	64448	54348	54548
Diesel	V36 **Q1/17**	54830	54430	64430	54330	54530
Diesel	V36 (Doppeltes Lottchen) **Q1/17**	54853	54453	64453	54353	54553
Diesel	V60	54831	54431	64431	54331	54531
Diesel	V60 DR	54835	54435	64435	54335	54535
Diesel	V80	54855	54455	64455	54355	54555
Diesel	V90 (MTU-12V-652)	55827	55427	65427	55327	55527
Diesel	Vossloh Euro 4000	56837	56437	66437	56337	56537
Diesel	VT 08	54850	54450	64450	54350	54550
Diesel	VT 11.5	54839	54439	64439	54339	54539
Diesel	VT 11.5 - Piko				56333	56533
Diesel	VT 11.5 (BR602) "Gasturbine"	54881	54481	64481	54381	54581
Diesel	VT 12.5 "Stuttgarter Rössle"	54882	54482	64482	54382	54582
Diesel	VT 135 / VT 70.9	56888	56488	66488	56388	56588
Diesel	VT 18	54840	54440	64440	54340	54540
Diesel	VT 2.09 / Ferkeltaxe	56839	56439	66439	56339	56539
Diesel	VT 36.5	56857	56457	66457	56357	56557

Type	Description	LokSound micro V4.0	LokSound V4.0	LokSound V4.0 M4	LokSound L V4.0	LokSound XL V4.0
Diesel	VT 610	56806	56406	66406	56306	56506
Diesel	VT 612	55898	55498	65498	55398	55598
Diesel	VT 614	56808	56408	66408	56308	56508
Diesel	VT 62	56880	56480	66480	56380	56580
Diesel	VT 62 / VT 69 / VT 858 Triebwagen	56802	56402	87809	56302	56502
Diesel	VT 628	54841	54441	64441	54341	54541
Diesel	VT 98	54854	54454	64454	54354	54554
Diesel	VW Draisine	55855	55455	65455	55355	55555
Diesel	Wismarer Schienenbus	57812	57412	67412	57312	57512
Electric	BR 101	54884	54484	64484	54384	54584
Electric	BR 110	54860	54460	64460	54360	54560
Electric	BR 111	56816	56416	66416	56316	56516
Electric	BR 120	54865	54465	64465	54365	54565
Electric	BR 141 / E41	54885	54485	64485	54385	54585
Electric	BR 143 DB / 243 DR **Q1/17**	54869	54469	64469	54369	54569
Electric	BR 151	56819	56419	66419	56319	56519
Electric	BR 181 / 184	55838	55438	65438	55338	55538
Electric	BR 185 DB (SBB Re 482 BLS Re 485)	54883	54483	64483	54383	54583
Electric	BR 187 "Traxx 3 Last Mile"	56865	56465	66465	56365	56565
Electric	BR 187 "Traxx 3"	56866	56466	66466	56366	56566
Electric	BR 189 / ES64F4 **Q1/17**	57818	57418	67418	57318	57518
Electric	BR 193 "Vectron" Last Mile **Q1/17**	57817	57417	67417	57317	57517
Electric	BR 193 "Vectron"	56858	56458	66458	56358	56558
Electric	BR 401 / 402 (ICE 1, ICE 2)	54867	54467	64467	54367	54567
Electric	BR 403 (ICE 3) **Q1/17**	56817	56417	66417	56317	56517
Electric	BR 420	55821	55421	65421	55321	55521
Electric	BR 442 / Talent 2 **Q1/17**	57821	57421	67421	57321	57521
Electric	E 03 / BR 103	54863	54463	64463	54363	54563
Electric	E 17 / BR117	57806	57406	67406	57306	57506
Electric	E 18 / BR 118	54892	54492	64492	54392	54592
Electric	E 32	56892	56492	66492	56392	56592
Electric	E 40	54861	54461	64461	54361	54561
Electric	E 44 **Q1/17**	54870	54470	64470	54370	54570
Electric	E 50 / BR 150	54866	54466	64466	54366	54566
Electric	E 75	54862	54462	64462	54362	54562
Electric	E 94	54864	54464	64464	54364	54564
Electric	ET 65	54893	54493	64493	54393	54593

Type	Description	LokSound micro V4.0	LokSound V4.0	LokSound V4.0 M4	LokSound L V4.0	LokSound XL V4.0
Electric	ET 91 / BR 491 "Gläserner Zug"	56889	56489	66489	56389	56589
Electric	ETA / ESA 176	54887	54487	64487	54387	54587
Electric	ETA150 - ESA150	55815	55415	65415	55315	55515
Electric	Eurosprinter	54886	54486	64486	54386	54586
Electric	Straßenbahn Altbau	54890	54490	64490	54390	54590
Electric	Straßenbahn Düwag Bogestra	56885	56485	66485	56385	56585
Electric	Straßenbahn GT4	55816	55416	65416	55316	55516
Other	Pferdebahn	55856	55456	65456	55356	55556
Denmark						
Steam	DSB Type D	55897	55497	65497	55397	55597
Diesel	DSB ME	55893	55493	65493		55593
Diesel	DSB MO 21MTC	55896	55496	65496	55396	55596
Diesel	DSB MT 21MTC	55894	55494	65494	55394	55594
Diesel	DSB MZ I 21MTC	55890	55490	65490	55390	55590
Diesel	DSB MZ II 21MTC	55891	55491	65491	55391	55591
Diesel	DSB MZ IV 21MTC	55892	55492	65492	55392	55592
Diesel	DSB Nohab	54838	54438	64438	54338	54538
Spain						
Diesel	RENFE D319	54845	54445	64445	54345	54545
Diesel	RENFE D333	56815	56415	66415	56315	56515
France						
Steam	SNCF 140 C	55822	55422	65422	55322	55522
Steam	SNCF 141 TA	57801	57401	67401	57301	57501
Steam	SNCF 141R / 1244 Mikado **Q1/17**	57820	57420	67420	57320	57520
Steam	SNCF 231	56800	56400	66400	56300	56500
Diesel	SNCF 68000	54857	54457	64457	54357	54557
Diesel	SNCF A1AA1A 62000 **Q1/17**	57819	57419	67419	57319	57519
Diesel	SNCF BB 63000 / SZ643	56851	56451	66451	56351	56551
Diesel	SNCF X2800	55813	55413	65413	55313	55513
Diesel	SNCF Y6200/Y6400 Poyaud	54847	54447	64447	54347	54547
Electric	SNCF BB 16500 (21MTC)	55825	55425	65425		
Electric	SNCF BB 25100	55814	55414	65414	55314	55514
Electric	SNCF BB 27000	56894	56494	66494	56394	56594
Electric	SNCF BB 7200	56810	56410	66410	56310	56510
Electric	SNCF BB 724000 / 734000	55812	55412	65412	55312	55512
Electric	SNCF BB15000	57802	57402	67402	57302	57502
Electric	SNCF BB22000	57805	57405	67405	57305	57505

Type	Description	LokSound micro V4.0	LokSound V4.0	LokSound V4.0 M4	LokSound L V4.0	LokSound XL V4.0
Electric	SNCF CC 40100	56895	56495	66495	56395	56595
Electric	SNCF CC 6500 **Q1/17**	57816	57416	67416	57316	57516
Electric	SNCF Z27500	57803	57403	67403	57303	57503
Italy						
Diesel	FS DE 753	55899	55499	65499	55399	55599
Netherlands						
Diesel	NS 6400	56852	56452	66452	56352	56552
Electric	NS 1600 / 1800	54851	54451	64451	54351	54551
Poland						
Diesel	PKP SM42 / SP42	56875	56475	66475	56375	56575
Diesel	PKP T669 / Rh770 / ChME3	56843	56443	66443	56343	56543
Electric	PKP EU07 / Era07	56877	56477	66477	56377	56577
Portugal						
Electric	CP 2500/2550 **Q1/17**	57827	57427	67427	57327	57527
Sweden						
Diesel	SJ T44	55841	55441	65441	55341	55541
Electric	LKAB DM3-1200	54896	54496	64496	54396	54596
Electric	LKAB IORE	54895	54495	64495	54395	54595
United Kingdom						
Steam	BR Standard Class 7 "Britannia"	57811	57411	67411	57311	57511
Steam	SR Merchant Navy Class	57809	57409	67409	57309	57509
Steam	SR West Country Class	57808	57408	67408	57308	57508
Steam	SR West Country (Un-Rebuilt)	57810	57410	67410	57310	57510
Diesel	Class 08 / NS 500	56887	56487	66487	56387	56587
USA						
Steam	USA "Heisler "	55852	55452	65452	55352	55552
Steam	USA 2-6-0 Mogul	55854	55454	65454	55354	55554
Steam	USA 2-8-2 Mikado	54812	54412	64412	54312	54512
Steam	USA UP Big Boy	54811	54411	64411	54311	54511
Diesel	USA FP7	54836	54436	64436	54336	54536
Diesel	USA PA 1	54844	54444	64444	54344	54544

E03, Class 103.1

Prototype

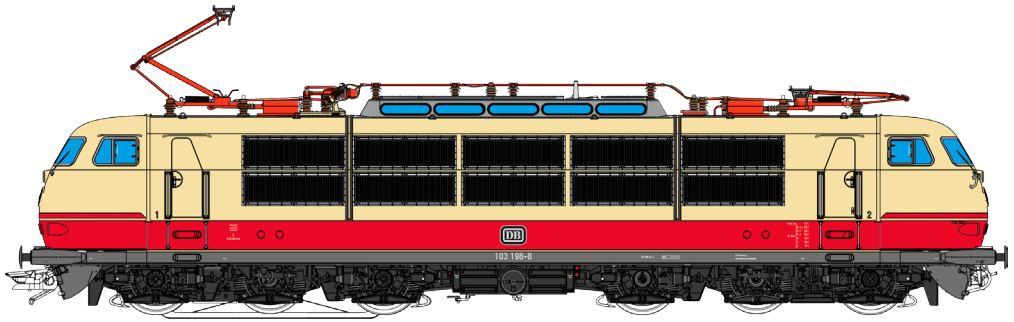
In 1965 four units of the pre-series class E03 were commissioned and the series production of a total of 145 locomotives commenced in 1970. The locomotives were already considered legends during their normal service life. The Deutsche Bundesbahn (DB) developed the E03 mainly together with Henschel and Krauss-Maffei for hauling light TEE trains (Trans European Express) at high speeds in mainly level country. In 1965 high speed tests were commenced with the E03 001 in regular express train service with a maximum speed of 200 km/h. These runs and the unique shape made the E03 also to the flagship for rail travel. The rounded cab sections were developed as a result of elaborate tests in the wind tunnel and the elegant TEE livery coined the image of high speed rail travel in Germany for more than 30 years. In 1969 the DB modified the specification for the E03 and increased the total train mass to 480 t at 200 km/h and 800 t at 160 km/h for the serial production locomotives. Therefore the power rating of the traction motors was also increased, namely to 7,780 kW. The serial type class 103.1 could easily be differentiated from the pre-production models due to the second row of ventilation grills along the body sides and the somewhat simplified livery without the silver stripes between the crimson and the beige areas. During the early 1970-ies the class 103.1 had the opportunity to display its incredible acceleration hauling TEE trains with a maximum of 7 coaches and hardly ever reached the performance limit due to the small number of main line sectors with a permitted maximum speed of 200 km/h. Since all trains travelling at speeds higher than 140 km/h had to be manned by two engine drivers, the DB indulged their staff by lengthening the cabs and thus the overall length of the locomotive in the last production series. By the way, the rule regarding the requirements of two engine drivers in high speed trains was only abolished in 1996. For this reason there are two engine drivers in the ESU model. The introduction of the IC'79 express train system in 1979 made the class 103.1 to extremely heavy workers. The new InterCity consists were made up of first and second class coaches approved for a speed of 200 km/h. Although these high speed locomotives were now operating close to their performance limit, they were still very impressive due to their great reliability. In 1990 the German reunification and the foundation of the DB AG enlarged the operating radius of these racers even further. The class 103.1 locomotives have been indispensable for the DB AG well beyond the turn of the millennium.

Model

- Metal body and chassis
- Multipart bogie side frame covers with real springs and numerous separately applied details
- SEraarately applied brake equipment with brake shoes aligned with the wheels
- SEraarately applied grab irons
- Couplers with kinematics in NEM shaft
- Powerful five pole ESU motor with two balanced flywheels
- Drive via Cardan shaft/worm gear to four axles, four traction tires
- LokSound V4.0 M4 decoder for DCC, Motorola®, M4 and Selectrix mode
- Automatic registration with RailComPlus® or mfx® capable command stations
- PowerPack energy storage capacitor for uninterrupted power supply
- Two high fidelity speakers for optimal listening pleasure
- Universal electronics with plug-in current pick-up for changing from two-rail to three-rail systems and vice versa
- Both pantographs can be digitally raised and lowered independently
- Digitalised original sounds of a class 103.1
- Sensor controlled sounds when travelling through curves and during braking shortly before stopping
- Directional lighting white / red, headlights can be turned off when train is coupled to loco, shunting lights, sEraarately switched cab lighting, illuminated driver's console and engine room lighting
- Brake sparks during sharp braking
- Minimum radius = 360 mm
- Length over buffers = 224.1 mm

31170, Electric loco, E03 001, DB, TEE, Era III, Sound + Panto

31171, Electric loco, 103 198, DB, TEE, Era IV, Sound + Panto



31172, Electric loco, 103 163, DB, orient red, Era V, Sound + Panto

Class 132 »Ludmilla«

Prototype

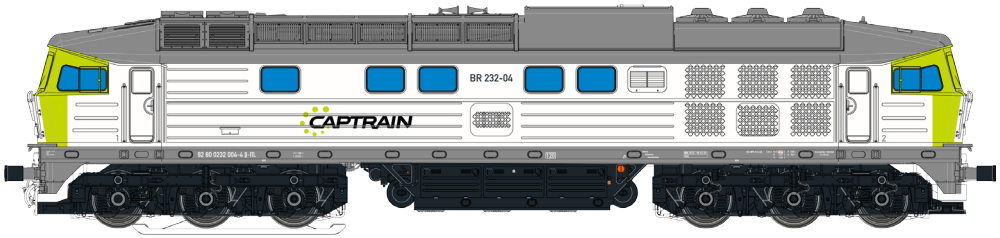
In 1973 the Deutsche Reichsbahn (DR) took delivery of the first class 132 equipped with train heating device and dynamic brake from the Soviet locomotive works in Woroschilowgrad. The installation of the train heating generator required the extension of the chassis to 20.820 mm, in comparison to the class 130 and class 131 types, which where only designated for freight service. Since the components except for the train heating generator have proven their reliability in several 100 units, this new locomotive also proved an immediate success. The class 132 diesel-electric locomotive is equipped with the 16-cylinder four-stroke diesel engine 16 Tsch N 26/26 (type 5 D 49) running at medium revs and driving the generator, which in turn powers 6 cannon box motors. In the beginning the class 132 locomotives generating 3000 HP were the most powerful diesel powered units in the roster of the DR. Since the speed was generally limited to 120 km/h in the German Federal Republic, the class 132 - better known as the "Giant Russian" or the "Russian" amongst the railroaders – could be employed for all train services. Until the end of the 1990-ies and on many lines even into the early years of the new millennium, the low rev babble and the distinct whistle under full load dominated the sounds in yards as well as on the main lines. In order to somewhat soften the distinctive noise, the DB equipped many locomotives with fan grills in the sloped roof sides as well as elevated shafts for the triple fans. The DB actually had great plans for the Russian six-axle locomotives shortly after the reunification.

Since the oldest units of the West German V 160 family approached their fortieth service year and many of them suffered from the strain in regular heavy freight service for the steel industry in the Ruhr area and became more and more damage-prone, the DB stationed the first class 132 locomotives in Oberhausen in 1992. After some initial scepticism due to the hitherto uncommon diesel-electric technology, the train drivers in the West soon made friends with these locomotives. The fact that many train drivers, previously employed by the DR in East Germany simply "followed" their locomotives to the West. Since 1994 this engine type is known as class 232 while the locomotives that have undergone an upgrading to 140 km/h maximum speed have been classified as class 234 by the DB AG.

Model

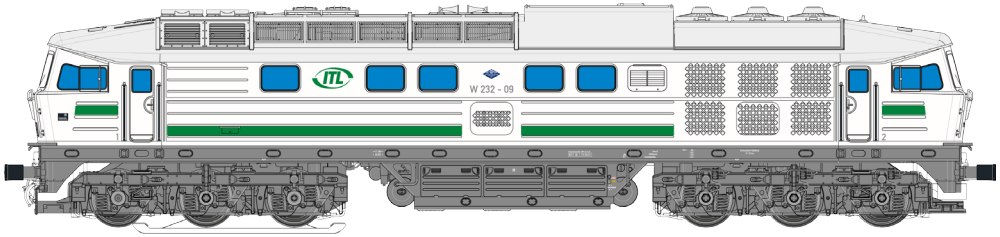
- Metal housing, chassis and gear boxes
- Open work fan grills in the roof area
- Multi-color driver's cab with driver
- Multi-part bogie frames with separately applied springs
- Separately applied grab irons and shunter's steps, metal exterior mirrors (DR version)
- Couplers with kinematics in NEM shaft
- Five-pole ESU motor with two flywheels
- Drive via Cardan shaft/worm gear to four axles, four traction tires
- LokSound V4.0 M4 decoder for DCC, Motorola®, M4 and Selectrix mode
- Automatic registration to command stations supporting RailComPlus® or mfx® functionality
- PowerPack storage capacitor for uninterrupted power supply
- Two quality speakers with large sound capsules for best possible sound
- Load dependent smoke generator, synchronised with LokSound
- Digitalised original sound sequences of a locomotive with a 16-cylinder engine, type 5 D 49
- Curve sensor for squealing wheels when moving slowly through curves
- Directional lighting, headlights can be turned off when train is coupled to loco, high beam headlight function of top headlight, separately switched cab lighting and illuminated driver's console
- Separately switched engine compartment interior lights
- Brake sparks during sharp braking
- Pipette for refilling smoke generator, prototypical etched part for covering the exhaust pipe, accessory parts for headstock included
- Minimum radius = 360 mm
- Length over buffers = 239.3 mm

31164, Diesel loco, 232-04, Captrain, grey / light green, Era VI, Sound + Smoke



31166, Diesel loco, 622.01, EVB, red-cream, Era V, Sound + Smoke

31167, Diesel loco, 232-09, ITL, silver, Era VI, Sound + Smoke



31169, Diesel loco, 232 204, DB, orient red, Era V, Sound + Smoke

31350, Diesel loco, RN 232 109, Railion NL, traffic red, Era VI, Sound + Smoke

31351, Diesel loco, 232 409, East-West, red-white, Era VI, Sound + Smoke

Class 265

Prototype

The Voith Turbo Lokomotivtechnik GmbH & Co KG developed the class 260/261, which replaced many locomotives of the V60 and V90 families since 2010. The 130 units of class 261, known as the Voith Gravita® actually met the expectations of the DB, however, the DB wanted to have locomotives with greater tractive force and an extended range for hauling heavy trains. In order to meet these requirements, Voith developed the 1.4 m longer class 261. The longer locomotive frame bears the tank that had been enlarged to 5000 l and the 12-cylinder diesel engine 12 V 4000 R43 by MTU. With its starting tractive effort of 272 kN, the class 265 is far superior to the older types of class 290-295 and 225. The locomotives reach a top speed of 50 km/h in shunting mode while their maximum speed in main line mode is 100 km/h. 31 units of class 265 have been delivered to the DB as of 2014. The Hohenzollerische Landesbahn HzL had leased one unit 261 for a longer period of time and then purchased two units of the more powerful class 265 in 2012, which since are employed in heavy freight service as V180 and V181. In 2010 Voith built the 265 500, which is employed as a charter locomotive. Two more units bear the characteristic orange livery of the locomotive hirer Northrail.

Model

- Metal housing and chassis, plastic cab
- Open fan grills in the long nose
- Multi-colour driver's cab with driver
- Multi-part bogie frames
- Separately applied grab irons and shunter's steps
- Coreless motor with two flywheels
- Drive via Cardan shaft/worm gear to four axles, two traction tires
- LokSound V4.0 M4 decoder for DCC, Motorola®, M4 and Selectrix mode
- Automatic registration to command stations supporting RailComPlus® or mfx® functionality
- PowerPack storage capacitor for uninterrupted power supply
- Quality speaker with large sound capsule for best possible sound
- Load dependent smoke generator, synchronized with LokSound
- Remote controlled digital couplers at both ends with kinematics in NEM shaft
- Digitalized original sound sequences of a class 265 locomotive with an MTU engine type 12V 4000 R43
- Curve sensor for squealing wheels when moving slowly through curves
- Directional lighting, headlights can be turned off when train is coupled to loco, separately switched shunting lights, cab lighting and illuminated driver's console and predotypical high beam headlights
- Brake sparks during sharp braking
- Pipette for refilling smoke generator, two non-magnetic couplers for installation on cars are included
- Minimum radius = 360 mm
- Length over buffers = 193.8 mm

31256, Diesel loco, 265 310, MRCE, black, Era VI, Sound + Smoke

Class 245

Prototype

This locomotive known as DB class 245 is actually an electric locomotive with integral power plant. The portion of parts that are identical to the Traxx electric locomotives of the DB classes 145/146 and 185 is about 75%. Traxx is an artificial name given by the manufacturer, Bombardier, for Europe's most successful locomotive family. DE stands for diesel electric power transmission. ME indicates multi engine, in other words a vehicle with several train traction systems. The latter characteristic is in fact the actual innovation for the Deutsche Bahn. Of course, there have been locomotives with several train traction systems in the past. After all the DB class V200 and V200.1 respectively the DR V180 had two engines providing tractive effort. At the time the reason for having two engines was simply the fact that it was technically not possible to make an engine powerful enough to generate the required performance data. Today the industry offers engines that can easily generate 2200 kW as is required for the class 245. The DB requires new more powerful locomotives for the dieselised network of lines around Frankfurt/Main and also for the Allgäu region heading passenger trains that have been hauled by the class 218 run pretty much to their limits for almost four decades.

The positive operating experience gained with the almost 1360 Traxx electric locomotives class 145/146 and class 185 encouraged the DB to lodge an enquiry with Bombardier. The excellent operating experience of Metronom (a DB subsidiary for a certain period due to the shareholding in the OHE, the Osthannoverschen Eisenbahnen) with the single engine class 246 diesel locomotive, which is also part of the Traxx family, speeded up the signing of the supply contract. Unfortunately the continued manufacture of the class 246 was hampered by new regulations regarding exhaust emissions questioned by many experts. Instead of modifying a single diesel engine in cooperation with the engine manufacturer in order to meet the regulations Bombardier proposed a different approach. The people in Kassel decided to split the electric power generation over four diesel engines.

Model

- Metal housing and chassis
- Separately applied brass and plastic detail parts
- Separate handle bars
- Perforated fan grills on the roof and the sides
- Sprung buffers
- Coupler shaft mounted onto close coupler kinematics as per NEM 362
- High performance skew-wound motor with sound optimized commutator and with two flywheels
- 3 axles powered by combined worm gear and helical gear box
- Two traction tires
- Universal electronics for usage on both DC and AC layouts
- Headlights, cab lighting, illuminated driver's cab-control panel with maintenance-free warm white LEDs
- Controlled with an ESU LokSound V4.0 M4 decoder with two large speakers
- Curve sensors
- "PowerPack" storage capacitor for uninterrupted power supply
- Two load dependent, fan driven smoke generators with temperature control
- Length over buffers = 217.2 mm
- Minimum radius = 360 mm

31098, Diesel loco, 245 030, DB, white, Era VI, Sound + Smoke

31099, Diesel loco, 245 502, SBB, red-blue, Era VI, Sound + Smoke

31340, Diesel loco, 245 040, DB, white-yellow-black, Era VI, Sound + Smoke

V200.0

Prototype

The class V200 was THE locomotive face of the German Railways (Deutsche Bundesbahn - DB) during the 1950-ties. No other diesel locomotive coined the image of the young DB as much as the long locomotive with the characteristic aluminium strips along the sides that merged to a stylised "V" at the front and rear. In their early days these locomotives were often hauling high class (light) fast trains whose consist was made up of blue or green express train coaches.

As early as shortly after World War II the DB, founded in 1949, intended to change its tractive power also for medium weight passenger service and freight trains. A four axle diesel hydraulic locomotive with a maximum speed of 140 km/h was also on the drawing boards of the DB. The type designation V200 simply indicated the required power of the diesel engines, namely 2000 HP. Since diesel engines with that power rating were not yet available at the time, the DB decided jointly with Krauss-Maffei, the responsible locomotive manufacturer, to build a locomotive with two power plants. Various auxiliary units were also found in the five units of the class V80 locomotives manufactured as from 1952 as well as in the rail cars VT08 and VT12.5. The latter also had the same primary power plant as the V200, because the 800 HP engines of the V80 were considered insufficient for the intended range of use. While the engines of the pre-series production of the V200 built commencing in 1953 were set to 1000 HP, the series production V200 locomotives were equipped with 12-cylinder engines generating 1100 HP at 1500 revs/min. These power plants were supplied by Daimler-Benz (MB 820 Bb), MAN (12 V 18/21) or Maybach (MD 650). The latter were the most commonly used power plants for the V200. Since the DB had no practical experience with such large diesel locomotives for mainline service, the five pre-production models were subjected to an extensive test program including hauling regular trains. Thus these locomotives were running up to 722 km per day. V200 005 was sent on a one-month presentation run to Turkey, Greece and Yugoslavia amongst others travelling about 10,000 km in one month.

Model

- Metal housing and chassis
- Separately applied brass and plastic detail parts
- Brass shunter's steps
- Separate handle bars
- Perforated fan grills
- Sprung buffers
- Close coupler kinematics and shaft as per NEM 362
- High performance miniature five-pole skew wound motor with noise optimized commutator and two flywheels
- 3 axles powered by combined worm gear and helical gear box
- Two traction tires
- Universal electronics
- Headlights, cab lighting, illuminated driver's cab-control panel, engine compartment lighting with maintenance-free warm white LEDs
- Controlled with an ESU LokSound V4.0 M4 decoder with two large speakers
- Curve sensors
- "PowerPack" storage capacitor for uninterrupted power supply
- Two load dependent, fan driven smoke generators with temperature control
- Length over buffers = 209.7 mm
- Minimum radius = 360 mm

31330, Diesel loco, V200 009, DB, old red, Era III, Sound + Smoke

31331, Diesel loco, 220 021, DB, old red, Era IV, Sound + Smoke

31334, Diesel loco, 417 01, EVB, red-beige, Era V, Sound + Smoke

Tank car type »Deutz«

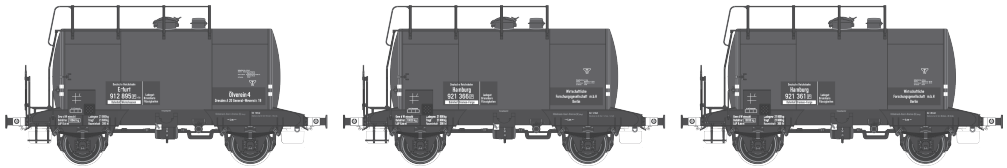
Prototype

Prior to World War II the rulers already recognized a considerable demand for tank cars for transporting flammable liquids, particularly for assuring reliable replenishment of materials at military bases. Thrifty handling of resources was a key requirement for the development. Taking into account these requirements Westwaggon in Cologne-Deutz developed a tank car without separate frame, where the headstock was welded to the tank. In order to prevent any damage to the tank itself due to the drag and impact forces in normal operation, the lower part of the tank is shaped like a trough. In other words it does not have any boiler shells as was previously the case. About 2000 units of this two-axle car, named after the location of the manufacturer's head office, were built between 1941 and 1944. While the cars of the first series were supplied to private owners, the military commands such as the Luftwaffe (German Air Force) received the major part of later deliveries. Only very few oil unions received any of these cars. All cars were registered with the German state railway, which meanwhile was only known as the Deutsche Reichsbahn. After World War II most of the privately owned cars remained with the successor companies of the oil unions while the state owned vehicles were transferred to the Vereinigte Tanklager und Transportmittel GmbH VTG (Consolidated Tank Storage and Transport GmbH), which was founded on 5 November, 1951. In 1953 the VTG owned a total of 9791 tank cars of various designs. In 1961, for instance, a large number of tank cars was transferred to the Industrieverwaltungsgesellschaft IVG (Industrial Administration GmbH). These cars were commissioned for the supply of military bases with operating supplies and could be seen individually or in groups right across Germany right through era IV. Private operators such as Shell, ESSO, ARAL or Texaco utilised the Deutz cars up to and in era IV. The last exemplars were decommissioned in 1990.

Model

- True to scale model of a light weight tank car with 30 m³ capacity
- Running boards or cat walk grating made off etched parts
- Various separately applied armatures
- Prototypically dimensioned railings and grab irons made off hard-wearing plastic
- Signage boards with correct information matching the respective era
- Two-sided profiled wheels
- Weight: 48 g for optimal running characteristics
- Toe bearing in metal bearings for smooth running
- Loop and hook couplers with non-magnetic loop in NEM shafts with kinematics
- Minimum radius = 360 mm
- Length over buffers = 101.2 mm

36205, Tank car set of 3, Deutz, Ölverein Erfurt, 912 895, grey, Wifo Hamburg, 921 366, grey, Wifo Hamburg, 921 361, grey, Era II, DC



36216, Tank car set of 3, Deutz, IVG, 5 594 947, grey, IVG, 5 594 352, grey, IVG, 5 531 612, green, Era III, DC

36217, Tank car set of 3, Deutz, ARAL, 503 074, grey, ESSO, 584 933, grey, Shell, 583 416, yellow, Era III, DC

36218, Tank car set of 3, Deutz, VTG, 070 5 149, grey, VTG, 070 5 156, grey, EVA, 737 7 610, grey, Era IV, DC

36219, Tank car, Deutz, ÖBB ÖMV, 532 25, black-blue, Era III, DC

36220, Tank car, Deutz, ÖBB OEVA, 736 6 025, grey, Era IV, DC

Panorama coach BEX

Prototype

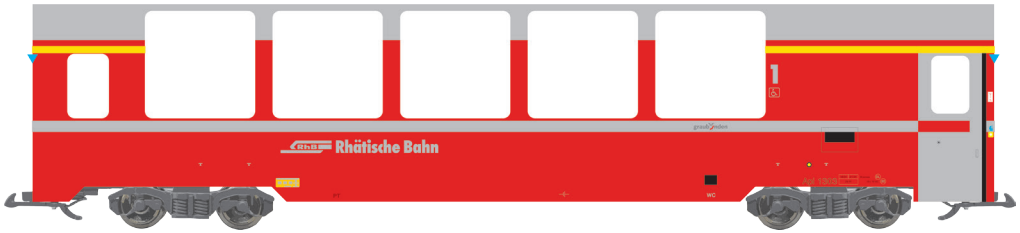
The RhB (Rhätische Bahn) ordered two production series with a total of 26 panorama coaches for the world famous Bernina Express. In comparison to previously built coaches for other destinations, the Bernina coaches are 3.2 m longer. Nine first class and 17 second class coaches have been built, which turned out very popular with the passengers.

The Pullman model is - subject to prototype – equipped either with SIG-90 bogies with a replica of the coil springs or with the Stadler SSL bogies with imitation air cushioning. All wheel current pick-up provides reliable power for the integral digital decoder. In addition, there is a PowerPack storage capacitor on board. Thus the interior coach lighting – supplied as a standard feature – will always operate flicker-free, even on dirty track. The era VI versions are equipped with prototypical destination signs on the sides.

Model

- Intricate printing including the floor
- Different seats in first and second class
- SIG-90 bogies with coil springs or Stadler SSL with air cushioning subject to era
- Three-point mounting of bogies
- All-wheel current pick-up
- Integral interior lighting with digital decoder and PowerPack
- Comprehensive lighting functions can be switched and adjusted
- Illuminated destination signs for era VI version
- For the first time as APi version
- Minimum radius = 600 mm
- Length over buffers = 680 mm

36350, Panorama coach BEX, RhB, Api 1303, red, Era VI

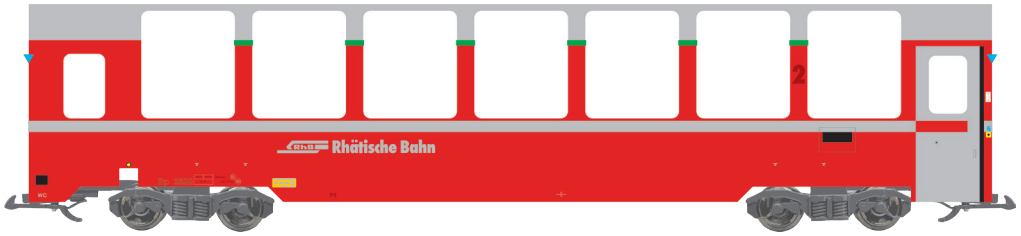


36351, Panorama coach BEX, RhB, Api 1304, red, Era VI

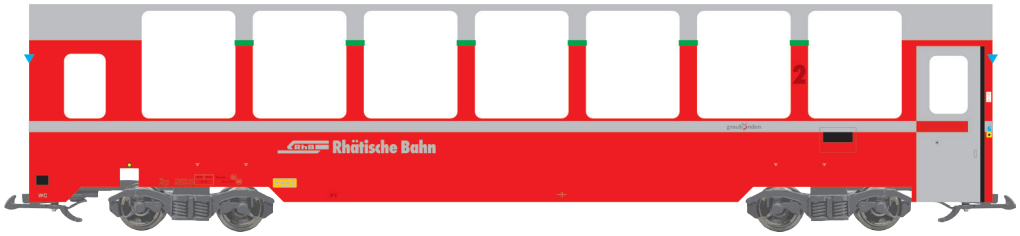
36352, Panorama coach BEX, RhB, Bps 2511, red, Era VI

36353, Panorama coach BEX, RhB, Bp 2521, red, Era VI

36354, Panorama coach BEX, RhB, Bp 2522, red, Era VI

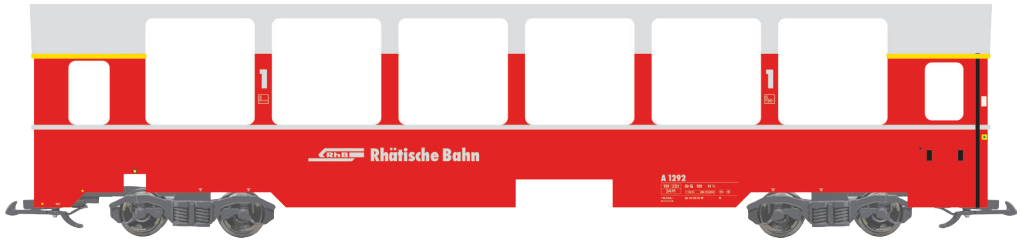


36355, Panorama coach BEX, RhB, Bp 2525, red, Era VI



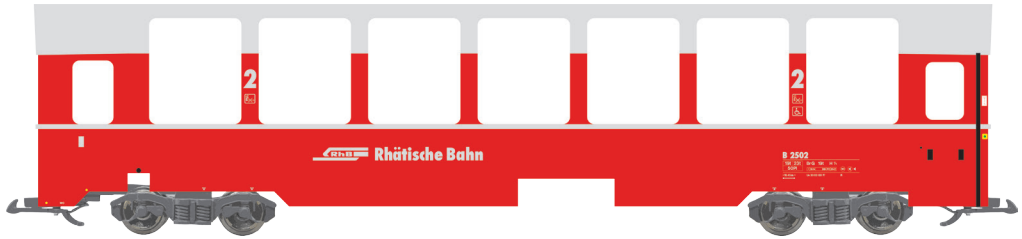
36356, Panorama coach BEX, RhB, A 1291, red, Era V

36357, Panorama coach BEX, RhB, A 1292, red, Era V

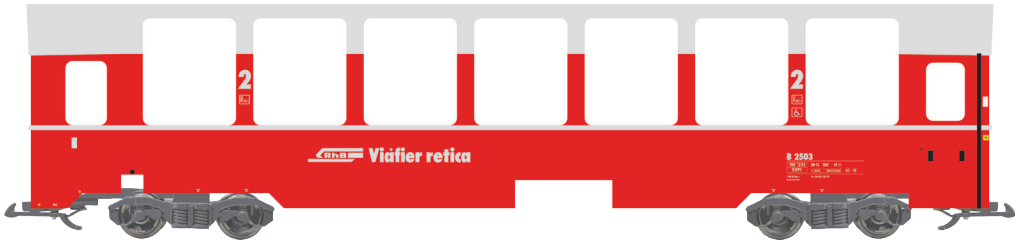


36358, Panorama coach BEX, RhB, B 2501, red, Era V

36359, Panorama coach BEX, RhB, B 2502, red, Era V



36360, Panorama coach BEX, RhB, B 2503, red, Era V



36361, Panorama coach BEX, RhB, B 2505, red, Era V

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