CV	Description	Area	Value*
1	**Locomotive address**	DCC: 1 - 127 Mot: 1 - 80	3
2	**Minimum speed** (the speed from 0 until the locomotive is running at speed step 1)	0 - 255	1
3	**Acceleration delay**	0 - 255	30
4	**Braking rate**	0 - 255	30
5	**Maximum speed** (must be greater than CV 2)	0 - 255	200
6	**Average speed** (must be greater than CV 2 and less than CV 5)	0 - 255	100
7	**Software version** (The processor can be updated)	-	differently.
8	**anufacturer identification** decoder reset, CV8 = 8	-	162
12	**Decoder operating mode** — **Value** Bit 0=1 DC (analog operation; direct current) on — *1 Bit 2=1 DCC data format on — *4 Bit 4=1 AC (analog 3-rail operation; alternating current) on — *16 Bit 5=1 Motorola® data format on — *32	0 - 117	117
17 18	**Long locomotive address** 17 = high Byte 18 = low Byte	1 - 10239 192 - 231 0 - 255	1000 195 232
27	**Brake signal settings (automatic stop)** — **Value*** Bit 0 = 1 -> ABC (Automatic Brake Control) right rail positive — 1 Bit 1 = 1 -> ABC left rail positive — 2 Bit 4 = 1 -> DC; opposite direction of travel — 16 Bit 5 = 1 -> DC; same direction of travel — 32	0 - 51	0
29	**DCC standard configuration** — **Value*** Bit 0=0 Normal direction of travel — *0 Bit 0=1 Opposite direction of travel — 1 Bit 1=0 14 speed steps — 0 Bit 1=1 28 speed steps — *2 Bit 2=0 Digital mode only — 0 Bit 2=1 Automatic analog/digital recognition — *4 Bit 3=0 RailCom® turned off — 0 Bit 3=1 RailCom® turned on — *8 Bit 4=0 Speed steps over CV 2, 5, and 6 — *0 Bit 4=1 Use the characteristic curve from CV 67 - 94 — 16 Bit 5=0 Short address (CV1) — *0 Bit 5=1 Long address (CV 17/18) — 32	0 - 63	14
30	**Error codes for the motor, thermal overload, function outputs and sound:** 1 = fault motor, 2 = fault thermal overload, 4 = fault function output, 8 = fault soundflash, 16 = fault during sound transmission	0 - 31	0

* Factory setting

Function assignments

F0	Light	F10	Medium Whistle Blast	F20	Compressor
F1	Engine	F11	Volume Regulator	F21	Manual Fan
F2	Whistle	F12	Tunnel mode	F22	Coupling
F3	Cab Light	F13	Conducter's Whistle	F23	Curve Squeal
F4	Engine Room Lights	F14	Hand Brakes	F24	Clickety-Clack
F5*	Headlight	F15	Emergency Brake	F25	Air Valve Release
F6	Engineer's Greeting	F16	Train Brakes	F26	Oil Pump
F7	Switching Gear	F17	Pantograph	F27	Sanding
F8	Train Lighting: Engine pulling	F18	Cab Window	F28	-
F9	Train Lighting: Engine pushing	F19	Cab Door		

* version dependent

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PIKO SmartDecoder XP Sound Next18 for Electric Locomotives BR 191 / E 91 N multiprotocol

NOTE: Detailed information on the PIKO SmartDecoder XP Sound is available as a PDF file on our Webshop on the page of the respective item number. The file contains a full description of all functions and operating possibilities for the new SmartDecoder XP Sound.

Description

This PIKO SmartDecoder XP Sound Next18 is a compact, very powerful multiprotocol sound decoder of the latest generation with 12 bit sounds and high sample rate, 8 sound channels, an output power of 2.5 watts and a significantly increased memory depth. The sound decoder provides a noise-free sound experience at the highest level. It complies with the current RC standards in all areas and can be used in DCC and Motorola® digital systems. Furthermore, it also works in analog mode with DC or AC voltage. The sound decoder is RailCom® as well as RailCom Plus® capable. The innovative PIKO SmartDecoder XP Sound with many braking section functions independently recognizes the respective operating mode and has a wide variety of setting options for the additional functions.

The load-controlled sound decoder works with a fundamentally newly developed auto-adaptive motor control for silky-smooth operation and is thus suitable not only for DC motors, but also for bell armature motors up to a continuous current consumption of 1 A. The sound decoder masters ABC braking, ABC automatic shuttle as well as ABC slow speed. The setting of the motor characteristic is done via the minimum, average and maximum speed (simple characteristic), or via the extended characteristic with individual settings for 28 speed steps. The sound decoder has two direction-dependent lighting outputs, as well as four (two of which are logic) additional special function outputs that can be switched via function keys up to F68 (DCC). The shunting mode with extended slow speed range, the three possible starting and braking delays, as well as the many vehicle sounds are also switchable via function keys. Depending on the project, the sound section can control defined function outputs and the motor output of the decoder. For example, the lighting of a diesel locomotive flickers when the engine is started. Due to the advanced power management the PIKO SmartDecoder XP is supported in case of short-term voltage loss.

Installing the PIKO SmartDecoder XP Sound

Remove the jumper plug from your model's Next18 interface. Insert the new sound decoder into the interface socket. Please install the loudspeaker as shown in the graphic of the "Spare parts list". Check for crossed wires and short circuits before and after reinstalling the shell. Place the model on your programming track with programming mode activated on your DCC system. During programming or when reading the model's DCC address, a small amount of current will flow through the model, which does not affect the decoder; even in the event of a short circuit.

Special functions A1 to A4

The special function outputs A1 to A4 of the sound decoder can only be used if the desired consumers are already connected to the Next18 interface in the vehicle, or solder pads are present on the main board. The Next18 decoder controls only light white (A0v, A0h) and light red (A1, A2). An additional light controller controlled via SUSI controls the remaining light functions!

A short circuit in the motor, lighting, pick-up wiper, or wheelsets can destroy the decoder as well as the electronics of the model!

First-time use of the decoder (state of delivery)

Enter address 3 on your DCC control system. Depending on the data format used to address the sound decoder, the locomotive runs in DCC mode with 28 speed steps or in Motorola® mode. When using a RailCom Plus®-enabled DCC system, the decoder is recognized automatic and can be operated immediately. If the decoder is used on a conventional analog layout, it can be controlled with a DC or AC power pack. The decoder will automatically detect the layout's operating mode.

NOTE: In analog mode, your model will only start at a higher voltage than what you may accustomed to when operating analog models. You will need to turn the throttle up for the model to start operating.

Function outputs in analog mode

It is possible to program the decoder so that function keys F0 - F12 (as they are assigned in the function mapping) can also be activated in analog mode. To do this, CVs 13 & 14 must first be programmed with a DCC central control unit. The corresponding values can be found in the CV table of the detailed operating instructions. The light function F0, F5* and the driving noise F1 are switched on at the factory.

Motorola®
The decoder utilizes 4 Motorola® addresses to access functions F1 - F 16, when using a Motorola—based command station. The three sequence addresses for the functions F5 - F16 are ascending to the decoder address and can be activated in CV61 as required by the values 1 (F5 - F8), 2 (F5 - F12), or 3 (F5 - F16).

Configuration of CVs
In addition to the decoder address, the indexed CVs of a locomotive decoder are the most important CVs. These are the CVs 29, 50 and 51 in the PIKO SmartDecoder XP Sound. As a rule, an indexed CV contains various basic settings of a decoder, such as reversing the direction of travel. CV calculation examples can be found in the detailed operating instructions.

RailCom®, RailCom Plus®
In the sound decoder, CV29 (RailCom®) can be turned on or off via bit 3. If RailCom Plus® is turned on, the decoder will be automatically recognized by a RailCom Plus®-enabled DCC control system (like PIKO SmartControl*wlan*) and a locomotive icon, decoder name, and its special function icons will appear on the control system's screen. With RailCom Plus® technology, no locomotive data has to be stored in the DCC central control unit and no locomotive addresses have to be programmed into the decoder.

Braking
The sound decoder understands the following braking methods:
Märklin® braking section (brakes with analog DC voltage)
DCC braking function
ABC (Automatic Brake Control) braking section
The sound decoder can stop the model with two adjustable braking distances that are accurate down to the centimeter. More information on "braking behavior" can be found in the detailed operating instructions for PIKO SmartDecoder XP Sound.

Function outputs
A comprehensive description of all options related to the function outputs can be found in the detailed operating instructions.

Simple function mapping (CV96 = 1)
In the **simple function mapping** (CVs 33 - 46) the assignments of the switching tasks like lighting and special function outputs can be freely assigned to the function keys F0 to F12 of the digital central unit. The switchable acceleration, braking delay and the shunting gear can be assigned to any function keys in CVs 156 and 157. More detailed information can be found in the detailed operating instructions.

Extended function mapping (CV96 = 6, factory setting)
Due to its complex nature, extended **function mapping** cannot easily be set by programming individual CVs. If you want to change the advanced **function mapping**, you will need either the PIKO SmartProgrammer USB stick (#55830) or the PIKO SmartProgrammer test and programming device (#56415) and (optionally) the PIKO SmartTester (#56416). Detailed information on extended function mapping is available in the instruction manual.

Servo control
The sound decoder enables the control of servo motors via the function outputs A1 and A2. The assignment to the function keys is done exclusively via the extended function mapping.

The use of a servo with the decoder requires electronics expertise.

Further information can be found in the detailed operating instructions.

ATTENTION: Soldering on the decoder should only be carried out by experienced specialists with the appropriate tools. Decoders damaged by improper handling will not be covered by the warranty.

Sound settings
The overall volume can be set as desired by programming CV63 in a value range of 0 - 255.

NOTE: To upload a PIKO locomotive project—including sound—to the sound decoder, use the PIKO SmartProgrammer Stick (#55830) or the PIKO SmartProgrammer test and programming device (#56415) with the optional PIKO SmartTester (#56416).
All further information about the sound section of the PIKO SmartDecoder XP Sound as well as the available For setting options, please refer to the detailed operating instructions.

Factory reset
To restore the sound decoder to its factory settings, program CV8 to a value of 8.

Programming

Configuration variables (CVs) form the basis of all the decoder's settings. This decoder can be used with the PIKO SmartControl*wlan*, PIKO SmartControl*light*, DCC system, the PIKO SmartControl DCC system, or any other Motorola-based system.
For more information on programming options, please refer to the instruction manual.

Update
The PIKO SmartDecoder XP is updateable. To perform an update, you will need either the PIKO SmartProgrammer Stick (#55830), the PIKO SmartProgrammer (#56415), or the digital system PIKO SmartControl*wlan* (#55821).

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RailComPlus® is a registered trademark of ESU electronic solutions ulm GmbH & Co. KG

NOTE: This product is not a toy and is not suitable for children under the age of 14. Any liability for damage of any kind caused by improper use or failure to observe these instructions is excluded.

Service:
Internet: www.piko.de
E-Mail:info@piko.de
Hotline: Di + Do 16-18 Uhr

Service: In the event of a complaint about the item, please send us the item with the proof of purchase (copy) and the completed complaint form, which you can find in our webshop under "Cancellation and returns".

Warranty Statement
Each decoder module is fully tested before shipment. Nevertheless, should a malfunction occur within the 2-year warranty period, we will repair the module free of charge on presentation of the proof of purchase. This warranty is voided if the unit has been damaged by improper use. Please note that, according to the German Electromagnetic Compatibility Law (EMV-Gesetz), the decoder module may only be used inside models bearing the CE mark.

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