

Firebox flickering

The outputs light, A1 to A7 can be assigned a random flickering. This effect is used for example for the flickering of a firebox.

CV 181:	Value	
Bit 0	Light output with flickering	1
Bit 1	A1 with flickering	2
Bit 2	A2 with flickering	4

A combination of (the total of the single values) is of course possible here again.

In CV182, the settings for the flicker rhythm and the brightness change are entered:

Bits 0 - 3 change the flicker rhythm (value range 1 to 15).

Bits 4 - 6 change the brightness (value range 16, 32, 48, 64, 80, 96, 112).

With the value 128 the output is always bright, but can be combined with the value range 16 to 112.

As only one value can be programmed in a CV, the flickering results from the sum of the single values of the flicker rhythm plus the sum of the single values of the brightness (sum of bits 0 -3 plus sum of bits 4 - 6).

The combination of all bits leads to different random flicker images. The rule here is "try it out".

Adjustable PWM - Frequency of light and function outputs

The output voltage of a function output is pulse width modulation (PWM) at a given frequency.

The function outputs of the decoder are factory set to a frequency of 156 Hz. This frequency can be increased to 24 kHz for outputs A0 to A7. The frequency switching can be set in the CV50 in bit 3. Bit 3 = 0 -> 156Hz, Bit 3 = 1 -> 24KHz

Return to Factory Setting (Reset)

Two CVs (CV8, CV59) can be used in DCC programming and one CV (CV59) in Motorola programming to return the decoder to factory settings. If you do not want to rewrite all available areas, you can decide which areas should be set to default.

The to be programmed value 1-5 places the following CVs into factory setting:

1 = CV0 - 256, as well as CV257 - 512 (RailCom® Bank 7)	CV31=0, CV32=255
2 = CV257 - 512 (RailCom Plus® Banks 5 & 6)	CV31=1, CV32=0 and CV31=1, CV32=1
3 = CV257 - 512 (extended function Mapping Banks 1 & 2)	CV31=8, CV32=0 and CV31=8, CV32=1
4 = CV257 - 512 (PWM-Modulation Function outputs banks 3 & 4)	CV31=8, CV32=3 and CV31=8, CV32=4

Please note! After a reset of the decoder, all default configurations are overwritten! Therefore, please only do a reset in case of an important and urgent emergency. If you still reset your decoder, you eventually have to reprogram the individual function mapping (see FAQ for more information)!

Programming

Configurations variables (CVs) form the basis of all possible settings of the decoder. The decoder can be programmed with DCC and Motorola control panels.

Technical Data

Addresses:	1-9999 (extended DCC address)
Max. motor current / Load:	1,2 A* short-term to 2 A
Function outputs:	0,4 A each
Size:	22 x 11 x 4 mm
*Continuous load, may vary depending on the installation situation	

Note: This product is not a toy and is not suitable for children under the age of 14. Any liability for damages of any kind caused by improper use or not observing these instructions is excluded.

CV	Description	Range	Value
1	Loco address	DCC: 1 - 127 Motorola: 1 - 80	03
2	Minimum speed (change, until the loco drives with speed step 1)	1 - 63	01
3	Acceleration 1 means that every 5ms the actual speed is increased by 1. If the internal maximum speed is set to 200 (CV5=50 or CV94=200), then the acceleration from 0 to Fmx is 1sec.	0-255	05
4	braking interia (time factor like CV3)	0-255	05
5	Maximum speed (must be greater than CV2)	1 - 63	48
6	Middle speed (must be greater than CV 2 and less than CV5)	1 - 63	24
7	Software version (the processor can be updated)	-	different
8	Manufacturer ID Decoder reset, values as CV59	different	162
17	Expensive loco address 17 = High Byte 18 = Low Byte	1 - 9999	2000
18		192 - 231	199
		0 - 255	208
30	Error memory for function outputs, motor and temperature monitoring 1 = fault function outputs, 2 = fault motor, 4 = overtemperature	0-7	0
31	1. Marker CV for CV-Banks	0, 1, 8	0
32	2. Marker CV for CV-Banks	0,1,3,4,5,255	255
33-46	Simple Function Mapping Relation of the function outputs to the CVs CV 33 Light function key (F0) forwards CV 34 Light function key (F0) backwards CV 35 Function key F1 CV 36 Function key F2 CV 37 Function key F3		1 2 3
59	Reset to factory defaults (even with CV8) 1 = CV 0 - 256, as well as CV257 - 512 (RailCom® bank 7) 2 = CV 257 - 512 (RailCom Plus® banks 5 & 6) 3 = CV 257 - 512 (extended function mapping banks 1 & 2) 4 = CV 257 - 512 (PWM-Modulation function output banks 3 & 4)	0 - 4	0

Note:

You can find a detailed instruction manual for the PIKO SmartDecoder 4.1 on the web page of the respective product in our web shop.

Service:

Internet: www.piko.de

E-Mail:info@piko.de

Hotline: Di + Do 16-18 Uhr

In case of a possible defect, please send us the module with the proof of purchase, a short error description and the decoder address.

Warranty Declaration

Each component is checked for its complete functionality before delivery. Should an error nevertheless occur within the warranty period of 2 years, we will repair the module free of charge upon presentation of the proof of purchase. The warranty claim is void if the damage was caused by improper handling. Please note that, according to the EMC law, the module may only be operated within vehicles bearing the CE mark.

Subject to technical alterations, errors and misprints excepted.

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56402 PIKO SmartDecoder 4.1 PluX16

multiprotocol



Description

This locomotive decoder is a small, high performance multiprotocol decoder. It can be used with DCC-, Selectrix- and Motorola digital systems and also operates in analog mode with AC or DC currents.

The individual mode of operation is automatically recognized, but can also be set manually.

The decoder works on a frequency of 18,75 kHz and is therefore not only suitable for DC current but also for bell-shaped armature motors (e. g. Faulhaber, Maxon, Escap) up to a continuous current consumption of 1.2 A. Short-term higher motor currents up to 2 A are well tolerated.

The decoder is also RailCom® and RailCom Plus® capable and is in command of ABC braking as well as ABC Slow Running. Setting of the motor characteristics is done via minimum, medium and maximum speed (simple characteristic) or via the extended characteristic with individual adjustments for 28 drive positions.

The decoder has two headlight outputs depending upon direction of travel and (depending on decoder version) up to seven additional special function outputs. Over and above that, there are 3 sensor inputs, e.g. Reed Contacts or Hall Type Sensors on the decoder, two are in the SUSI-Interface with one as a solder pad. Slow moving extended shunting operations and the three possibilities in starting out, brake action delays can be set by function keys.

Characteristics

- Suitable for DC current and bell-anchor motors up to 1.2 A.
- Quiet motor running by motor control with 18.75 kHz
- 14, 27, 28, 128 gears, depending upon data format.
- Short (1-127) and long (128-9999) Addresses
- NMRA conformity
- RailCom® and RailCom Plus®
- Adjustable minimum, maximum and medium speeds.
- Extended driving gear characteristics are adjustable.
- Shunting gear (half-speed) adjustable.
- 3 settings for startup and brake delay, individually adjustable via F0 - F28
- Headlight outputs in direction of travel dimmable.
- 2 Special function outputs, dimmable and adjustable in direction of travel.
- 4 logical outputs
- Adjustable activation of the light- and function outputs adjustable for analog operation.
- Second dim function for lights adjustable from A1 to A7.
- Simple function mapping, brake delay and shunting operations.
- Extended Function Mapping, F0 - F44 for switching multiple outputs depending on linked conditions
- Train illumination disengageable.
- Function outputs: Blinking with variable shutoff time.
- Function exists: 2 phase for alternative flashers.
- Load dependent smoke generator controls.
- Firebox with adjustment parameters for brightness changes and flicker rhythm.

- Shunting coupling and shunting tango.
- Fading in, or out of the lighting- and function outputs, adjustable.
- Energy saving lighting effect: After attaining maximum brightness after time setting.
- Fluorescent lighting, switching-on effect with adjustable flash time and –number.
- 8 PWM banks with 64 modulation entries each for e. g. American light effects such as Mars Light, Gyra Light, Strobe etc.
- Brakes with DCC braking signal, braking track with DC current or ABC-Brakes.
- ABC-Slow Moving Distance with LENZ BM2
- 2 settings for braking distance in cm, activated by ABC-, DC- and DCC-brake signal, as well with driving speed 0 with adjustable speed level step.
- 2 motor control types for a precise motor control with many control settings
- All outputs are secured against short circuits.
- Error memory for motor and function outputs as well as temperature shutoff.
- Conventional AC and DC operation with automatic switch-over to the individual mode of operation.
- All CVs must be programmed with digital devices with DCC formats and Motorola.
- In DCC-operation, programmable per register, CV directly or page programming.
- Main track programming (DCC)
- Decoder programming lock.



SUSI Interface

The SUSI Interface of this decoder is executed via the PluX16 Interface. If the main circuit board of the vehicle is equipped with a SUSI-Interface, then either an PIKO Sound-Module with SUSI, or a suitable function decoder or two servo switchings can be connected to it.

Which CV must be programmed for the individual use can be seen in the CV-Chart.

In the factory setup, the decoder at the SUSI-Interface provides data for an PIKO Sound-Module.

CAUTION: Soldering on the decoder should only be performed by experienced experts with proper tools. For decoders which were damaged by improper handling, any warranty becomes void.

A short circuit with the motor, lighting, third rail pickup and wheels can destroy the device and eventually the locomotive electronics!

CV 29

Decoder Startup (delivered condition)

Enter address 3 into the control unit. The decoder operates depending on the data format used in DCC-Operation with 28 speeds or in Motorola operation. With a RailCom Plus® capable digital center, the decoder is up and running within a few seconds and can be operated immediately. If the decoder is used on conventional systems, it can be controlled with a DC or AC drive unit. The operating mode is automatically recognized by the decoder. The status of functions F0 - F2 can be set for analog operation via CVs 13 and 14.

CV 13

CV 14

Configurations-CVs

Besides the decoder address, the configuration CVs of a locomotive decoder are certainly the most important CVs. These are the CVs 29,50 and 51 of the PIKO SmartDecoder 4.1, and a configuration CV usually contains different settings of a decoder, which are displayed in a maximum of 8 bits (0 - 7). The value to be entered for a CV is calculated from the respective CV table by adding the values of the desired functions. The following table shows you the meaning and content of the configuration CVs, as well as an example calculation of the value:

Bit	Configuration CV29	default
0	normal direction reversed travel	0 1
1	14 / 27 speed steps 28 / 128 speed steps	0 2
2	only digital operation automatic analogue / digital switching	0 4
3	RailCom® switched off RailCom® switched on	0 8
4	speed steps from CV2, 5 and 6 speed characteristics from CV67 to 94	0 16
5	short address (CV1) long address (CV 17/18)	0 32

Bit	Configuration CV50	Value
0	Motorola 2. address not use Motorola 2. address use	0 1
1	Motorola 3. address not use Motorola 3. address use	0 2
2	light output not switch light output switch	0 4
3	Frequenzy Light, A1 to A2 = 156Hz Frequenzy Light, A1 to A2 = 24KHz	0 8
4	FSUSI = SUSI SUSI = A3/A4 Logic level	0 16
5	KSUSI = SUSI SUSI DATA = Input 1, CLK = Input 2	0 32
6	A8 = Output with Logic level A8 = Input 3	0 64

CV 50

CV 51

RailCom®, RailCom Plus®

The RailCom® technology developed by LENZ® is based on the transmission of data from the decoder into the specially prepared (CutOut) DCC digital signal on the track. Detectors must be located on the track to evaluate this decoder data and, if necessary, forward it to the control center. The decoder sends, depending on the setting, the decoder address and, when read out via the main track programming, CV values which can be displayed by the digital control panel (depending on the detector and control panel). The CV29 RailCom® can be switched on or off in the decoder via bit 3 of the CV29 RailCom®. Further RailCom® settings can be made in CV 28. There, for example, RailCom Plus® is also switched on via bit 7. If RailCom Plus® is switched on, the decoder will automatically log on to a RailCom Plus® capable control unit (e. g. PIKO SmartControl) with its locomotive symbol, decoder name and special function symbols within a few seconds. Thanks to this RailCom Plus® technology, there is no need to store locomotive data in the central control unit and no locomotive addresses have to be programmed into the decoder.

CV 28

CV 27

CV 27

CV 27

CV 29

^[1] Besides the decoder address, the configuration CVs of a locomotive decoder are certainly the most important CVs

^[2] These are the CVs 29,50 and 51 of the PIKO SmartDecoder 4.1, and a configuration CV usually contains different settings of a decoder, which are displayed in a maximum of 8 bits (0 - 7)