Class 412 DBAG – ZIMO decoder installation guide
for the Kato model K10950/K10951

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The prototype:

ICE 4 is Deutsche Bahn's name for a type of high-speed Intercity Express (ICE) train for long-distance passenger transport that has been in service since 2017. A total of up to 300 trains are to be purchased. In 2011, Siemens Mobility was commissioned to develop and build 170 trains for the time being. The series designation for the railcars is 412, whereby the driveless middle and control cars are given the series designation 812. A twelve-car version has been in regular service since December 2017, and a seven-car version is scheduled to be operational from December 2020.

Source Wikipedia

The technical implementation for the Kato model

DCC Motor decoder: **Kato EM13 = ZIMO MX605N**

DCC Function decoder for front- and rear lights: **Kato FL12 = ZIMO MX605SL**

DCC Function decoder for interior lighting: **Kato FR11 = ZIMO MX605FL**

Requirement for the basic set K10950:
1x MX605N, 2x MX605SL and 7x MX605FL

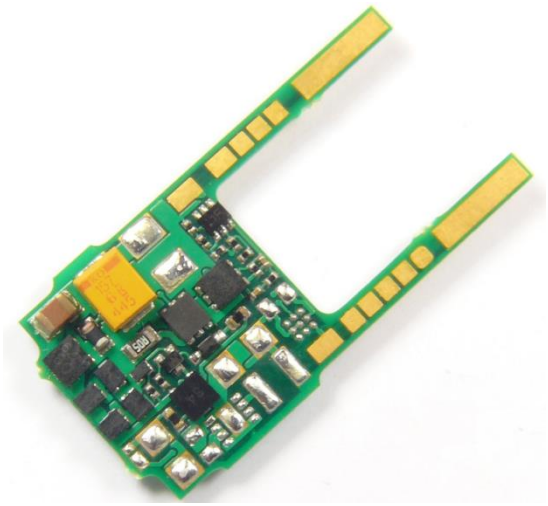
Requirement for the supplementary set K10951:
1x MX605N and 5x MX605FL

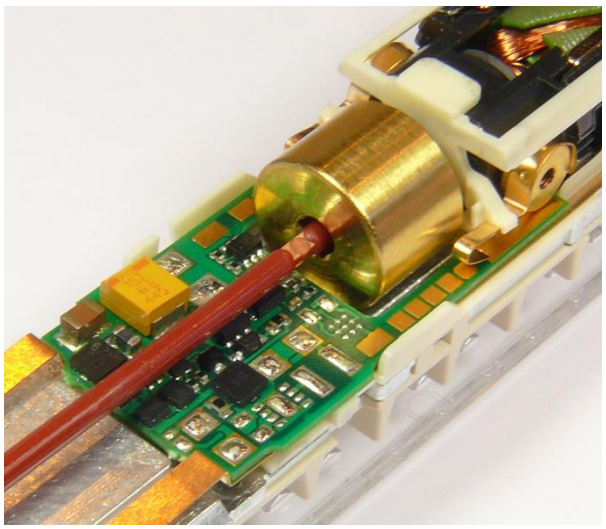
conversion instructions

- Installation of the motor decoder MX605N:

Installation takes place in carriages 5 (basic set) and 6 (supplementary set).

The car body is dismantled according to the Kato instructions.



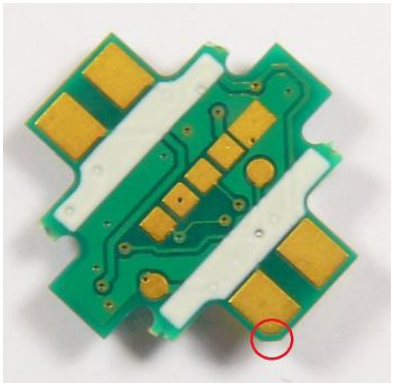


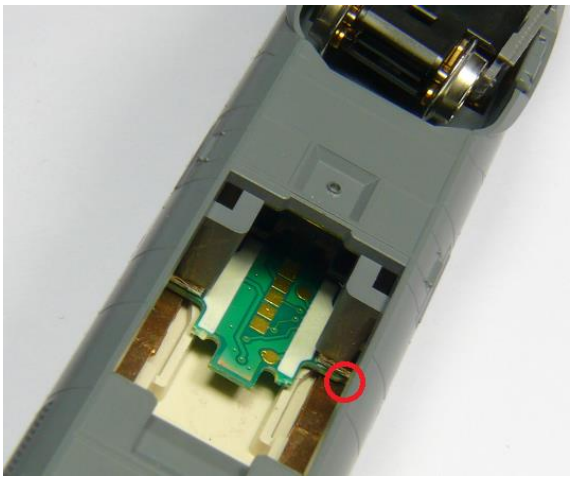
As in the Kato instructions, the cardan shaft is pulled out of the cardan shell of the bogie. The same is done afterwards on the engine side. The ZIMO Decoder MX605N is inserted with the yellow tantalum capacitor "up" (to the viewer). The cardan shaft and the car body is assembled in reverse order.

- Installation of the function decoder for front and tail light MX605SL:

Installation takes place in the respective cab cars of the basic set.

The disassembly of the flap in the car floor is carried out according to Kato instructions.





The ZIMO Decoder MX605SL is inserted into the shaft with tweezers. It comes to rest between the contact plates. Make sure that the decoder is pushed to the front oft he shaft.

The decoder for the second control car must be installed turned by 180° (red ring in this case at the top left of the picture), so that the front lights light up correctly when reversing (the red tail lights therefore light up when driving forwards).

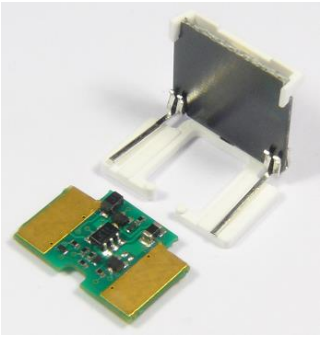
If the forehead light should still light up "the wrong way round", the decoder can be programmed individually via DCC address 3. CV #33 = 2 (default value 1) and CV #34 = 1 (default value 2).

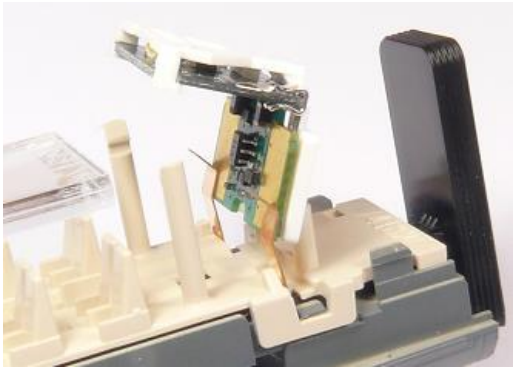
After installation, the slot is closed with the previously dismantled flap.

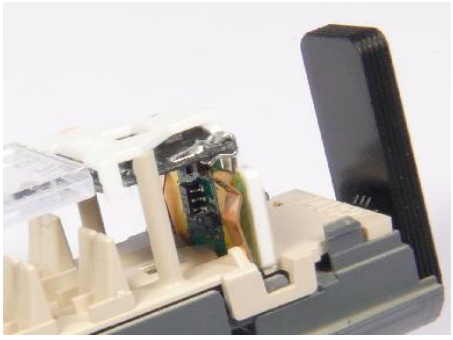
- Installation of the function decoder for the interior lighting MX605FL:

The installation takes place in each carriage of both sets.

The disassembly of the car bodies and the decoder holder is done according to the Kato instructions.







The ZIMO Decoder MX605FL is placed on the decoder holder. Both are then pushed between the contact plates and the plastic holder until the decoder holder engages in the car interior.

The function should then be tested before mounting the car body.

After all decoders have been installed and individually tested, the train can be assembled.

The motor decoders react to the DCC address 3, which can be changed at will. The settings of the CVs should only be changed in small steps, except for the address, in order not to influence a good function.

- The preset function keys:

Key	Function	Function output
F0	Front light MX605SL	FO0v / FO0r
F1	Interior lighting MX605FL	FO 1

- The most important CVs:

Motor decoder ZIMO MX605N:

CV# 1 1 - 127 3 „Short“ address; applies, when CV #29, Bit5=0
CV# 2 1 - 255 1 Start voltage (lowest internal speed step)
CV# 3 0 - 255 4 Acceleration rate (seconds from stop to full speed)
CV# 4 0 - 255 4 Deceleration time (seconds from full speed to stop)
CV# 5 0 - 255 1 Top speed (max. speed step, 1 equals 255)
CV# 6 1 - 128 1 Medium speed (1= 33% of max. speed)
CV# 7 Read-only SW-version no. (see also CV #65 subversion)
CV# 8 Read-only Manufacturer-ID: 145 (= ZIMO), CV #8 = 8: Hard reset
CV# 9 0 - 255 79 EMF sampling rate (tens digit) / sampling time (ones digit)
CV# 17,18 128-10239 „Long“ address, when CV #29, Bit 5 = 1
CV# 19 0 - 127 0 Consist address, when > 0
CV# 28 0 - 3 3 RailCom: Bit 0=1: Broadcast | Bit 2: Data
CV# 29 0 - 63 14 Bit 0=direction, Bit 2=DC operation, Bit 3=1:RailCom
Bit 1=0: 14 speed steps / =1: 28 or 128
Bit 5=1: long addr. (CV #17&18),Bit 4=speed table.
CV# 56 11 - 99 33 Motor regulation: P-value (tens), I-value (ones)
CV# 57 1 - 255 70 Voltage reference: max. voltage in tenth-V
CV# 58 0 - 255 255 BEMF intensity at lowest speed
CV# 65 Read-only SW-subversion, see also CV #7
CV# 124 div. Bits 3 Shunting key (low gear., momentum deact.)
CV# 144 Bits6,7 128 Bit 6 = 1: Prog lock, Bit 7 = 1: Update lock
CV# 250 - 253 Read-only decoder-ID (typ + serial no.)

Front light decoder ZIMO MX605SL

CV#1	1-127	3	„Short“ address; applies, when CV #29, Bit5=0
CV#3	0-255	4	Acceleration rate (seconds from stop to full speed)
CV#4	0-255	4	Deceleration time (seconds from full speed to stop)
CV#13	0-255	0	FO1 off in DC operation
CV#14	0-255	67	FO0 on in DC operation
CV#29	0-63	6	Bit 0 / Bit 1 / Bit 2 / Bit 5: see MX605N
CV#33	0,1	1	F0v controls FO0v/white light
CV#34	0,2	2	F0r controls FA0r/red light
CV#60	0-255	0	Dimming value, 0=100%
CV#63	0-255	51	Cycle time for effects resp. for dimming
CV#114	0-3	0	Dim mask, no dimming: Bit 0 = FO0v, Bit 1 = FO0r
CV#125,126		0	Function effekts (head lights); 88 = Low/high beam
CV#144	Bits6,7	128	Bit 6 = 1: Programming lock, Bit 7 = 1: Update lock
CV#190,191			Dimming time

Decoder für Innenbeleuchtung ZIMO MX605FL:

CV#1	1-127	3	„Short“ address; applies, when CV #29, Bit5=0
CV#13	0-255	1	FO0 on in DC operation
CV#29	0-63	6	Bit 0 / Bit 1 / Bit 2 / Bit 5: see MX605N
CV#35	0,4	4	F1 controls FO1/Interior lighting
CV#36-46	0,4	0	F2-F12 controls FO1/ Interior lighting
CV#60	0-255	0	Dimming value, 0=100%
CV#63	0-255	51	Cycle time for effects resp. for dimming
CV#144	Bits6,7	128	Bit 6 = 1: Programming lock, Bit 7 = 1: Update lock