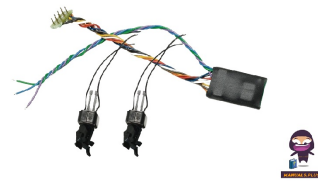**Manuals+** — User Manuals Simplified.

Fleischmann 651581
Multiprotokoll Decoder with
Remote Controlled Couplings

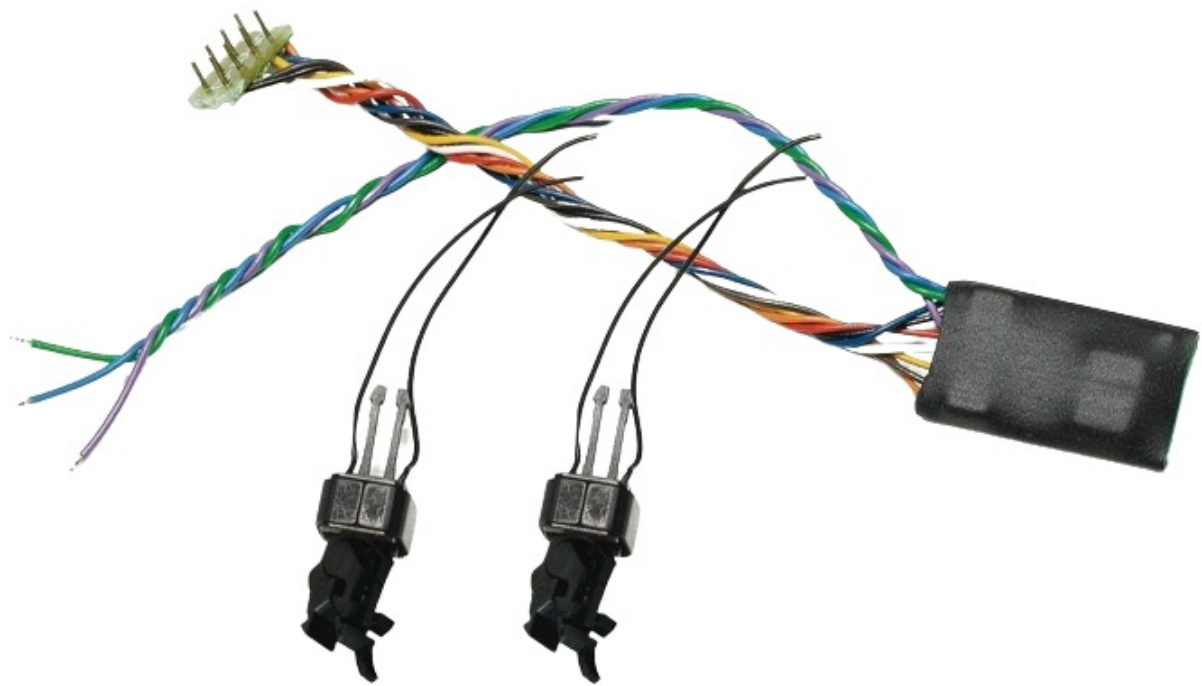# Fleischmann 651581 Multiprotokoll Decoder with Remote Controlled Couplings User Manual

Contents

Fleischmann

Fleischmann 651581 Multiprotokoll Decoder with Remote Controlled Couplings

FAQ

- **What should I do in case of a short circuit during installation?**
  - If a short circuit occurs during installation, immediately refer to the guidelines provided in the manual to rectify the issue and prevent further damage.
- **How do I configure the CV values for the decoder?**
  - You can configure the CV values by accessing the CV Values Configuration section in the manual and adjusting them as per your needs.
- **Can I operate multiple locomotives simultaneously with this decoder?**
  - No, due to system limitations, simultaneous operation of multiple locomotives on the same track is not recommended. Ensure only one locomotive is active on the tracks at a time.

SPECIFICATIONS

This decoder is designed for installation in model railway locomotives and cars with FLEISCHMANN digital coupling.

PROPERTIES OF THE DECODER

Locomotives with this decoder can be run on digital systems (DCC or MÄRKLIN2) Motorola3)) but also on analog systems (two wire DC or three wire AC). The decoder has the special property of being able to automatically detect the system. The decoders have the address 3 in the digital mode.
Fully-automatic flying change between all 4 operating modes is also assured as the use of braking sections.
128, 28, or 14 driving stages in DCC operation and 14 driving stages in Motorola3) operation.
With a decoder installed, the speed of the loco remains constant, irrespective of the load, i.e. whether up or downhill, the loco will run at the same speed (allowing for sufficient motive power).

- **Max. size:** 20 x 11 x 3.5 mm
- **Load capacity:** Motor 1.0 A, Function output (single and in summary) 0.8 A
- **Address:** Electronically codeable
- **Special function light:** Switchable on/off, coordinated with direction of travel

- **Power Control:** Speed unaffected by load
- **Acceleration and Braking Inertia:** Settable at several levels
- **Control Characteristics:** 2, settable
- **Motor and light output:** Protected against short circuit
- **Overheating:** Switches off when overheated
- **Sender function:** Already integrated for RailCom1).

In the event of a short circuit between the motor connections, the decoder switches off itself and in addition, by blinking the loco lights will indicate the type problem:

- **Continual blinking:** Short circuit
- **Double blinking:** Overheating
- **Triple blinking:** Current overload

Once the reason of the problem has been eliminated out, the loco will run once again.

Note: The digital decoders are high value products of the most modern electronics, and therefore must be handled with the greatest of care:

- Liquids (i. e. oil, water, cleaning fluid …) will damage the decoder.
- The decoder can be damaged both electrically or mechanically by unnecessary contact with tools (tweezers, screwdrivers, etc.).
- Rough handling (i. e. pulling on the wires, bending the components) can cause mechanical or electrical damage.
- Soldering onto the decoder can lead to failure.

BECAUSE OF THE POSSIBLE SHORT CIRCUIT HAZARD, PLEASE TAKE NOTE OF THESE POINTS DURING INSTALLATION:

- Before handling the decoder, ensure that you are in contact with suitable earth (i.e. radiator)
- Because the decoder gets very warm in operation, it must be fixed to the largest available metal surface, using the enclosed iso lating adhesive strip
- When gluing in position, please be careful to ensure that no exposed parts of the decoder can come into contact with any metal (cut the adhesive strip to suit).
- Please take care when plugging in the decoder plug into the decoder socket when it is situated on the motor faceplate, or around the bogie! It is essential here to ensure that there can be no short circuit between the plug and the motor face-plate/motor/bogie. In order to isolate the relevant parts, there is a second adhesive strip included with the decoder.

TOOLS AND THE WORK PLACE

In order to avoid any damage by electrostatic discharges, we recommend the following:

- electronic tools with isolated hand grips
- a soldering iron with common earth connection

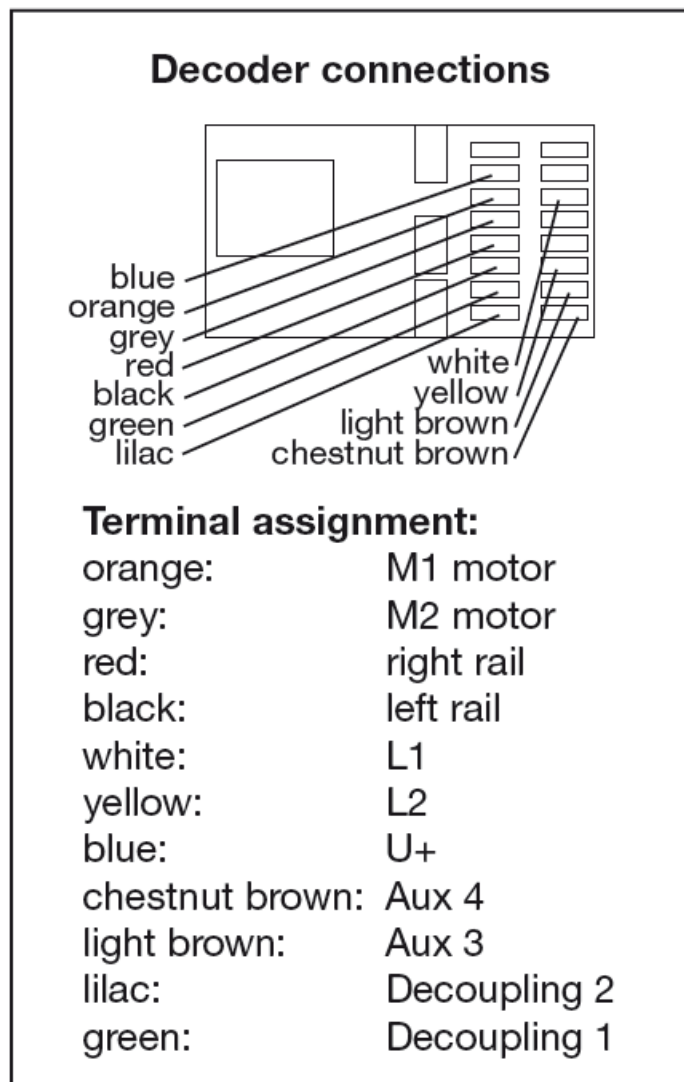- an earthed workbench cover with additional wrist bands and earthing wire

Advice: There are several variations of the motor faceplate as shown in the diagram (H0), the pcb (H0+N) of likewise the motor (H0+N). The connections of the locos to be converted may therefore be different as to the example depicted

INSTALLATION PROCEDURE

1. According to the instructions, remove the loco body.
2. **Alterations inside the loco:** The motor must be completely isolated from the common chassis! Most Fleischmann locomotives possess a commonfree motor. Only a few locos are fitted with a motor, which has a silver contact bridge between the brushes and the motor body. This contact bridge must be removed or cut through.
   - **Attention:** Don't remove suppressors and condensers fitted to the motor! Ensure that the armature rotates freely! Additionally one of the connections to the lights must also be free from other electrical connections.
3. Solder on the wires of the decoder as shown in the diagram. According to the installation requirements, the wires may be shortened if necessary. Always isolate any connection points. Make sure that you follow the colour coding. If the running direction of the loco is not correctly in sequence with the lights, then simply swap over the gray and orange wires.
4. With the aid of the included double-sided adhesive strip, position the decoder on the site prepared for it by the loco manufacturer, or in case none is available, then on a metal surface with good heat conducting capabilities. First of all place the adhesive strip on the metal surface, and then carefully place the decoder onto the adhesive strip.
5. Replace the loco body, making sure that the wires are not squeezed.

OPERATION INSTRUCTIONS

DCC OPERATION

Decoder connections

blue
orange
grey
red
black
green
lilac

white
yellow
light brown
chestnut brown

Terminal assignment:

orange:	M1 motor
grey:	M2 motor
red:	right rail
black:	left rail
white:	L1
yellow:	L2
blue:	U+
chestnut brown:	Aux 4
light brown:	Aux 3
lilac:	Decoupling 2
green:	Decoupling 1

Locos with inbuilt decoder can be used with the FLEISCHMANN-controllers LOK-BOSS (6865), PROFI-BOSS (686601), multiMAUS®, multiMAUS®PRO, WLAN-multiMAUS®, TWIN-CENTER (6802), Z21® and z21®start conforming to the NMRA standard. Which decoder functions can be used within which parameters are fully described in the respective operating instructions of the respective controller. The prescribed functions shown in the instruction leaflets included with our controllers are fully useable with the decoder.

The simultaneous, compatible running possibilities with D.C. vehicles on the same electrical circuit is not possible with DCC controllers conforming to NMRA standards (see also manual of the respective controller).

MOTOROLA3) OPERATION

The vehicle can be used with all Motorola3) and compatible systems. The functions F1 to F4 can only be used with the so-called "new Motorola3) format" however. In order to activate these, the DIP switches 1 and 2 on the Central Unit 6021 have to be set to the top position ("On").

MÄRKLIN2) DELTA-SYSTEM2) OPERATION

The vehicle decoder has been preset to the address 3 by the manufacturer so that the address has to be reprogrammed to a corresponding vehicle symbol for the allocated addresses before a DELTA-System2) operation is possible.

- **These addresses are:** Steam locomotive: 78
    - **Diesel locomotive:** 72
    - **E-locomotive:** 24

- **Multiple unit:** 60
- **Delta Pilot:** 80

Using the DELTA-System2), the lights are always switched off and no decoupling is possible!

ANALOG OPERATION

You want to run your loco once in a while on a DC layout? No problem at all, because as delivered, we have adjusted the respective CV29 in our decoders so that they can run on "analog" layouts as well! However, you may not be able to enjoy the full range of digital technique highlights, e.g. no decoupling is possible!

If a locomotive with this decoder runs from the digital layout into an analog layout and the transformer is set for this area that the locomotive will continue in the same direction, so the locomotive will do so. The speed is dependent on the setting of the transformer. You can then shunt the train in the digital layout and then go to run in an analog circuit of your model railway layout.
In analog AC systems, the decoder acts as a conventional direction of travel commutator.

PROGRAMMING

PROGRAMMING WITH DCC

- The decoder enables a range of further settable possibilities and information according to its characteristics. This information is stored in so-called CVs (CV = Configuration Variable). There are CVs that store only a single information, the so-called Byte, and others that contain 8 pieces of information (Bits). For FLEISCHMANN, the Bits are numbered from 0 to 7. When programming, you will need that knowledge. The CVs required we have listed for you (see CV table).
- The programming of the CVs can be done with any controller which is capable of the programming by bits and bytes in mode "CV direct".
- The programming of some CVs by registerprogramming is also possible. Furthermore, all CVs can be programmed byte-wise on the main track, independently from the programming-track. However, this is possible only if your appliance is capable of this programming mode (POM – program on main).
- Further information concerning that issue is given in the respective manuals and operating instructions of the digital controllers.

BRAKING SECTIONS

- The decoder is able to automatically slowdown the locomotive in brake sections which are not digital, but which are either supplied with DC or with AC (Märklin2) braking section). The decoder is to be adjusted with CV programming before a reaction to these sections is possible.
- First of all, the normal analogue operation has to be deactivated in CV29, i.e. Bit 2 is set to zero (0) or the value 4 is deducted from the total value of the CV.
- The braking distances detection (DC) also needs to be activated in CV124 Bit 5=1 (value 32). If the Märklin2) braking sections with AC should be used, this must be additionally activated by using CV112 Bit 6=1 (value 64).
- If the brake section is switched back from analog to digital, the locomotive continues running with its digital commands.

SIMULATION OF TRAIN WEIGHT

In our decoder we have integrated acceleration and braking inertia values, that represent the weight of a "real" locomotive (see CV table). Often, however it is of advantage to be able to switch off this simulation, e.g. when coupling. The inertia can then be switched on and off using the function key F4 (see also CV156).

SHUNTING GEAR

- Some operational situations require delicate speed adaption, often called 'shunting gear'.
- By using the F3 function key, you can set your loco to "half speed" with increased speed levels in order to make the shunting far more finely controllable (see also CV155).

RAILCOM1)

The decoder has RailCom1) functionality, i.e. it does not only receive data from the control center, but can also return data to a RailCom1) capable control center. For more information please refer to the manual of your RailCom1) capable control center. By default RailCom1) is switched on. For operation with a control center that does not have RailCom1) capability, we recommend to switch off RailCom1) (CV29, Bit 3=0).

PROGRAMMING WITH MÄRKLIN2) "MOBILE STATION" AND "CENTRAL STATION"

- No locomotives must be on the tracks except the one which is to be programmed!

1. Press the ESC button
2. Select the menu item "New Loco"
3. Select the menu item "Database"
4. Select the article number "36330" with the rotary knob
5. Press the ESC button
6. Move to menu option "Change Locomotive" with the knob
7. Choose menu option ("Address")
8. Choose menu option ("Name")

Functions F1 – F4 are called up by pressing the 4 left buttons of the Märklin2)-Mobile Station. The top button matches function F1. The activatet functions cannot be displayed.
If the programming is not successful even after a second attempt, perform a decoder reset (see CV8).

PROGRAMMING WITH MÄRKLIN2) 6020/6021

A Märklin2) 6020/6021 controller can be used to program all of the CVs but they cannot be read out.

- The controller has to be set to "0".
- No locomotives must be on the tracks except the one which is to be programmed!
- Please observe the locomotive lighting flashing signals during programming.
- Any number of changes/settings can be made as long as the decoder is in programming mode.

1. Press the STOP and GO buttons at the same time until a reset is carried out
2. STOP button until deactivation of the track voltage

3. Enter address 80

4. Press the direction of travel switch and keep it pressed in and then additionally press GO for at least 0.5 sec in order to reactivate the track voltage

5. The decoder is in programming mode = slow flashing

6. Enter the register which is to be changed (two-digit in the address field)

7. Confirm by pressing the direction of travel switch = rapid flashing

8. Enter the required value (two-digit in the address field)

9. Confirm by pressing the direction of travel switch = slow flashing

If you wish to program additional CVs, repeat step 5.-9.
To stop the programming, switch the centre to "STOP" or enter the address "80" and briefly activate the direction of travel change.
As a Motorola3) Control Centre from Märklin2) can only be programmed by entering numbers between 1 and 80, the value "0" has to be entered via the address as "80".

ADVICE ON SWITCHING

ADVICE ON SWITCHING THE DIGITAL LAYOUT ON AND OFF

To switch off your model railway controller, first of all activate the emergency stop function of the controller (see instructions with the controller). Then finally, pull out the mains plug of the controller power supply; otherwise you might damage the appliance. If you ignore this critical advice, damage could be caused to the equipment. Detailed information are also available at **www.zimo.at** amongst other in the operation manual "MX-KleineDecoder.pdf", for decoder MX630.

1. RailCom is a registered trademark of Lenz GmbH, Giessen

2. Märklin and Delta-System are registered trademarks of Gebr. Märklin & Cie. GmbH, Göppingen

3. Motorola is a protected trademark of Motorola Inc., Tempe-Phoenix (Arizona/USA)

CV-VALUES

CV-VALUES OF THE FLEISCHMANN DECODER

CV	Name	Basic Value	Description
1	Loco address	3	DCC: 1–127 Motorola3): 1-80
2	v min	5	Minimum speed (range of values: 1-255).
3	Acceleration rate	3	Inertia value when accelerating (range of values: 0-255).
4	Deceleration rate	3	Inertia value when braking (range of values: 0-255).
5	v max	220	Maximum speed (range of values: 1 – 255).

6	v mid	1	Medium speed (not in use when 0) for non-linear characteristic curve.
7	Version-no.		Read only: Software version of the decoder (see also CV65).
8	Manufacturer ID	145	Read: NMRA identification no. of manufacturer. **Zimo** is 145 Write: By programming CV8 = 8 you can achieve a **Reset** to the factory default settings.
17	Extended address (Upper section)	192	Upper section of additional adresses, value: 128 – 9999. Effective for DCC with CV29 Bit 5=1.
18	Extended address (Lower section)	0	Lower section of additional adresses, value: 128 – 9999. Effective for DCC with CV29 Bit 5=1.
28	RailCom1) Configuration	3	Bit 0=1: RailCom1) channel 1 (Broadcast) is switched on. Bit 0=0: switched off. Bit 1=1: RailCom1) channel 2 (Daten) is switched on. Bit 1=0: switched off.
29	Configuration variable	Bit 0=0 Bit 1=1	Bit 0:With Bit 0=1 the direction of travel is reversed. Bit 1:Basic value 1 is valid for controllers with 28/128 speed levels.
		Bit 2=1	For controllers with 14 speed levels use Bit 1=0. Feed current detection: Bit 2=1: DC travel (analog) possible. Bit 2=0: DC travel off.
		Bit 3=1 Bit 4=0	Bit 3:With Bit 3=1 RailCom1) is switched on. With Bit 3=0 it is switched off. Switching between 3-point-curve (Bit 4=0) and speed table (Bit 4=1 in CV67-94.
		Bit 5=0	Bit 5: for use of the additional addresses 128 – 9999 set Bit 5=1.
60	Dimming the function output	0	Reduction of the effective voltage to the function outputs. All function outputs will be dimmed simultaneously (range of values: 0 – 255).
65	Subversion-no.		Read only: software subversion of the decoder (see also CV7).
66	Forward trim	0	Here, the speed values contained in CV67 – 94 can be adjusted by a percentage from 248=100%. E.g. 124=50%. Value valid for running forward.

67 to 94	Adjustment of the control characteristic curve of the controller		A speed between 0 and 255 can be given in each of the 28 CVs from 67 to 94. CV67 holds the minimum speed, and CV94 holds the top speed. The control characteristic curve is then determined by intermediate values. They decide how the speed of the vehicle alters with the controller setting.
95	Backwards trim	0	As CV66, but for running backwards.
155	Shunting gear	3	Function key which cut in half the locomotive speed for shunting.
156	Inertia simulation	4	Function key which deactivates the delay of acceleration and deceleration stored in CV3 and CV4.

FUNCTION MAPPING

The function keys of the controller can be assigned to the function outputs of the decoder freely. For the assignment of function keys to function outputs the subsequent CVs must be programmed with values according to the table.

CV	Key	Decoupling 2	Decoupling 1	Light backward	Light forwards	Value
33	F0v	8	4	2	**1**	1
34	F0r	8	4	**2**	1	2
35	F1	8	**4**	2	1	4
36	F2	**8**	4	2	1	8
37	F3	1				2
38	F4	1				4
39	F5	1				8
40	F6	1				16
41	F7	1				0
42	F8	1				0

Note: no assignments can be made in the grey marked areas.

The bold numbers in the table reflect the default settings that are found also in the right column.
By changing the values in the CVs you can adjust the assignments to suit your requirements. Example: With CV36 = 12 (i.e. 8 + 4) Decoupling 2 and Decoupling 1 are switched together by key F2.

FUNCTION OF THE DIGITAL COUPLING

- The couplings have the same function as the FLEISCHMANN PROFI-coupling, i.e. "coupling", "pre-decoupling" and "decoupling".
- They are used either individually operated via F1 or F2 or, depending on the connection, together operated with F1 or F2 respectively.
- The decoder is programmed specifically for the control of the digital clutches. The control of the digital couplings over a 'normal' function output or another decoder would destroy them.
- The conventional coupling and decoupling (e.g. with an decoupler track) is not possible. In analog mode, the digital coupling can not be controlled remotely.

INSTALLATION OF THE DIGITAL COUPLING

This digital couplings are designed exclusively for use in vehicles with standard slot according to NEM362.

- stick digital couplings in the standard slot.
- install wires (grey and brown). Ensure sufficient space of movement of the coupling mechanism.
- Fasten contact board isolated with the enclosed double-sided tape.
- solder wires from the digital couplings (grey and brown) to contact board.
- solder wires from the decoder (blue, green and lilac) to contact board. during reassembly, ensure that bogies, preand post-carriage have enough space and that no moving parts of the drive damage the wires.

COUPLING AND DECOUPLING

- To avoid damage to the couplings, we recommend that you perform the connection and disconnection process carefully and only on straight sections of track.

Coupling:

- Running a locomotive by control dial gently toward the car until the couplings of the locomotive and cars engage.

Decoupling:

- Select address of the loco. To disengage the car with digital coupling(s) press the F1/F2 function key. The mechanism lifts up and releases thereby the coupler hook of the car.
- After 0.8 sec the voltage is switched off , the PROFI-coupling is pre-decoupled. The locomotive can now move away from the car.

DECODER INSTALLATION WITH THE INCLUDED 6-PIN (NEM 651) OR 8-PIN (NEM 652) CONNECTOR

1. For use in vehicles that already have a 6-pin NEM 651 or 8-pin NEM 652 interface, the provided plugs can be soldered. For pin assignment see image.
2. Pull out the D.C. plug from the 6/8-pole digital connector port in the loco (retain the removed plug for later issues. If an error should occur later, it will be easier to discover whether the error is caused by the loco or by the decoder).
3. Insert the 6/8-pole plug of the decoder into the connector port of the loco. Please make sure that the marking "1" respectively the "white dot" on the plug is on the same edge as the "1" on the connector part.
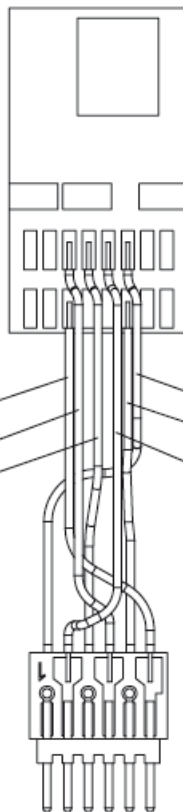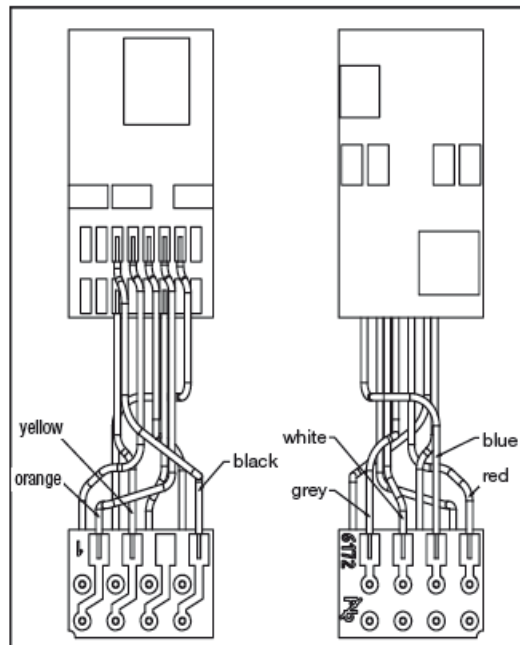
CONNECTIONS

Connectors of the decoders
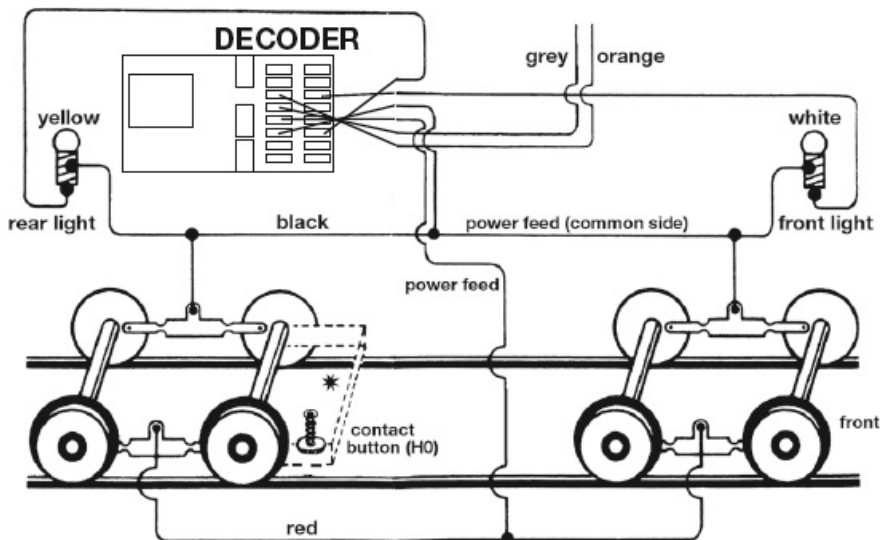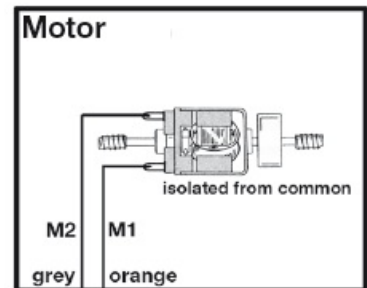
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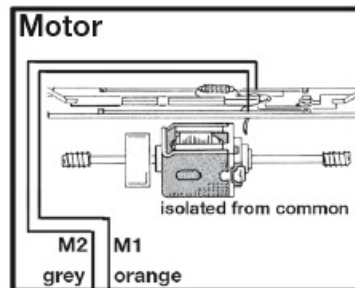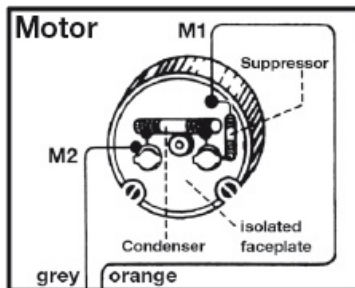
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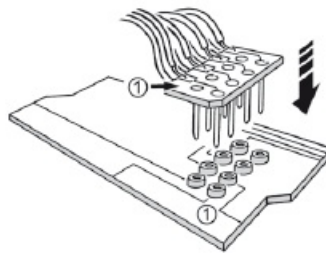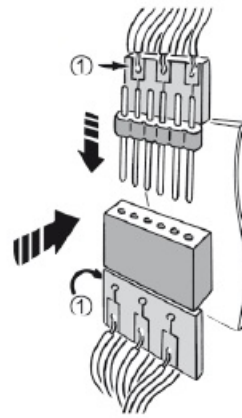
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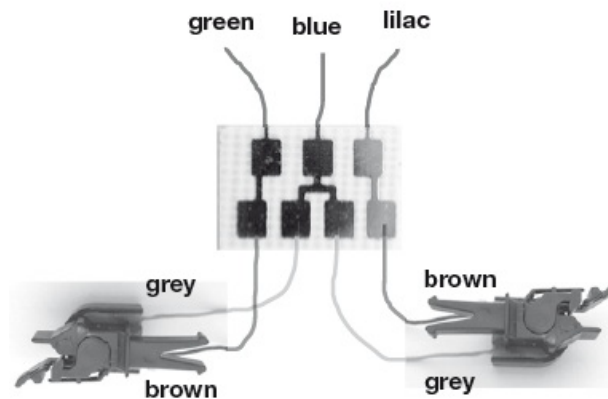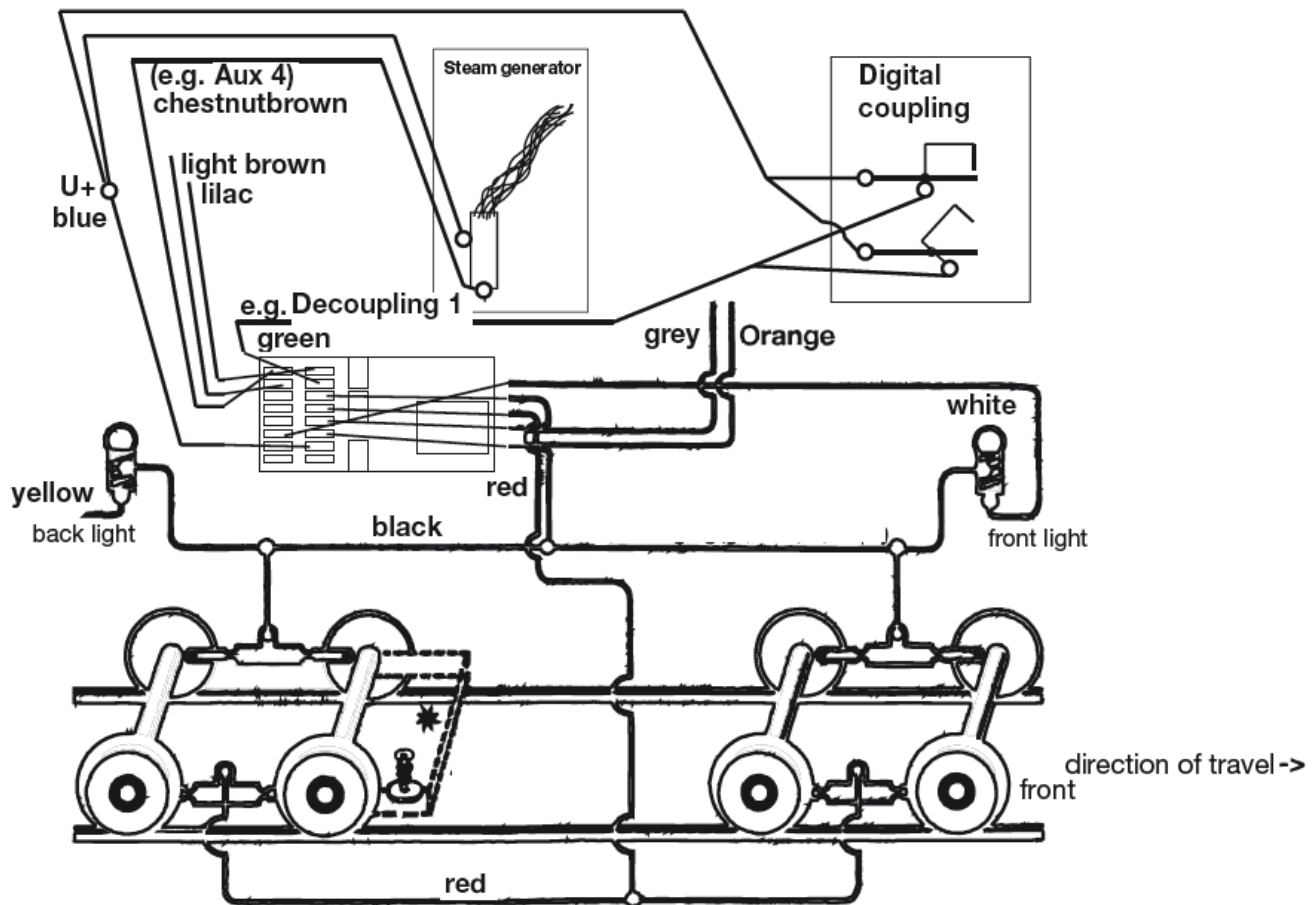grey

MOTOR AND LIGHT CONNECTION

M1 = + side for DC

M2 = connection for common side ✱ for DC (-)

✱ On locos with overhead catenary operation: chassis conducting "common" side as per NEM 621

Direction of travel ->

FUNCTION OUTPUT CONNECTION, EXAMPLES

CONTACT

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- **Tel.:** 00800 5762 6000 AT/D/CH
    - (free of charge / free of charge / gratuit)

International: +43 820 200 668 (at local rates from landlines; mobile communications max. €0.42 per minute including VAT / local tariff for landline, mobile phone max. 0.42€/ min. incl. VAT.

Documents / Resources

Fleischmann 651581 Multiprotokoll Decoder with Remote Controlled Couplings [pdf] User Manual

6865, 69685401, 651581 Multiprotokoll Decoder with Remote Controlled Couplings, 651581, Multiprotokoll Decoder with Remote Controlled Couplings, Decoder with Remote Controlled Couplings, Remote Controlled Couplings, Controlled Couplings, Couplings

References

- **ℱ FLEISCHMANN Modelleisenbahn**
- **ℤ Page has moved**
- **User Manual**