

CV121, resp. CV131 Bit4 must comply with the selection of the light output made in the Function mapping in CV33 and CV34. Otherwise the two adjustments will annulate each other.

The Decoder is adjusted in such a way, that he will detect analogue or DCC operation automatically. The light outputs as well as the function outputs are pre-adjusted "on" in DCC operation only. This, however was selected, because in analogue operation the outputs will only work correctly, if the LEDs or lamps are connected to U+ (blue line of the Decoder) and not are connected to the left rail.

DIMMING AND ADJUSTMENT OF LIGHT OUTPUTS

In the CVs 121 and 131 (s. **Table of basic settings of outputs used as Light output or Switching output**) you can carry out various adjustments of the light outputs. If you program the total value of a CV (byte-wise programming), each partial value of the adjusted bit must be added and programmed together. The outputs Out1, Out2 may be used in the following operation modes:
 1. Light output, 2. Light output with blinking function.

CV-values of the FLEISCHMANN DCC-DECODER

CV	Name	Basic value	Meaning
1	Loco address	3	On DCC effective with CV29 bit 5=0, value 1–127.
2	v min	3	Minimum speed (range of values: 0-255)
3	Acceleration rate	2	Inertia Value when Accelerating (range of values: 0-255).
4	Deceleration rate	2	Inertia Value when Braking (range of values: 0-255).
5	v max	180	Maximum speed (range of values: 2-255).
6	v mid	0	Medium speed (not in use when 0) for non-linear characteristic curve.
7	Manufacturer/Version No.	91	Read: Type number of the inbuilt decoder.
8	Manufacturer ID	155	NMRA Identification No of Manufacturer. FLEISCHMANN is 155. If you program values into that CV you can achieve a reset of certain CVs to the factory settings. Example: CV8 = 3 will reset CV2 to its factory setting.
9	Motor control	20	0: motor frequency 100 Hz, 15-22: motor frequency 15-22 kHz. Freq.=X*1000 Hz
11	Packet timeout	0	Time after which a running loco with missing running instructions will stop: time = n * 0,2s. If 0, no timeout.
12	Power source conversion	1	Which protocol may be valid beneath DCC. Bit 0: DC operation (analogue) 1=on, Bit 0 = 0: DC operation off. Bit 1: 7 = 0: always 0.
17	Extended address (Upper section)	192	Upper section of additional addresses, value: 128–9999. Effective for DCC with CV29 Bit 5=1.
18	Extended address (Lower section)	0	Lower section of additional addresses, value: 128–9999. Effective for DCC with CV29 Bit 5=1.
29	Configuration variable	6	Bit 0: With Bit 0=1 the direction of travel is reversed. Bit 1: Basic value Bit 1=1 valid for controllers with 28/128 speed levels. For controllers with 14 speed levels use Bit 1=0. Feed current detection: Bit 2=1: DC travel (analogue) possible. Bit 2=0: DC travel off. Bit 4: Switching between 3-point-curve (Bit 4=0) and speed table (Bit 4=1) in CV67-94. Bit 5: For use of the additional addresses 128–9999 set Bit 5=1.
30	Error information	0	If an error occurs, it will be stored in CV30. By writing any value to CV30 this content can be erased. Bit 0= 1: Short-circuit on L1 detected Bit 1= 1: Short-circuit on L2 detected Bit 2= 1: Short-circuit on F1 detected Bit 3= 1: Short-circuit on F2 detected Bit 4= 1: Short-circuit on F3 detected Bit 5= 1: Short-circuit on F4 detected Bit 6= 1: Short-circuit on Motor detected Bit 7= 1: Overtemperature detected
33	Light forward	1	Assignment internal to external function (RP 9.2.2). Out 1: Light forward
34	Light backward	2	Out 2: Light backward
35	F1	4	Out 3: Function 1
36	F2	8	Out 4: Function 2
37	F3	16	Out 5: Function 3
38	F4	4	Out 6: Function 4
39	F5	8	Out 7: Acceleration Zero
40	F6	16	Out 8: Half Speed
41	F7	32	Out 9: Train-Navigation (important: see CV63)
42	F8	64	Out 10
43	F9	16	Out 11
44	F10	32	Out 12
45	F11	64	Out 13
46	F12	128	Out 14
50	Selection of motor	0	Motor type. 0: CV52/53/54/65 used
51	Individual FLEISCHMANN-settings #1	217	Bit 0: Motor regulation 1=on, 0=off Bit 1, 2 = 0 Bit 3, 4 = 1 Bit 5 = 0 Bit 6, 7 = 1
52	MpFac	60	proportional motor factor for PID-regulator. Note: Write on CV52 sets CV 50=0
53	MiFac	40	integral motor factor for PID-regulator. Write on CV53 sets CV 50=0
54	MdFac	30	differential Motorfaktor for PID-regulator. Write on CV54 sets CV 50=0
63	FLEISCHMANN settings #3	0	TRAIN-NAVIGATION: Bit 0= 1: Train category 0..3 = 1..4 Bit 2=0: TrainNavigation switched off. =1: TrainNavigation active (TrainNavigation is also active with OUT9=1) Bit 3=0: State of F7 is transmitted into Bit 2, if F7 is sent by DCC =1: F7 is ignored Important: TrainNavigation is active, if Bit 2 OR OUT9 (Function Mapping s. CV's 33-46) is set. Bit 3 = 0 makes sense when operated with the TwinCenter, because there the state of the function keys F5, F8 is transmitted only once when hitting the key. This way the state of F7 will be stored permanently in Bit 2 even after a "stop".
64	RESET see also Reset CV8		Writing to that address resets the Decoder to the factory settings. CV64=1: reset to factory settings CV64=3: Reconstruct speed step table CVs 67-95, 66, 95 CV64=4: Reconstruct 3-point-curve CVs 2, 5, 6, 66, 95 CV64=5: Reconstruct motor parameters CVs 50, 54, 9, 65 CV64=6: Reconstruct addresses, CVs 1, 17, 18, 29 CV64=7: Reconstruct function mapping CVs 33, 46
65	Kick start	70	In order to overcome the motor inertia when going from speed step1 to step 2, here, the first motor impulses can be extended allowing more energy flowing into the motor (0=off, 1...255 energy amount)
66	Forward trim	248	Here, the speed values can be adjusted by percentage from 248=100%. E.g. 124=50%. Value valid for running forward.
67 to 94	Adjustment of control characteristic curve of 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	248	As CV66, but for running backwards
105/106	User variables	0	Values free to use

RUNNING ON CONVENTIONAL DC LAYOUTS

You want to run your FLEISCHMANN DCC-loco once in while on a DC layout? No problem at all, because as delivered, we have adjusted the respective CV29 and CV12 in our decoders so that they can run on "analogue" layouts as well! However, you will not be able to enjoy the full range of digital technique highlights.

SIMULATION OF TRAIN WEIGHT

In our decoders 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 f5.

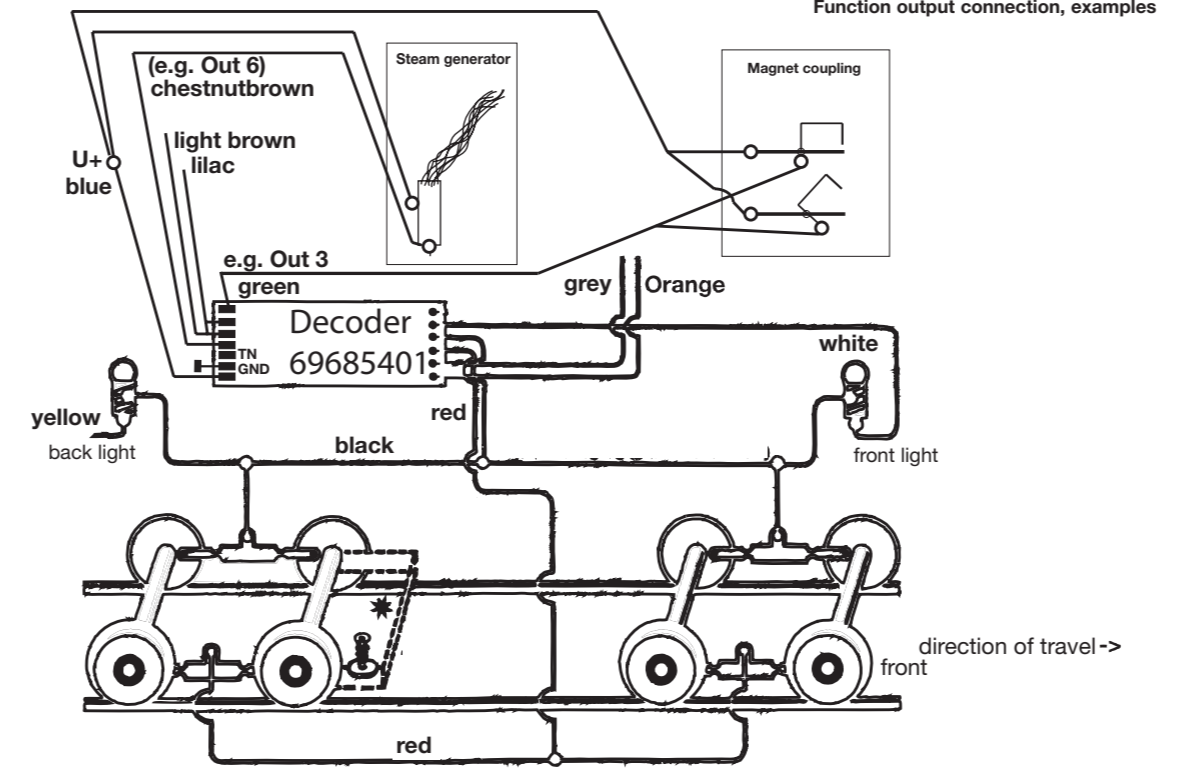
SHUNTING GEAR

Some operational situations require delicate speed adaptation, often called 'shunting gear'. By using the f6 function key, you can set your DCC-loco to "half speed" with increased speed levels in order to make the shunting far more finely controllable.

Table of basic settings of outputs used as Light output or Switching output:

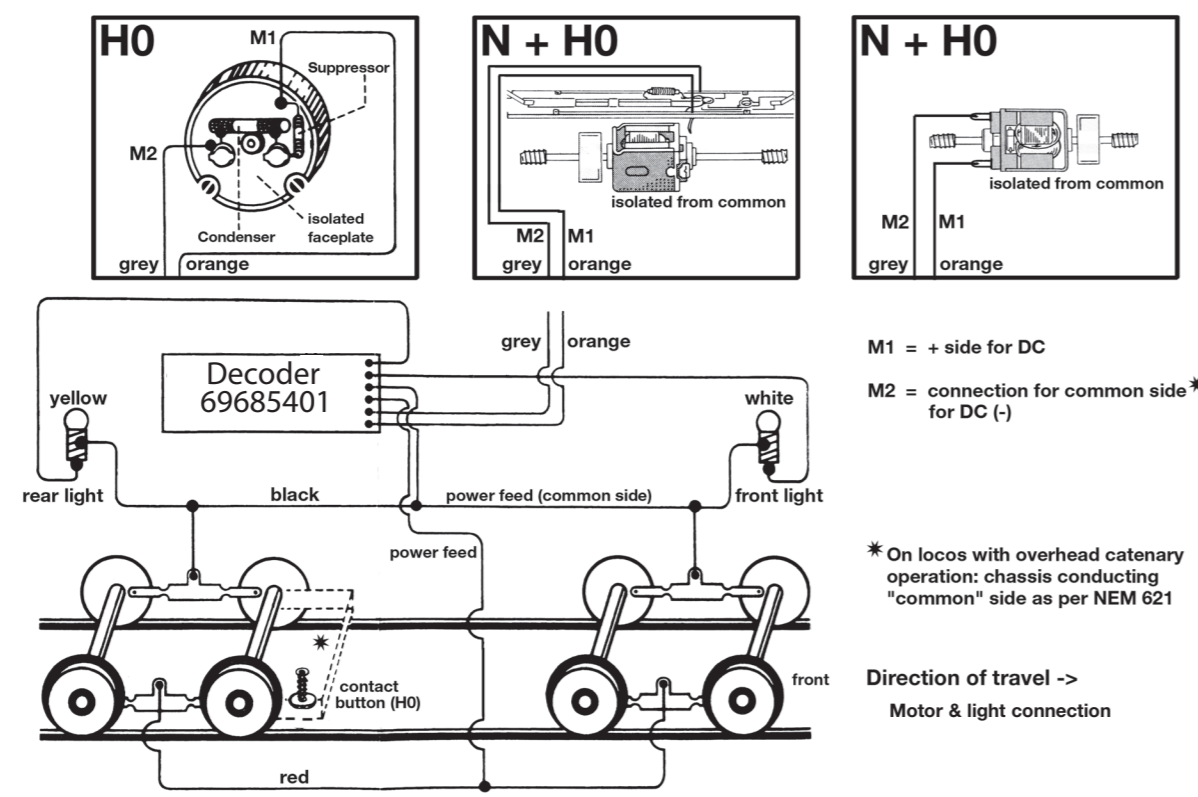
Adjusting the Outputs as Light outputs resp. Switching outputs (Basic setting)						
Function	CV	Value	Decoder output	Description	Settings	Part value
Light output / switching output	120	0	Out 1: Light forward, f0v	Operation mode of decoder output is light- / switching output	When selected 0: output is light-/switch-output	
	130	0	Out 2: Light backward, f0r			
	140	0	Out 3: Function 1, Aux 1			
	150	0	Out 4: Function 2, Aux 2			
	160	0	Out 5: Function 3, Aux 3			
	170	0	Out 6: Function 4, Aux 4			
Analog & DCC assignment	121	8	Out 1: Light forward, f0v	Brightness, dim value of resp. output: Bit 0..3: The light can be dimmed in 16 steps (0..15) Parameter for analog & DCC assignment: Bit 4..7:	Bit 0: Brightness, dim value: 1=on, 0=off Bit 1: Brightness, dim value: 1=on, 0=off Bit 2: Brightness, dim value: 1=on, 0=off Bit 3: Brightness, dim value: 1=on, 0=off Bit 4: Function is on in direction: 0=forward, 1=backward Bit 5: Output depends on direction: 1=on, 0=off Bit 6: Function valid for: 1=DCC and analogue, 0=DCC Bit 7: Function is active at: 1=only when running, 0=running and standing	0/1, 0/2, 0/4, 0/8, 0/16, 0/32, 0/64, 0/128
	131	8	Out 2: Light backward, f0r			
	141	8	Out 3: Function 1, Aux 1			
	151	8	Out 4: Function 2, Aux 2			
	161	8	Out 5: Function 3, Aux 3			
	171	8	Out 6: Function 4, Aux 4			

Adjusting the Outputs as Light outputs resp. Switching outputs with blinking function										
Function	CV	Value	Decoder output	Description	Settings	Part value				
Light output / switching output	120	1	Out 1: Light forward, f0v	Operation mode of decoder output is light-/switching output with blinking function	When selected 1: output is light-/switch-output with blinking function					
	130	1	Out 2: Light backward, f0r							
	140	1	Out 3: Function 1, Aux 1							
	150	1	Out 4: Function 2, Aux 2							
	160	1	Out 5: Function 3, Aux 3							
	170	1	Out 6: Function 4, Aux 4							
	Analog & DCC assignment	121	8				Out 1: Light forward, f0v	Brightness, dim value of resp. output: Bit 0..3: The light can be dimmed in 16 steps (0..15) Parameter for analog & DCC assignment: Bit 4..7:	Bit 0: Brightness, dim value: 1=on, 0=off Bit 1: Brightness, dim value: 1=on, 0=off Bit 2: Brightness, dim value: 1=on, 0=off Bit 3: Brightness, dim value: 1=on, 0=off Bit 4: Function is on in direction: 0=forward, 1=backward Bit 5: Output depends on direction: 1=on, 0=off Bit 6: Function valid for: 1=DCC and analogue, 0=DCC Bit 7: Function is active at: 1=only when running, 0=running and standing	0/1, 0/2, 0/4, 0/8, 0/16, 0/32, 0/64, 0/128
		131	8				Out 2: Light backward, f0r			
		141	8				Out 3: Function 1, Aux 1			
		151	8				Out 4: Function 2, Aux 2			
161		8	Out 5: Function 3, Aux 3							
171		8	Out 6: Function 4, Aux 4							
Blinking light		122	18	Out 1: Light forward, f0v	Switch-on duration of output in blinking funktion	0: Light, switch-output permanently on				
	132	18	Out 2: Light backward, f0r							
	142	18	Out 3: Function 1, Aux 1							
	152	18	Out 4: Function 2, Aux 2							
	162	18	Out 5: Function 3, Aux 3							
	172	18	Out 6: Function 4, Aux 4							
	Number of blink-/switch cycles	124	0	Out 1: Light forward, f0v				Number of blink-/switch-cycles with blinking light-/switch-function. 1..255 blink-/switch cycles are carried out with each function transmitted by the DCC controller. If the function is stopped by the controller, the procedure is ended, even if there is a rest of cycles.	1..255: 1..255 blink-/ switch cycles 0: With this value, no blinkingswitching cycles will be carried out.	
		144	0	Out 3: Function 1, Aux 1						
		154	0	Out 4: Function 2, Aux 2						
		164	0	Out 5: Function 3, Aux 3						
174		0	Out 6: Function 4, Aux 4							



Adjusting the outputs as switch output for steam generator						
Function	CV	Value	Decoder output	Description	Settings	Part value
Light output / switching output	120	2	Out 1: Light forward, f0v	Operation mode of decoder output is switching output for steam generator	When selected 2: output is switching output for steam generator	
	130	2	Out 2: Light backward, f0r			
	140	2	Out 3: Function 1, Aux 1			
	150	2	Out 4: Function 2, Aux 2			
	160	2	Out 5: Function 3, Aux 3			
	170	2	Out 6: Function 4, Aux 4			
Analog & DCC assignment	121	8	Out 1: Light forward, f0v	steam amount at constant speed	Bit 0: steam amount at constant speed: 1=on, 0=off Bit 1: steam amount at constant speed: 1=on, 0=off Parameter for analogue & DCC assignment Bit 3: steam amount at constant speed: 1=on, 0=off Bit 4: function is on at driving: 0=forward, 1=backward Bit 5: output depends on driving direction: 1=on, 0=off Bit 6: function valid for: 1=DCC and analogue, 0=DCC Bit 7: function is active at: 1=only when running, 0=running and standing	0/1, 0/2, 0/4, 0/8, 0/16, 0/32, 0/64, 0/128
	131	8	Out 2: Light backward, f0r			
	141	8	Out 3: Function 1, Aux 1			
	151	8	Out 4: Function 2, Aux 2			
	161	8	Out 5: Function 3, Aux 3			
	171	8	Out 6: Function 4, Aux 4			
	Steam amount	125	242			
135		242	Out 2: Light backward, f0r			
145		242	Out 3: Function 1, Aux 1			
155		242	Out 4: Function 2, Aux 2			
165		242	Out 5: Function 3, Aux 3			
175		242	Out 6: Function 4, Aux 4			

Adjusting the outputs as switch output for magnet coupling										
Function	CV	Value	Decoder output	Description	Settings	Part value				
Light output / switching output	120	3	Out 1: Light forward, f0v	Operation mode of decoder output is switching output for magnet coupling	When selected 3: output is switching output for magnet coupling					
	130	3	Out 2: Light backward, f0r							
	140	3	Out 3: Function 1, Aux 1							
	150	3	Out 4: Function 2, Aux 2							
	160	3	Out 5: Function 3, Aux 3							
	170	3	Out 6: Function 4, Aux 4							
	Analog & DCC assignment	121	8				Out 1: Light forward, f0v	Parameter for analogue & DCC assignment	Bit 0: -- Bit 1: -- Bit 2: -- Bit 3: -- Bit 4: function is on at driving: 0=forward, 1=backward Bit 5: output depends on driving direction: 1=on, 0=off Bit 6: function valid for: 1=DCC and analogue, 0=DCC Bit 7: function is active at: 1=only when running, 0=running and standing	0/1, 0/2, 0/4, 0/8, 0/16, 0/32, 0/64, 0/128
		131	8				Out 2: Light backward, f0r			
		141	8				Out 3: Function 1, Aux 1			
		151	8				Out 4: Function 2, Aux 2			
161		8	Out 5: Function 3, Aux 3							
171		8	Out 6: Function 4, Aux 4							
Magnet coupling: time		122	18	Out 1: Light forward, f0v	Bit: 0.2 Time for pick-up in operation mode magnet coupling 0.1..0.8 s	Bit 0: pick-up time: 1=on, 0=off Bit 1: pick-up time: 1=on, 0=off Bit 2: pick-up time: 1=on, 0=off Bit 3: hold time: 1=on, 0=off Bit 4: hold time: 1=on, 0=off Bit 5: hold time: 1=on, 0=off Bit 6: hold time: 1=on, 0=off Bit 7: hold time: 1=on, 0=off	0/1, 0/2, 0/4, 0/8, 0/16, 0/32, 0/64, 0/128			
	132	18	Out 2: Light backward, f0r							
	142	18	Out 3: Function 1, Aux 1							
	152	18	Out 4: Function 2, Aux 2							
	162	18	Out 5: Function 3, Aux 3							
	172	18	Out 6: Function 4, Aux 4							
Magnet coupling: energy	123	47	Out 1: Light forward, f0v	Bit: 0.3 Energy for pulling in operation mode magnet coupling	Bit 0: energy for pick-up: 1=on, 0=off Bit 1: energy for pick-up: 1=on, 0=off Bit 2: energy for pick-up: 1=on, 0=off Bit 3: energy for pick-up: 1=on, 0=off Bit 4: energy for holding: 1=on, 0=off Bit 5: energy for holding: 1=on, 0=off Bit 6: energy for holding: 1=on, 0=off Bit 7: energy for holding: 1=on, 0=off	0/1, 0/2, 0/4, 0/8, 0/16, 0/32, 0/64, 0/128				
	133	47	Out 2: Light backward, f0r							
	143	47	Out 3: Function 1, Aux 1							
	153	47	Out 4: Function 2, Aux 2							
	163	47	Out 5: Function 3, Aux 3							
	173	47	Out 6: Function 4, Aux 4							
	Magnet coupling: number of switch cycles	124	0				Out 1: Light forward, f0v	Number of switching cycles in operation mode magnet coupling	1..255: 1..255 switch cycles 0: Light, switching output switching permanently	
134		0	Out 2: Light backward, f0r							
144		0	Out 3: Function 1, Aux 1							
154		0	Out 4: Function 2, Aux 2							
164		0	Out 5: Function 3, Aux 3							
174		0	Out 6: Function 4, Aux 4							



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.

Please note: If you connect e.g. a steam generator between GND and an output terminal, you'll only get half of the energy produced. Use the U+ terminal instead of GND.

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 ->
 Motor & light connection

Function output connection, examples