Viessman 5076 H0 Coach lighting 11 LEDs with Function Decoder User Manual

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Important information

Please read this manual completely and attentively before using the product for the first time. Keep this manual. It is part of the product.

Safety instructions

 **Caution:**

Risk of injury!
Due to the detailed reproduction of the original and the intended use, this product can have peaks, edges and breakable parts. Tools are required for installation

Electrical hazard!
Never put the connecting wires into a power socket!
Regularly examine the transformer for damage. In case of any damage, do not use the transformer.
Make sure that the power supply is switched off when you mount the device and connect the cables!
Only use VDE/EN tested special model train transformers for the power supply!
The power sources must be protected to avoid the risk of burning cables.

Using the product for its correct purpose

This product is intended:

- For installation in model train waggons, observing the installation instructions in the waggon's manual.
- For connection to an authorized model train transformer (e. g. item 5200), both AC- and DC-operation.
- For operation with a digital command station (e. g. Viessmann items 5300 and 5320) supporting either NMRA DCC or Märklin Motorola.
- For operation in dry rooms only.

Using the product for any other purpose is not approved and is considered inappropriate. The manufacturer is not responsible for any damage resulting from the improper use of this product.

Checking the package contents

Check the contents of the package for completeness:

- Coach lighting with 11 LEDs and with function decoder (items 5076 yellow, 5077 warm-white, 5078 white)
- Additional resistor for programming at the programming output, 120 ohms
- Manual

Introduction

The decoder responds to locomotive addresses. You may comfortably select various light scenes by pressing the appropriate function buttons of your digital controller.
In addition these light scenes can be varied by means of two random generators enabling you to simulate realistic effects such as compartments that are currently not occupied and, therefore, remain dark. Other effects such as faulty fluorescent lamps or ones that do not start properly are also available. These preprogrammed light scenes may be modified to a large degree in order to meet your personal requirements.
Additional addressing possibilities also provide more comfort, see chapter 4.2.2.

Quick-start

Connect the decoder according to fig. 1.

It is immaterial if your digital command station generates DCC or Märklin Motorola signals. The decoder adapts to the used protocol and sets to address 3 by factory setting.
Please note that the change of data protocol which is assigned to CV 49, may take some time.
Turn on your digital system and you are ready to select the pre-programmed light scenes with the function buttons F0 to F6.
Some function keys and the pre-programmed light scenes:

F0: headlights / rear lights = light scene A/B, depending on the direction
F1: AUX = light scene C
F2: all 11 LEDs
F3: first group of 3 LEDs = light scene D
F4: centre group of 5 LEDs = light scene E
F5: last group of 3 LEDs = light scene F
F6: emergency lighting = light scene G
F7: random control for saloon coach = light scene H

Hardware properties

The coach lighting is equipped with a switching regulator assuring a very low temperature rise of the device. There are connections for connecting capacitors resp.
power packs and three more outputs: Two for controlling directional front and rear lights and an additional output with a maximum load of 150 mA.

In order to adapt the plate to the different length of various coaches, it can be cut at certain points. This also allows you to arrange the segments according to the layout of the compartments in the coach.

The brightness may be adjusted via a CV in digital mode and with the aid of a potentiometer in analogue mode.

Digital and analogue operating modes

The decoder has light scenes. Various configurations have been stored to facilitate the combination and control of different LEDs.

Digital mode

One particular feature of this coach lighting is the ability to memorize the most recent configuration that has been selected via the function buttons. Details to be looked up in the CV table at CV 135 as well as in chapter 4. Therefore, there is no need to call up the desired light scene again after switching off the command station at the end of an operating session and commencing a new session! As this information is saved in the permanent memory of the decoder this is also true for extended periods of power cuts.

Analogue mode

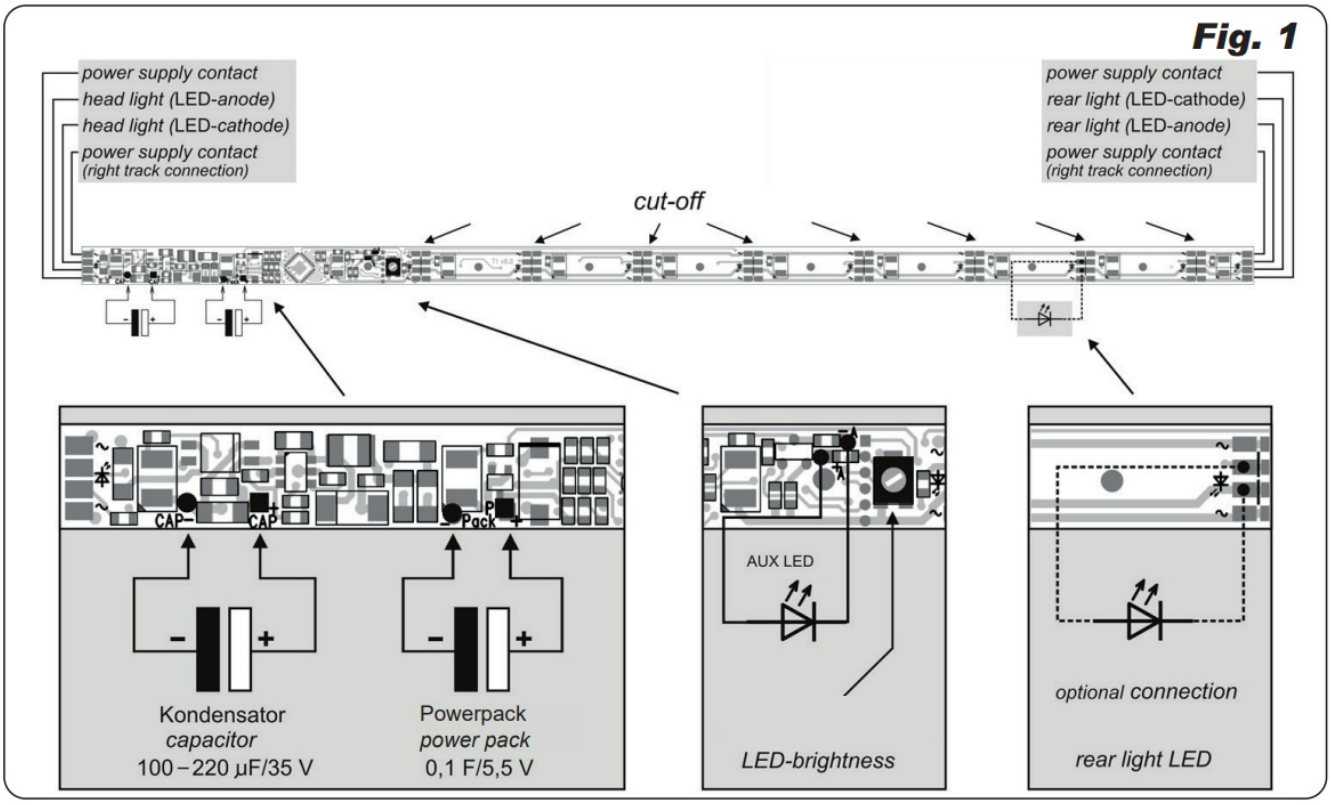
A certain feature of the decoder allows storing the desired configuration in two CVs 13 and 14 that will be automatically selected in analogue mode. Thus you may enjoy the desired light scenes in your passenger trains also in analogue mode by programming them only once! Of course, the random control also works in analogue mode in order to add some “spice” to your coach lighting. Random control is switched on by default.

Connection and installation

Please note the instructions regarding the installation of the lighting in the manual of the coach.

Mounting of the board

Shorten the lighting board at one of the marked cut-off areas with a fine saw to the required length (fig. 1).
Attention: If you cut the board into several segments you have to maintain the original sequence of the segments when reassembling.



Connection

Connect the coach lighting as shown in fig. 1.

- Shorten the cables if needed.
- The supply connections on the circuit board are already interconnected.
- The polarity is not important as the coach lighting has rectifiers.

After connecting the power supply and succesful testing, you can mount and fasten the coach lighting in the waggon. Mount the coach lighting with double-sided adhesive tape underneath the roof of the waggon.

Power pack/Capacitor

Additional capacitors can be connected to the board at the marked positions (capacitor/power pack). The so-called gold-caps do not work here.
When using additional capacitors/power packs it is possible, that inrush currents may overload the central unit. Use a series resistor of 10 to 30 ohms in one of the two supply lines of the module.

Connection of front lights, rear lights and switching output

The return of the switching and LED outputs of the decoder must be wired to the decoder ground. For that reason you must connect the cathodes (-) of the LEDs to the function outputs.

Please note:
LEDs must always be wired via a series resistor!
Please pay attention to the correct polarity of the LEDs!

When you connect the LEDs according to fig. 1, you can omit the resistors firstly, as they are integrated in the decoder. However, the provided current might make the LEDs shine too brightly. Use additional resistors to reduce the current. This is especially recommended when you connect LEDs in parallel. The resistor value depends on the type and current draw of the LEDs. Determine the appropriate value or inquire when purchasing the LEDs.

You can connect several LEDs in parallel to each output. In this case every LED must have its own series resistor.

If you connect several LEDs to one output in series, only one series resistor is required.

Rear lights can be connected in two ways with the coach lighting. Here a 1.2 k-resistor is already available on the board.

1. At the ends of the board at the inner soldering pads (fig. 1). F0 activates directional control of the front and rear lights. Left-hand in fig. 1 the front lights are connected, right-hand the rear lights. The connection to the rear light output is provided at every cut-off.
2. One or two red LEDs for the rear lights can also be connected to the pads marked with “+” and “-” at every cut-off. Use Viessmann item 5056 (H0). Item 5056 includes such a series resistor.

The switching output

The switching output (or “AUX”-output) can be used as shown in fig.1, especially in case of LEDs. In this case, the connection is similar to the front and rear lights, described in chapter 3.4.

Alternatively, you can use heavier loads like small incandescent bulbs, which are supplied directly from the track. These do not use the internal power supply and they do not reduce the time the LEDs stay on in case of a power interruption. See fig. 2 for a connection diagram. This connection is not recommended for LEDs as they might flicker.

Operation

Analogue operation

A preferred configuration of light scenes, of course including random control, can be stored in CVs 13 and 14. It will be executed, when the function decoder detects analogue operation after a cold start.

This cold start is very important, if the value of CV 135 is not zero, it has a higher priority than the CVs 13 and 14, so the configuration saved during digital operation will be loaded. Keep CV 135 zero if you would like to use CVs 13 and 14.

In DC operation the decoder switches the front and rear lights according to direction. Right track positive means rear light is active and vice versa.

In AC operation the configuration in CV 14 is used, because an absolute direction using the AC switching pulse is not available and, therefore, the direction of the train is unknown.

Digital operation

The function decoder in the coach lighting is a multi protocol decoder supporting both DCC and Motorola. It automatically detects the data format transmitted by the command station.

The number of supported addresses depends on the data format used.

Base address

Set a different address for each coach equipped with a digital coach lighting, and take care not to use addresses that are already in use by locomotives. In this case you can use programming on the main (POM) comfortably.

Motorola format: The decoder supports 255 addresses.

DCC format: The decoder supports 127 base addresses or 10,239 extended addresses.

Programming the decoder is done by setting the configuration variables (CVs, DCC compliant).

Programming of CVs 1 to 8 can also be done by physical register programming.

Motorola function address

When using the Märklin Motorola protocol, you can use the functions F5 to F8 with the help of an additional address, which you can set up in CV 113.

Alternative address

The decoder inside the digital coach lighting can make use of the commands sent to the locomotive of the train, to decide whether the train moves or is stopped, and in which direction it travels, see chapter 4.7. This is useful for the decoder to decide which type of random generator is to be used. In order to enable the decoder to have an own address other than the locomotive, but still remaining able to listen to the commands sent to the locomotive, the locomotive address can be set in CVs 114 and 115.

Consist address – Controlling the whole train

The use of the consist address in CV 19 provides a comfortable way to easily control the whole train from a single digital address. You can assign the same consist address to all the coaches in a train to control all of them simultaneously. After you set up the light scenes for the coaches over their individual addresses, you can use the consist address to switch specific functions with a single button push for the whole train, e. g. switching between day/night modes or switching the randomness on or off. Note, that functions eligible for this have to be enabled individually in CVs 21 and 22.

For example, if you use F8 to control the day/night function, you have to set CV 21 to 128. By doing so, you enable F8 to be controlled by the consist address.

Light scenes

Due to the eleven LEDs, the additional directional out puts as well as the switching output you may choose between many different configurations.

In order to assure easy handling of so many different options the concept of light scenes has been developed. Light scenes combine certain LEDs and outputs to groups and assign them to a certain function that can be

switched by a function button of your command station resp. your throttle. A number of light scenes like “headlight”, “first three LEDs”, “emergency lighting”, “random switching of single LEDs”, “random control of complete light scenes” have been pre-programmed in the decoder.

One particular feature of this concept is that one may control several light scenes by activating one function button.

Example: As a standard the decoder is configured with three light scenes consisting of two groups of three LEDs (at either end) and one group of five (in the middle). Light scene “D” controls the first three LEDs together, light scene “E” controls the group of five LEDs and light scene “F” controls the second group of three LEDs. In the standard configuration these three light scenes can be switched with the function buttons F3, F4 and F5.

Nevertheless, it may also be useful to have one function button switching all eleven LEDs simultaneously. We choose F2 for this purpose and enter the value 56 in the appropriate CV, namely CV 36. This value is calculated by adding the values of the individual light scenes that we have now combined: Value 8 for light scene D, value 16 for light scene E and value 32 for light scene F: 8+16+32 = 56. Thus pushing function button F2 calls up three light scenes simultaneously! Of course you may assign the light scenes to more than one function button at the same time.
The CV table shows the different light scenes and their values. Below please find the standard allocation:

F0: headlights/rear lights = light scene A/B, depending on the direction

F1: AUX = light scene C
F2: all 11 LEDs
F3: first group of 3 LEDs = light scene D
F4: centre group of 5 LEDs = light scene E
F5: last group of 3 LEDs = light scene F
F6: emergency lighting = light scene G
F7: random control for saloon coach = light scene H

Light scenes A through H are stored in CVs 50 – 57, see CV table on page 16.

You may modify the light scenes according to your personal preference. Such changes will also be effected by all function buttons that control these light scenes as outlined in the above example.

As a standard the following properties have been configured:

Values smaller than 200: Definition of LED groups. Take the number of the first LED to be lit as a two digit number followed by the one digit number of LEDs to be lit in total. Example: Light scene D (group of first three LEDs): First LED is to be lit means “1”, three LEDs should be lit in total means “3” – therefore, value “13” has to be entered in CV 53, etc.

Or light scene E (group of central five LEDs): LEDs 1 – 3 are off, LED No. 4 is the first to be lit and a total of 5 are lit – therefore, value “45” has to be entered in CV 54, etc.

Value 200: Emergency lighting 1: All LEDs to be lit with reduced brightness – overwrites all other light scenes.

Value 201: Emergency lighting 2: Every second LED to be lit with reduced brightness – overwrites all other light scenes.

Value 202: Random control active, switches light scenes (suitable for saloon coaches).

Value 203: Random control active, switches individual LEDs (suitable for coaches with compartments).

Value 212: As in 202, but only changing when the coach is stationary.

Value 213: As in 203, but only changing when the coach is stationary.

You will find more examples in the annexe.

Lighting effects at starting

There are three options for the behaviour of the LEDs during switch-on. First there is the “normal” behaviour as we know it from incandescent lamps. Then there is a slowed down dimming up similar to a fluorescent tube with faulty electronic ballast. Finally there is the option with flickering light as is the case with a faulty starter.

Furthermore, it is possible to define two LEDs as defective in CVs 58 and 59 that do not switch on at all or simply flicker once the appropriate group of LEDs has been switched on.

Brightness setting

In analogue mode set the brightness via the small potentiometer “Helligkeit Einstellen” on the board with a small screwdriver.

Caution:
Do not overwind the stop position!

In digital operation the brightness of all 11 LEDs can be adjusted together. Light and AUX-outputs can be adjusted individually.

Random mode

One special feature of the random mode is the fact that one can differentiate between a moving and a stationary train. Thus in random mode several light scenes can be triggered while the train is stopped at the station due to the fact that a large number of passengers enters or exits the coach. Different lights will be turned on or off in compartments or in a saloon coach. While the train is moving on the main line very few changes can be expected. Accordingly the random generator can be configured to only trigger a few changes of light scenes.

Please note:
The random mode only works on activated functions!

Calculating the train speed for controlling the random generator and alternative address

In order to enable the decoder of the coach lighting to determine if the train is moving or has stopped, it is advantageous to programme it to the same address as the address of the locomotive hauling this particular train. The coach decoder then monitors the commands for the locomotive decoder and thus determines the speed and direction of the train.
Provided at the acceleration and deceleration ramps of the coach decoder have been set to the same values as those of the locomotive decoders, the train speed and, particularly important, the fact that the train has stopped will be correctly detected.

In case using the same address for both locomotive and coach should for any reason not be possible for instance because of functions already in use with the locomotive, it is possible to save the locomotive address in two CVs 114 and 115 of the coach decoder. Thus the coach decoder can determine the speed while the light scenes can be switched via another address.

Changing between digital and analogue mode

Whenever the coach lighting detects a change from digital to analogue mode, for instance in a Märklin braking sector, the digitally set parameters remain intact. Short power supply interruptions do no harm. Longer power interruptions (in the range of perhaps 20 to 30 seconds) cause the decoder to switch into analogue mode once power is available once again. The behaviour of the functions previously set then depends on the value in CV 135. The most recent known commands received in digital mode will be activated, provided CV 135 has a value other than zero. Should the value zero have been set in CV 135, the configurations saved in CVs 13 and 14 will be activated.

Saving the current configuration

The decoder can store desired or current configurations. CV 135 controls this: Once the value is not zero, the current configuration is stored at the next power interruption, once or permanently.

In order to provide a maximum of user comfort and easy handling, the decoder knows three operating modes. The required configuration of CV 135 can be found in the CV table. The decoder is set to the “Standard” mode by factory setting.

Note, that CV 135 has to be set to 1 or 2 at the beginning, either via POM or the programming track.
After this, you can switch functions on the main track, ideally starting from the basic setting of all functions being off. When the desired functions are on, turn the track power off or remove the coach from the track. The loss of power triggers the saving.
The difference between the “dynamic” (value 1) and “permanently wired” (value 2) modes is that in the “dynamic” mode the decoder saves the states of the functions at every power cut, while the “permanently wired” mode saves only once, at the very first power cut. In this case, to change to a new “wiring”, you can write the value 2 again into CV 135.

”Standard” mode

The decoder awaits commands for switching light scenes activated by the appropriate function buttons F0 through F28.

This means that all LEDs that should be lit must be turned on by pressing the corresponding function button. In case the command station, after having been turned on, does not switch on the most recently triggered functions, this operating mode means that the operator has to turn on the desired light scene manually. While travelling, long power interruptions may cause the interior lighting to either extinguish partially or completely until the command station has re-activated these functions.
The behaviour of different models of command stations available in the market may vary considerably.

“Dynamic” mode

The decoder recalls its most recent configuration, accepts changes and saves them in its permanent memory in case of interruption of the track power. Once track power is re-established the most recent configuration will be activated immediately without regard to any potential function commands issued by the command station. Thus the configuration may be changed according to the operator’s preference and this configuration will be saved.

“Permanently wired” mode

In this mode a configuration, in other words a compilation of the desired light scenes will be frozen by entering the value 2 in CV 135, switching the desired functions on and turning the track power off. This configuration then behaves just as if the LEDs were tightly wired accordingly. Of course, you may change the configuration at any time by changing the value of CV 135 to 0 or 1.

Day and night operation

It is common to all operating modes that you can switch the selected light scenes in order to alternate between day and night time operations.
In CV 136 you may determine with which function button between F0 and F28 you want to trigger this switching process.

It is suggested to use F8 for instance, because this function is available on almost every control unit. The number of the chosen function must be stored in CV 136.

Specifics

As the functions are not transmitted individually but in groups in DCC mode, it may happen that a function, which is turned on, may be transmitted together with functions in this group, which are switched off. Such functions that are turned off should, of course, not turn off any other functions that were already switched on. Therefore, the decoder will only accept a switch-off command of this particular function, if it has previously received a switch-on command.

Example: Function F3 controls light scene D (the first three LEDs of the coach lighting), function F4 controls light scene E (the five central LEDs), and the function F5 controls light scene F (the last three LEDs). Let's assume the most recent known configuration of the coach lighting means light scene E is active, namely the five LEDs at the centre of the saloon coach.

If the command station initially sets all functions to "off" during run-up, the coach lighting would be completely turned off. In order to prevent this, the coach lighting ignores these switch-off commands because it has not received any switch-on commands before.

Example: Your command station has just started up and light scene E of your coach lighting is still active. You now wish to turn on also the first three LEDs.
If F4 is still in the "off" position on your command station, a command will contain the following: Switch on F3, turn off F4. The decoder interprets this thus: Turn on F3 (the first three LEDs will light up).
Although the switch-off command for F4 will be transmitted, the decoder ignores this, since there was no prior command to switch on F4 by the command station. Result: The first eight LEDs light up.

Most command stations do not save the most recent status of all decoder functions if they shut down. According to the example above, this means that the command station does not know during run-up that function F4 of the decoder had been switched on previously. In order to actually turn off F4 in the decoder you must first switch on F4 and then turn it off again.
You will find that the five LEDs at the centre will extinguish.

Programming the functions:

Please programme the functions of the decoder by means of CV programming. You can find all possible options in chapter 6.

Programming

You may programme the decoder of your coach lighting at the programming output of your command station or on the main track (POM). Programming also works in the "Motorola mode".

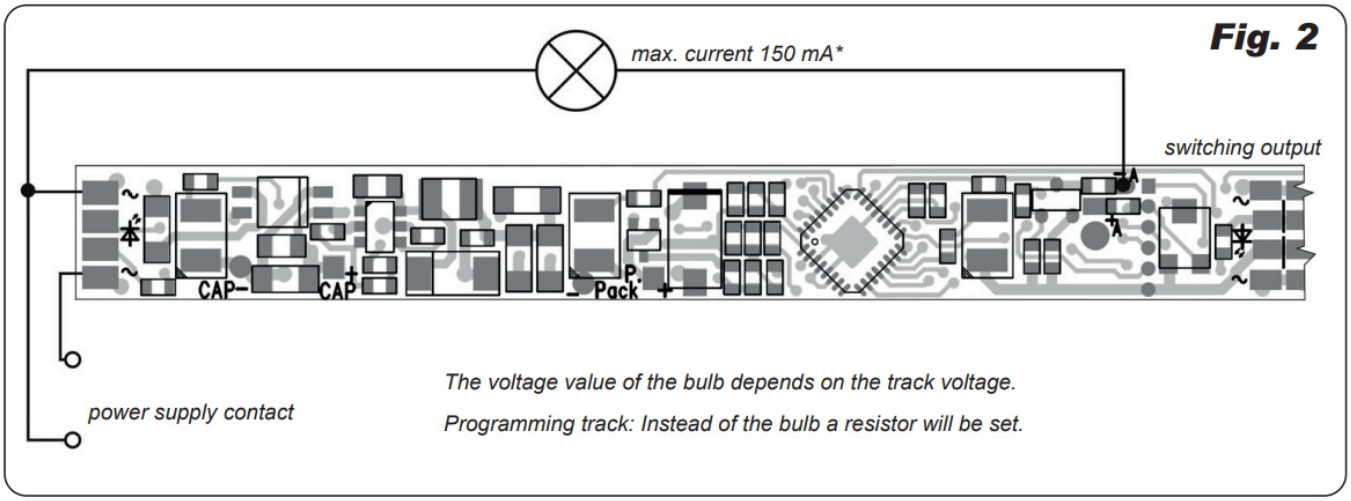
Here the decoder acknowledges the different kinds of status while in programming mode by blinking of the first LED.

Programming with a DCC command station on the programming track

You can programme the configuration variables (CVs) of the decoder from the command station.

Also take note of the relevant chapter of the manual of your command station where the byte-by-byte programming of (CVs) is explained.
Due to the low current consumption the decoder cannot generate the so called “acknowledge” signal without additional means.

Therefore, one cannot read the CVs and when writing them one gets an error message. To avoid this, connect the enclosed resistor as shown in fig. 2.



Regardless of error messages writing CVs is usually successful.

Programming with Motorola central units

Put the coach onto a track section connected to the central unit’s track output. Make sure no other vehicle is located on the track as the decoder in that vehicle will also be programmed.

Please note:
If you use a command station supplying both DCC and Motorola signals it is recommended to programme the decoder in DCC mode. After completing programming the decoder will also operate in the Motorola mode.

Reset the central unit (by simultaneously pushing the buttons “Stop” and “Go” for some time) or switch off the central unit for a moment and then on again. Then select the current address or address “80” (for instance, if you do not know the current address of the decoder). The manufacturer´s default setting is “3”. Set all functions to ”Off” (function, F1 to F4).

Push the “Stop” button at the central unit. Operate the direction switch and hold it in that position briefly while pushing the “Go” button. As soon as LED 1 starts flashing (after approx. 2 seconds) the decoder is in programming mode and you may release the direction switch.

In programming mode you can programme the registers of the decoder as follows:

1. Choose the register you want to programme by entering the register´s number as Motorola locomotive address on your central unit. Please note that with some central units a leading “0” has to be entered.
2. Push the direction switch. The lights flash faster.
3. Set the desired value of the register by setting the register´s value as Motorola locomotive address on your

central unit.

4. Push the direction switch again. The value zero can be reached via the Motorola address 80. The lights start flashing again.

Repeat the steps 1 to 4 for all registers you want to programme. In order to choose a register for programming or to enter a value for a register you have to confirm the entered number like selecting a Motorola locomotive address.

The lights show which kind of entry the decoder expects:

- Lights flash: Entry of a register number
- Lights flash faster: Entry of a register value

In order to terminate the programming mode simply push “Stop”.

Hint: Programming values higher than 80 in the “Motorola extended mode”

n order to change from the classical Motorola mode into the extended mode programme at first register 7to the value of 7 as described above. Subsequently the LED 1 starts blinking twice long followed by a pause. This pattern is then repeated. Now the decoder expects the hundred and the decade value of the register you want to programme as a value. Enter the appropriate number on your central unit and confirm by pushing the direction switch.

Then the decoder blinks long once followed by a long pause.

This rhythm is continually repeated. Now the decoder expects the input for the unit position. Enter the appropriate number on your central unit and confirm by pushing the direction switch. Now that the decoder “knows” the name of the register the content can follow.

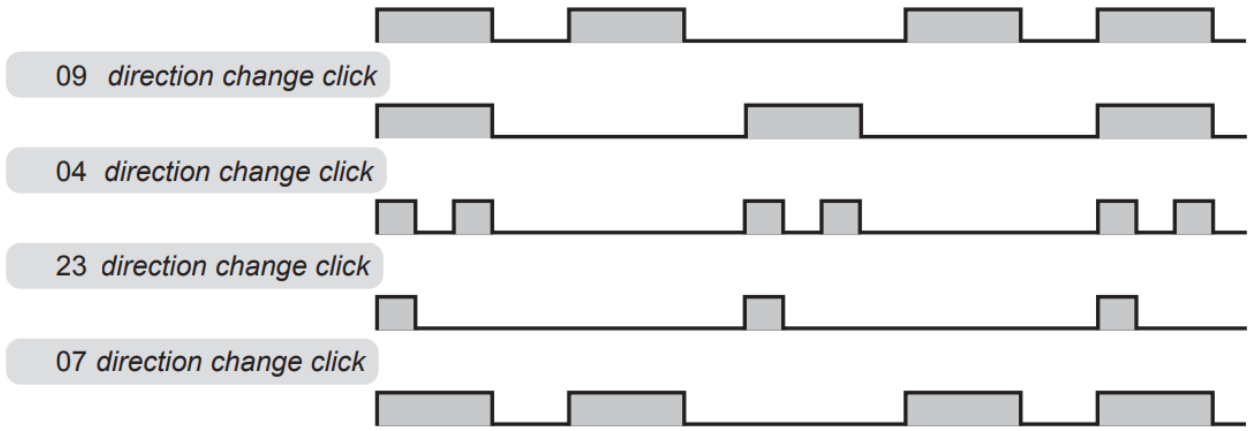
Enter the relevant number on the command station and confirm by activating the change-of-direction command. The decoder blinks long followed by a long pause. This rhythm is repeated continuously. The decoder now expects the input for the unit position.

Example: The value 237 is to be written into register 94. Assuming the decoder is already in the extended mode activated by the classic Motorola method by setting register 7 to value 7.

The programming sequence is shown in fig. 3.

Fig. 3

Blinking rhythm in Motorola long mode



Configuration variables (CVs)

The following table (beginning on page 16) shows all configuration variables that can be programmed for the coach lighting.

In the table you will find the numbers of the configuration variables in the column “CV No.”. The default values are the values set by factory setting and also whenever you do a reset of the decoder.

The values stated should not be exceeded since this may lead to unexpected resp. unpredictable behaviour. Simply correct this by programming values within the given range.

Notice:
For some configuration variables, the input values have to be calculated by adding the numerical values assigned to the desired parameters. These bit-based variables are indicated by italic type in column three of the table.

Name of CV	***No.***	(***Default) value range***	***Remarks***
Primary address	1	1 … 255 (3)	*Range of values in DCC: 1 … 127*
Acceleration rate	3	0 … 63 (8)	*CVs 3, 4, 5, 47 and 67 – 94 serve for setting the train speed and are needed for determining if the train is moving or if it has stopped. This is required for setting the random generator into“ moving” or “stopping” mode.*
Deceleration rate	4	0 … 63 (6)	*The deceleration ramp may be used for recognizing if the train has stopped.*

Max. speed	5	0 … 255 (255)	*The max. speed may be used for recognizing if the train has stopped.*
Version number	7		*Read only! Motorola (extended programming): Writing of value 7 allows extended programming in Motorola protocol.*
Manufacturer	8	(109)	*Read only! Factory reset: Writing a value of 8 resets all CVs to the factory default settings. Writing 9 resets all CVs except the address, CV 29 and the speed step table.*
F1 – F8 *Analogue function status*	13	*0 … 255 (66)*	*Indicates the status of the functions in analogue mode.* *F1 on = 1; F2 on = 2; F3 on = 4; F4 on = 8; … F8 on = 128* *Has a lower priority than CV 135. If CV 135 is not zero, the most recently set configuration in digital mode will be active.*
F0, F9 – F12 *Analogue function status*	14	*0 … 63 (3)*	*Calculated as in CV 13. F0 forward on = 1; F0 backwards on = 2; F9 on = 4; F10 on = 8; F11 on = 16; F12 on = 32*

Extended address	17	192 … 255 (192)	*Allows addresses above 127 if the long address is activated in CV 29, in DCC. Most command stations permit entering long addresses directly. In this case the CVs 17, 18 and 29 are set automatically to the proper values.*
	18	0 … 255 (0)	
Consist address	19	1 … 127 (0)	*Address in multi-traction mode.*
Consist mode function status	21	*0 … 255 (0)*	*Bit set to 0 means that the cor- responding function can only be con- trolled via the coach address. Bit set to “1”enables controlling functions via the consist address.* *Assignment as in CV 13/14. Example: CV 21: Value 1 = F1 controlled by the consist address.*
	22	*0 … 63 (0)*	

				Wert
			direction normal direction inverted	0 1

Configuration	29	*(22)*	*14 speed steps 28 and 128 speed steps*	02
			no analogue operation analogue operation allowed	04
			short address in CV 1 long address in CV 17-CV18	032
Error information	30		*Value 0: No error. Value 1: There was a short-circuit at AUX.*	
Function Mapping F0	33	*0 … 255 (1)*	*Value 1 – light scene A*	
Function Mapping F0	34	*0 … 255 (2)*	*Value 2 – light scene B*	
Function Mapping F1	35	*0 … 255 (4)*	*Value 4 – light scene C.*	
Function Mapping F2	36	*0 … 255 (56)*	*Value 56 – light scene D + E + F.*	
Function Mapping F3	37	*0 … 255 (8)*	*Value 8 – light scene D.*	
Function Mapping F4	38	*0 … 255 (16)*	*Value 16 – light scene E.*	
Function Mapping F5	39	*0 … 255 (32)*	*Value 32 – light scene F.*	
Function Mapping F6	40	*0 … 255 (64)*	*Value 64 – light scene G.*	

Function Mapping F7	41	*0 … 255 (128)*	*Value 128 – light scene H.*
F8 – F12 *Function Mapping F8 – F12*	42 – 46	*0 … 255 (0)*	*Defines a mapping between further function inputs and light scenes.*
Control settings	47	0, 2 (0)	*Bit 1: No emergency stop when changing direction/Emergency stop when changing direction.*
Preferred protocol	48	0, 1 (0)	*0 = DCC; 1 = Motorola*
Multi protocol	49	0 … 255 (50)	*Delay in case of change of protocol.*
If the decoder is no longer addressed in its actual digital protocol for a time period, it tries the alternative, by switching between DCC and MM. The time is 0.1 seconds x CV 49 (e. g. a value of 20 means 2 seconds). A value of 0 means this function is not active, and the de- coder does not switch protocols while in operation. Some digital stations, like the EcoS, do not address stopped locomotives periodically, in this case it is recommended to turn this feature off.			
Profile A	*50*	0..255 (1)	*Default: Headlights*
Profile B	*51*	0..255 (131)	*Default: Tail lights*
Profile C	*52*	0..255 (121)	*Default: AUX*
Profile D	*53*	0..255 (13)	*Default: First 3 LEDs*
Profile E	*54*	0..255 (45)	*Default: central 5 LEDs*
Profile F	*55*	0..255 (93)	*Default: Last 3 LEDs*

Profile G	*56*	0..255 (200)	*Default: Emergency lighting*
Profile H	*57*	0..255 (202)	*Default: Random mode for saloon coach*
Defective light 1	*58*	0..11 (0)	*0: Feature inactive. Otherwise indicates which light is “defective” and so it does not switch on or flickers regardless of the light scene.*
Defective light 2	*59*	0..11 (0)	*As in CV 58*
Brightness headlights	*60*	0..40 (40)	*If the value is 0 or in analogue mode the brightness is controlled with the potentiometer.*
Brightness tail lights	*61*	0..40 (40)	*If the value is 0 or in analogue mode the brightness is controlled with the potentiometer.*
Brightness AUX	*62*	0..40 (40)	*If the value is 0 or in analogue mode the brightness is controlled with the potentiometer.*
Brightness LEDs	*63*	0..40 (40)	*If the value is 0 or in analogue mode the brightness is controlled with the potentiometer.*
Lighting effects (e.g. fluorescent lamp simulation)	*64*	0..2 (1)	*Lighting effects when switching lights. 0: No effect (incandescent lamps), immediate start* *1: Dimming up (fluorescent lamps with electronic ballast)* *2: Flicker (fluorescent lamp with* *starter)*
Speed table	*67 – 94*	0…255	*Used for keeping track of the train speed.*
Motorola secondary function address	113	0 … 255	*Setting an address in this CV allows the functions F1 – F4 for this loco ad- dress to be used as functions F5 – F8. This feature allows to use 8 functions even with digital stations which can control only 4 functions.*

Locomotive address (LSB)	114	0..255 (0)	*For some functions it is useful to know if the train is currently moving or if it is stationary. If the locomotive address* *is different from the coach lighting address one may enter the locomotive address at this point. If the value is zero, it is assumed that the locomotive address and the coach lighting ad- dress are the same.* *Address = CV 114 + 256 x CV 115*
Locomotive address (MSB)	115	0..64 (0)	
Random generator "drive" minimum	116	0..255 (30)	*Minimum time in seconds.*
Random generator "drive" maximum	117	0..255 (120)	*Maximum time in seconds.*
Random generator "standstill" minimum	118	0..255 (4)	*Minimum time in seconds.*
Random generator "standstill" maximum	119	0..255 (12)	*Maximum time in seconds.*
Random generator "standstill" – delay minimum	120	0..255 (3)	*Minimum time in seconds.*
Random generator "standstill" – delay maximum	121	0..255 (5)	*Maximum time in seconds.*
Random generator "standstill" – probability of activation	122	0..8 (6)	*Probability of the random generator switching into station mode (CVs 118 – 121) after the train has stopped.*

Random generator switching output AUX off minimum	123	0..8 (0)	*Time in seconds.*
Random generator switching output AUX off maximum	124	0..8 (0)	*Time in seconds.*
Random generator switching output AUX on minimum	125	0..8 (0)	*Time in seconds.*
Random generator switching output AUX on maximum	126	0..8 (0)	*Time in seconds.*
Effects AUX	127	0…2 (0)	*Refer to CV 64.*
Flashing period headlights	129	0..255 (0)	*Time in 0.1 seconds.*
Turn on time headlights	130	0..255 (0)	*Time in 0.1 seconds.*
Flashing period tail lights	131	0..255 (0)	*Time in 0.1 seconds.*
Turn on time tail lights	132	0..255 (0)	*Time in 0.1 seconds.*

Learning mode (function saving)	135	0..2 (0)	*0 = “standard mode”* *1 = “dynamic mode”* *2 = “permanently wired mode”*
The decoder is capable of „learning“ the status of functions and trigger these functions whenever it is starting up (or also in analogue mode) if no specific commands have been issued to its address. In order to avoid having to activate the individual light scenes in each coach or to programme several bits in CVs at the beginning of every operating session (powering up the layout) you can set the decoder into “learning mode” and simply push the desired function buttons on your command station. The decoder stores the information regarding the function status and switches these functions during start-up of the layout if no specific commands have been issued to its address. Once the decoder receives a command it will interpret it and disregard the saved functions. Writing the value 1 puts the decoder into the learning mode. This can be accomplished either via the programming track or via POM. If and when the decoder subsequently receives a command, it prepares to save this information. Should the decoder subsequently experience a power cut-out, it saves the latest status of the functions. Writing the value 0 deletes the programmed functions. Also refer to chapter 4.9.			
“Day mode”/switching off all lights	136	0..255 (255)	*In order to deactivate all LEDs you may define any of the available function buttons (F0 through F28) by entering a value corresponding to the number of the function button (0 for F0; 1 for F1; 2 for F2; etc.)*
Analogue hysteresis on	140	0..255 (110)	*Upper voltage level in analogue mode for the activation of the lights.*
Analogue hysteresis off	141	0..255 (50)	*Lower voltage level in analogue mode for the deactivation of the lights.*
F13 – F28/*Function mapping F13 – F28*	147 – 162	0…255 (0)	*Defines a mapping between further function inputs and light scenes.*

Troubleshooting

All Viessmann products are produced with high quality standards and are checked before delivery. Should a fault occur non withstanding, you can do a first check using the following points.

The coach lighting gets very hot and switches off.

- Disconnect power immediately!
- Possible cause: Overload of the switching output.

  Check the power input.

LEDs cannot be switched on.

- Check for invalid configurations in the function mapping. Reset the decoder to the factory settings.
- Daylight operation activated?

LEDs appear to switch on and off arbitrarily.

- You may have activated the random mode calling up the various light scenes. Set the appropriate CVs to the correct (standard) values or reset the decoder to default values.
- Possibly function commands are transmitted to the decoder address that are actually intended for a locomotive decoder. Change the function allocations or assign a new address to the coach lighting.

Your DCC central unit reports an error while programming the decoder at the programming track.

- The decoder cannot give enough current feedback to the central unit without additional means. Connect the enclosed resistor according to fig. 2.

Annexe

F7 with light scene H: “Random control of saloon coach“

You do not have a saloon coach but rather one with compartments in which different lights should be turned on and off in a random pattern. It is quite simple to adapt light scene H for this purpose. Point 4.3 lists the value 203: “Random control for compartment coaches”. Simply change light scene H in CV 57 to the value 203. There is no need to modify the function mapping, because F7 now triggers light scene H with the value 203.

If light scene H is linked to several functions, it will be automatically updated in all applications without changing CVs 33-46. This is the true advantage of the concept of light scenes: One function button can activate several light scenes and any light scene may be linked to several function buttons. You may also reconfigure individual light scenes without having to recalculate any values for the function mapping.

Compartment coach and modified light scenes

In case of a compartment coach it may be useful to set F3, F4 and F5 (CVs 37, 38, 39) to zero in order to prevent the unintentional switching of groups of LEDs that would appear out of place in a compartment coach. In order to be able to use light scenes E and F differently, light scene D must be changed in such a way that it switches all 11 LEDs.

Now the settings of the CVs vary from the basic settings as follows:

CV 36 = 8 (F2 now only switches light scene D = 8)
CV 37 = 0 (F3 is not needed any longer and can possibly be used for some other task)
CV 38 = 0 (F4 is not needed any longer and can possibly be used for some other task)
CV 39 = 0 (F5 is not needed any longer and can possibly be used for some other task)
CV 53 = 10 (Light scene D: All LEDs starting from LED
No. 1; Exception: 0 means “all LEDs”)
CV 54 = 0 (Light scene E is not needed any longer and can possibly be used for some other task)
CV 55 = 0
CV 57 = 203 (Random control triggers individual LEDs rather than groups)

Austrian saloon coach with centre doors as well as doors at the ends

Arrangement of doors and windows: D W W W W W D D W W W W W D (D = Door, W= Window)

For lighting these two interior spaces separately, two light scenes are needed.

Light scene D is to control the first half of the coach, e. g. lights 1 through 5, therefore, value 15 is entered in CV 53.

Light scene E controls the last 5 LEDs; therefore, value 75 is entered into CV 54 (5 LEDs beginning with LED No. 7).

LED No. 6 is located at the doors in the middle of the coach. If it is also to be assigned to a light scene, enter value 61 (beginning with LED 6, 1 LED only!). This

LED could be assigned to light scene F, therefore, enter value 61 in CV 55.

Warranty

Each model is tested as to its full functionality prior to delivery. The warranty period is 2 years starting on the date of purchase. Should a fault occur during this period please contact our service department (**service@viessmann-modell.com**). Please send the item to the Viessmann service department for check and repair only after consultation. If we find a material or production fault to be the cause of the failure the item will be repaired free of charge or replaced. Expressively excluded from any warranty claims and liability are damages of the item and consequential damages due to inappropriate handling, disregarding the instructions of this manual, inappropriate use of the model, unauthorized disassembling, construction modifications and use of force, overheating and similar.

Technical data

Operating voltage (analogue):	14 – 24 V AC~ / DC=
Operating voltage (digital):	max. 24 V (eff.)
Current consumption plus switching and light outputs:	ca. 20 mA
Data format:	DCC and Motorola (MM
Switching output:	max. 150 mA
Protection category:	IP 00
Ambient temperature in use:	+8 – +35 C°
Comparative humidity allowed:	max. 85 %
Weight:	ca. 10.5 g
Dimensions:	L 8.2 x W 254 x H 3 mm (highest component 4 mm)

Do not dispose of this product through (unsorted) domestic waste, supply it to recycling instead.

Subject to change without prior notice. No liability for mistakes and printing errors.

You will find the latest version of the manual on the Viessmann website using the item number.

Model building item, not a toy! Not suitable for children under the age of 14 years! Keep these instructions!

Customer Support

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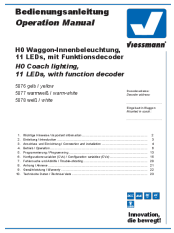
Documents / Resources

	Viessman 5076 H0 Coach lighting 11 LEDs with Function Decoder [pdf] User Manual 5078, 5076 H0 Coach lighting 11 LEDs with Function Decoder, H0 Coach lighting 11 LEDs with Function Decoder, Coach lighting 11 LEDs with Function Decoder, LEDs with Function Decoder , Function Decoder

References

- Welcome to the Modell Group
- Viessmann Modelltechnik GmbH