DR4018

Application manual

A compilation of the topic: “Digikeijs DR4018: controlling signals”

Please note this has been automatically translated from Dutch and could have translation errors

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1.0 Introduction

The DR4018 is a fully configurable switch decoder, the outputs of which can realize a large number of functions that can be linked to a DCC address.
The configuration is performed by assigning a value to CVs. This allows the DR4018 to be used as a decoder for points, signals, on / off switch and switch motor; whether or not in combination with each other.
To make it easy to use, it is possible to make the DR4018 suitable for a desired application by means of a preset.
It is certainly possible to combine different applications; however, this requires additional configuration, for which many examples are discussed in this manual.

1.1 Outputs

The DR4018 has 16 physical outputs. The outputs can each be accessed by a DCC address to be set, or a group of outputs can each be accessed by a DCC address. This depends on the function assigned to those outputs.

Example 1)

There are 16 outputs, each of which can be accessed by a DCC address if the decoder is used as an on / off switch.

DR4018 outputs

fig. 1

Example 2)

There are 8 groups of 2 outputs, which can be accessed by 8 DCC addresses if the decoder is used as a turnout decoder: one for “turnout right” and one for “turnout”. Thus, 8 switches can be switched.

The same applies to the use of the decoder as a two-light signal: 8 groups of 2 outputs; one output of signal = red and one before signal = green.

Example 3)

There is a group of 16 outputs, which is approached by 1 DCC address when the decoder is used to control 16 lights with fluorescent lighting effect.

1.2 Possible properties of the outputs.

The following properties can be assigned to each of the DR4018's outputs:

- A constant voltage that can be varied from the maximum value to zero. This allows the intensity of lighting, for example, to be dimmed to a desired level. Use with lighting, signal lamps, etc.

- A voltage that goes from zero to the maximum value when switched on and vice versa when switched off.

  This allows, for example, the lights of a signal to fade in and out.
- A voltage that switches on and off alternately. Flashers can be configured with this.
- A voltage that appears randomly at an output. This makes it possible to start up a series of, for example, platform lamps in any order.

- A voltage that appears at the output in the form of a pulse. With this one can control the coil of, for example, a switch.

1.3 Linking the outputs to a DCC address

With the DR4018, the outputs can be linked to a DCC address to your own device. This makes it possible, for example, to group 2 flashing lights with a bell under a single DC address and, for example, to combine these with 2 multiple light signals. If free outputs of a DR4018 are still available, it is possible to combine the applications with additional configuration. Examples of this are presented in detail in this manual.

1.4 Presets for the DR4018

In many cases, using the Presets will be appropriate for the desired application. Using a Preset means that all exits behave like the application assigned with the preset with the advantage that the DR4018 can be used immediately without additional configuration.

The following applications can be configured with Presets:

• Preset 0	8x switch with coil drive	8 DCC addresses
• Preset 1	16x permanent on / off switch	16 DCC addresses
• Preset 2	8x two-light signal with fader effect	8 DCC addresses
• Preset 3	8x AHOB	8 DCC addresses
• Preset 4	2 groups of 8x fluorescent lighting effect	2 DCC addresses
• Preset 5	1 group of 16x fluorescent lighting	1 DCC address
• Preset 6	8x AC motor control	8 DCC addresses
• Preset 7	4x NS three-light signal with number box	16 DCC addresses
• Preset 8	4x DB main signal	16 DCC addresses
• Preset 9	4x DB signal at the main signal	16 DCC addresses
• Preset 10	2x combination DB main signal and distant signal	8 DCC addresses
• Preset 11	4x DB signal	16 DCC addresses
• Preset 12	4x NMBS signal	16 DCC addresses
• Preset 13	8x alternator motor control with time limit	8 DCC addresses

The required properties are then assigned to the outputs, as well as that the outputs are correctly linked to the required number of DCC addresses.
In addition, in the case of multiple signals (Preset 7 to 12), the correct signal images are presented at the outputs as a function of a specific combination of the assigned DCC addresses.

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2.0 Using the DR4018

2.1 Preset 0: use as a switch decoder.

This application is configured with Preset = 0

Schematically the connection of this looks as follows:

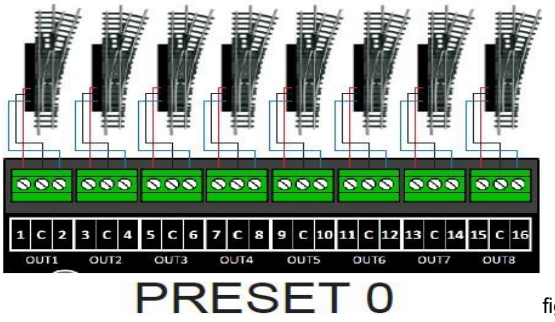

fig. 2

The Preset value is set with CV47; = 0

The value of CV47 cannot be read out because the value entered leads to an internal command in the DR4018 to set the CVs to the value associated with the Preset. (for entering values in the CVs, please refer to the Digikeijs manual DR4018, page 6)

The CVs are now set as follows in the DR4018:

DR4018 Preset 0 = 8x Wissel/Sein schakeling met puls

Configuratie		
CV	Val	
47	0	= Preset
107	70	= Donkertijd
108	10	= Dimwaarde
109	14	= PWM periode
110		
111	3	= Fade-snelheid
112	183	= Knippersnelheid

Sein OUT Config		
OUT	CV	Val
1-4	131	0
5-8	132	0
9-12	133	0
13-16	134	0

Fmap sein			OUT's			
Sein	CV	Val	1-4	5-8	9-12	12-16
1	143	0	1	2	4	8
2	167	0	1	2	4	8
3	191	0	1	2	4	8
4	215	0	1	2	4	8

DR4018				Configuratie		Pulstijd	
OUT		Fmap	Aansluiting	CV	Val	CV	Val
					143		**128**
1	1a	1	Wissel #1 Recht	113	143	238	128
2	1b	2	Wissel #1 Afbuig	114	143	239	128
3	2a	4	Wissel #2 Recht	115	143	240	128
4	2b	8	Wissel #2 Afbuig	116	143	241	128
5	3a	16	Wissel #3 Recht	117	143	242	128
6	3b	32	Wissel #3 Afbuig	118	143	243	128
7	4a	64	Wissel #4 Recht	119	143	244	128
8	4b	128	Wissel #4 Afbuig	120	143	245	128
9	5a	1	Wissel #5 Recht	121	143	246	128
10	5b	2	Wissel #5 Afbuig	122	143	247	128
11	6a	4	Wissel #6 Recht	123	143	248	128
12	6b	8	Wissel #6 Afbuig	124	143	249	128
13	7a	16	Wissel #7 Recht	125	143	250	128
14	7b	32	Wissel #7 Afbuig	126	143	251	128
15	8a	64	Wissel #8 Recht	127	143	252	128
16	8b	128	Wissel #8 Afbuig	128	143	253	128

DR4018		Fmap AAN				Fmap UIT			
Adres	Toepassing	CV	Val	CV	Val	CV	Val	CV	Val
1	Wissel #1	141	1	142	0	144	2	145	0
2	Wissel #2	147	4	148	0	150	8	151	0
3	Wissel #3	153	16	154	0	156	32	157	0
4	Wissel #4	159	64	160	0	162	128	163	0
5	Wissel #5	165	0	166	1	168	0	169	2
6	Wissel #6	171	0	172	4	174	0	175	8
7	Wissel #7	177	0	178	16	180	0	181	32
8	Wissel #8	183	0	184	64	186	0	187	128

fig. 3

The green box contains the CVs, with which some properties of the outputs can be set.

The yellow box at the bottom left shows the hardware, which is connected to the outputs, along with the CVs, which show the properties of the outputs **per output** show In this example: CV113 through CV128 have the value 143; the output gives a pulse.

The yellow box at the bottom right shows the addresses assigned to the outputs: in this example the starting address of the DR4018 is set to = 1 (see page 5 of the DR4018 manual from Digikeijs for giving a starting address to the DR4018).
Note that the DR4018 with 8 addresses is configured to control turnouts: one address per 2 outputs; one for turnout straight (green) and one for turnout (red). The CVs in this box provide the correct link between the DCC addresses and the outputs.

The two yellow boxes at the top right are intended for the use of the DR4018 as a decoder for light signals. The values of CVs 131 to 134 = 0. This is the value to be entered if no signals are used for none of the 4 outputs. The yellow box underneath ensures the correct coupling of the DCC addresses with the outputs in case signals are applied; the CV values are zero in this example because there are no signals.

3.0 Configuring the DR4018 as desired

This section explains how to bring a DR4018 to a desired configuration step by step.

To achieve this, roughly 2 or 3 adjustments apply to the DR4018:

1. Adaptation of the properties to the outputs of the desired application (s) (the yellow box on the left in image 3)
2. Linking the outputs of the applications with the corresponding DCC addresses yellow box on the right in image 3)
3. In case of application of light signals: setting of the desired light signal and the coupling per signal to the desired outputs. (yellow boxes at the top right in figure 3)

3.1 Assignment of properties at the output

The various properties of each of the 16 outputs are assigned by attributing a value to CVs 113 to 128.

CV 113 for output OUT1 and CV 128 for output OUT16 and the intermediate CVs for the intermediate outputs.

The most common values for these CVs are:

15 = maximum voltage in / out (can be dimmed by choosing a value between 0 and 15)
31 = maximum voltage in / out with fading (e.g. signal lamps)
63 = maximum voltage flashing with fading (eg AHOB)
191 = maximum voltage flashing in reverse phase with fading. (eg AHOB)
73 = varying voltage in / out for fluorescent lamp effect (eg platform lighting)
90 = varying voltage in / out for Gaslamp effect (e.g. street lighting)
143 = one-time pulse voltage for operating turnouts / signals with coil drive

How is the value to be filled in for these CVs created?

The value is an 8-bit number, the individual bits of which are set or not based on the desired property.

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The values of the bits of each of the properties are as follows:

Bit 0-3 Constant tension	Value **15** is max.	**0** is off	Value **15-0**
Bit 4 Fade in and out effect	Value **16** is on	**0** is off	Value **16 or 0**
Bit 5 Blinking effect	Value **32** is on	**0** is off	Value **32 or 0**
Bit 6 Random startup	Value **64** is on	**0** is off	Value **64 or 0**
Bit 7 Pulse time	Value **128** is on	**0** is off	Value **255-0**

Comments

Bit 4: Fade speed is adjustable with CV111 (see manual) Bit 5: Flashing
speed is adjustable with CV112
Bit 6: Start-up speed is adjustable with CV111; combined with bit 4, lighting starts up with a
flash, after which the light slowly comes on (gas lamp effect) Prerequisite: bit 1-5 is max. 14 Bit 7: Average value is 128. Pulse time can be set with CV238 to 253 Combined with bit 5
the output flashes in opposite phase

Examples

The following examples show which values can be assigned to different effects. The examples relate to CV113 belonging to output OUT1. CV113 = **Value** Bit 0-3 + **Value** Bit 4+ **Value** Bit 5+ **Value** Bit 6+ **Value** Bit 7

15 = Bit 0-3 (**15)** + Bit 4 **from (0)** + Bit 5 **off (0)** + Bit 6 **off (0)** + Bit 7 **off (0)**
= OUT1 permanently on at full strength

10 = Bit 0-3 (**10)** + Bit 4 **from (0)** + Bit 5 **off (0)** + Bit 6 **off (0)** + Bit 7 **off (0)**
= OUT1 permanently on, partially dimmed

31 = Bit 0-3 (**15)** + Bit 4 **to (16)** + Bit 5 **off (0)** + Bit 6 **off (0)** + Bit 7 **off (0)**
= OUT1 permanently on at full strength with fading

26 = Bit 0-3 (**10)** + Bit 4 **to (16)** + Bit 5 **off (0)** + Bit 6 **off (0)** + Bit 7 **off (0)**
= OUT1 permanently on with fading; partially dimmed

47 = Bit 0-3 (**15)** + Bit 4 **from (0)** + Bit 5 **on (32)** + Bit 6 **off (0)** + Bit 7 **off (0)**
= OUT1 flashing at full intensity

42 = Bit 0-3 (**10)** + Bit 4 **from (0)** + Bit 5 **on (32)** + Bit 6 **off (0)** + Bit 7 **off (0)**
= OUT1 flashing; partially dimmed

63 = Bit 0-3 (**15)** + Bit 4 **to (16)** + Bit 5 **on (32)** + Bit 6 **off (0)** + Bit 7 **off (0)**
= OUT1 flashing at full intensity with fading

58 = Bit 0-3 (**10)** + Bit 4 **to (16)** + Bit 5 **on (32)** + Bit 6 **off (0)** + Bit 7 **off (0)**
= OUT1 flashing; partially dimmed with fading

79 = Bit 0-3 (**15)** + Bit 4 **from (0)** + Bit 5 **off (0)** + Bit 6 **on (64)** + Bit 7 **off (0)**
= OUT1 permanently on at full strength; with random start-up (fluorescent effect)

74 = Bit 0-3 (**10)** + Bit 4 **from (0)** + Bit 5 **off (0)** + Bit 6 **on (64)** + Bit 7 **off (0)**
= OUT1 permanently on, partially dimmed; with random start-up (fluorescent effect)

90 = Bit 0-3 (**10)** + Bit 4 **to (16)** + Bit 5 **off (0)** + Bit 6 **on (64)** + Bit 7 **off (0)**
= OUT1 permanently on, partially dimmed; with flash / fade start-up (gas lamp effect)

143 = Bit 0-3 (**15)** + Bit 4 **from (0)** + Bit 5 **off (0)** + Bit 6 **off (0)** + Bit 7 **on (128)**
= OUT1 gives a PULSE at full strength (switching of switches with coils)

138 = Bit 0-3 (**10) + Bit 4 from (0) + Bit 5 off (0) + Bit 6 off (0) + Bit 7 on (128)**
= OUT1 gives a PULS with somewhat lower voltage
NB: The **pulse time** is defined per CV in CVs 238 to 253

191 = Bit 0-3 (**15) + Bit 4 to (16) + Bit 5 on (32) + Bit 6 off (0) + Bit 7 on (128)**
= OUT1 flashing at full intensity with fading; in counter phase

186 = Bit 0-3 (**10) + Bit 4 to (16) + Bit 5 on (32) + Bit 6 off (0) + Bit 7 on (128)**
= OUT1 flashing; partially dimmed with fading and in reverse phase

3.2 Linking the outputs with the corresponding DCC addresses

Linking the outputs to the DCC addresses is done via “Function Mapping”, which is realized by giving CVs 141 to 235 the correct value in relation to the desired DCC address. (see picture 4)

The DR4018 can be configured with 16, 8, 4, 2 and 1 address (es). As an example, the CV content of the Fmap for 16 and 8 address configuration is shown in detail.

Example 1: the DR4018 is set up for 16 addresses with 16 outputs on / off. In this case, only the CV series of **Fmap** used; the CVs associated with **Fmap out** all have the value = **0**

The 16 outputs OUT1 to OUT16 are divided into two groups of 8 outputs each with their own CV series for each group:

Group A: CV141, CV147, CV153 etc to CV231 (**green** in table of picture 4) Group B: CV142 ,, CV148, CV154, etc up to CV232 (**blue** in table of figure 4)) The 16 outputs must therefore be linked to 16 DCC addresses. Suppose the DCC address of OUT1 is equal to 1, then the link of the 16 addresses is established as follows:

- The OUTs of **group A (** OUT1 to OUT 8) are linked to the **DCC addresses 1 through 8**
- The OUTs of **group B (** OUT9 to OUT16) are linked to the **DCC addresses 9 to 16**

Address 1 FMAP ON is linked to OUT1 (Group A) via CV 141 = 1
Address 2 FMAP ON is linked to OUT2 (Group A) via CV 147 = 2
Address 3 FMAP ON is linked to OUT3 (Group A) via CV 153 = 4
Address 4 FMAP ON is linked to OUT4 (Group A) via CV 159 = 8
… Etc…
Address 8 FMAP ON is linked to OUT8 (Group A) via CV 183 = 128
Address 9 FMAP ON is linked to OUT9 (Group B) via CV 190 = 1
Address 10 FMAP ON is linked to OUT10 (Group B) via CV 196 = 2
… Etc…
Address 16 FMAP ON is linked to OUT16 (Group B) via CV 232 = 128 Schematically

the Function Map looks like this:

DR4018		Fmap AAN				Fmap UIT			
Adres	Toepassing	CV	Val	CV	Val	CV	Val	CV	Val
1	OUT1 aan/uit	141	1	142	0	144	0	145	0
2	OUT2 aan/uit	147	2	148	0	150	0	151	0
3	OUT3 aan/uit	153	4	154	0	156	0	157	0
4	OUT4 aan/uit	159	8	160	0	162	0	163	0
5	OUT5 aan/uit	165	16	166	0	168	0	169	0
6	OUT6 aan/uit	171	32	172	0	174	0	175	0
7	OUT7 aan/uit	177	64	178	0	180	0	181	0
8	OUT8 aan/uit	183	128	184	0	186	0	187	0
9	OUT9 aan/uit	189	0	190	1	192	0	193	0
10	OUT10 aan/uit	195	0	196	2	198	0	199	0
11	OUT11 aan/uit	201	0	202	4	204	0	205	0
12	OUT12 aan/uit	207	0	208	8	210	0	211	0
13	OUT13 aan/uit	213	0	214	16	216	0	217	0
14	OUT14 aan/uit	219	0	220	32	222	0	223	0
15	OUT15 aan/uit	225	0	226	64	228	0	229	0
16	OUT16 aan/uit	231	0	232	128	234	0	235	0

fig. 4

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The meaning of the columns Fmap ON and Fmap OFF

With 16 outputs with 16 addresses, each output for the configured function can be activated and deactivated by **the green key on the control panel of the relevant address for activate and the red key for deactivate.**

In the column Fmap ON you will find the CVs that connect the addresses “green button” to the relevant output. In the column Fmap OFF the same for the addresses “red button”. The CVs in this column are all zero in this case; this disables the function on the output. How does the DR4018 configure for 16 addresses?

Once a Mapping CV of an address> 8 has a non-zero value, the DR4018 is provisioned for 16 addresses (in this case: CV190 = 1)

Example 2: design of the DR4018 for 8 addresses with 2 outputs per address In this case, there is one output for “on” and an output for “off” per address. This configuration occurs if the DR4018 is configured as a turnout or two-light signal decoder. The output "on" is for turnout = straight or signal = green and the output "off" is for turnout = deflection or signal = red. In this case, the CV series of both Fmap on and Fmap off is used (see fig. 5). The 16 output and OUT1 to OUT16 are divided into two groups of 8 outputs each, each with its own CV series. :

Fmap on: Group A: CV141, CV147, CV153 etc. up to CV231 (**green** in table of figure 5) Fmap from: Group A: CV144, CV150, CV156 etc. up to CV234 (**green** in table of figure 5) Fmap to: Group B: CV142, CV148, CV154, etc. up to CV232 (**blue** in table of figure 5) Fmap from: Group B: CV145, CV151, CV157 etc. up to CV235 (**blue** in table of figure 5) The 16 outputs must therefore be linked to 8 DCC addresses. Suppose the DCC address of OUT1 is equal to 1, then the linking of the 8 addresses is established as follows:

- The OUTs of **group A (** OUT1 to OUT4) are linked to the **DCC addresses 1 to 4**
- The OUTs of **group B (** OUT5 to OUT8) are linked to the **DCC addresses 4 to 8**

Address 1	FMAP on is linked to OUT1 (Group A) via CV 141 = 1
Address 1	FMAP out is linked to OUT2 (Group A) via CV 144 = 2
Address 2	FMAP on is linked to OUT3 (Group A) via CV 147 = 4
Address 2	FMAP out is linked to OUT4 (Group A) via CV 150 = 8
	… Etc…
Address 4	FMAP on is linked to OUT7 (Group A) via CV 159 = 64
Address 4	FMAP out is linked to OUT8 (Group A) via CV 162 = 128
Address 5	FMAP on is linked to OUT9 (Group B) via CV 166 = 1
	… Etc…
Address 8	FMAP out is linked to OUT16 (Group B) via CV 187 = 128

Schematically, the Function Map looks like this:

DR4018		Fmap AAN				Fmap UIT			
Adres	Toepassing	CV	Val	CV	Val	CV	Val	CV	Val
1	OUT1/2 aan/uit	141	1	142	0	144	2	145	0
2	OUT3/4 aan/uit	147	4	148	0	150	8	151	0
3	OUT5/6 aan/uit	153	16	154	0	156	32	157	0
4	OUT7/8 aan/uit	159	64	160	0	162	128	163	0
5	OUT9/10 aan/uit	165	0	166	1	168	0	169	2
6	OUT11/12 aan/uit	171	0	172	4	174	0	175	8
7	OUT13/14 aan/uit	177	0	178	16	180	0	181	32
8	OUT15/16 aan/uit	183	0	184	64	186	0	187	128
		189	0	190	0	192	0	193	0
		195	0	196	0	198	0	199	0
		201	0	202	0	204	0	205	0
		207	0	208	0	210	0	211	0
		213	0	214	0	216	0	217	0
		219	0	220	0	222	0	223	0
		225	0	226	0	228	0	229	0
		231	0	232	0	234	0	235	0

fig. 5

From the 9e address, the Mapping CVs are equal to zero, which means that the DR4018 is set up for 8 addresses.

The meaning of the columns Fmap ON and Fmap OFF

With 16 outputs with 8 addresses, each output can be activated and deactivated for the configured function, only the process differs from that of the 16 outputs with 16 addresses: **green** key on the control panel of the relevant address **activates** the corresponding output when not active and **deactivates** the exit associated with the **red** test. Other way around

activates the **red** key in the corresponding output when not active and **deactivates** the exit associated with the **green** test.

In the column Fmap ON you will find the CVs that connect the addresses “green button” to the relevant output. In the column Fmap OFF the same applies to the addresses “red button”. The CVs have a value in both columns, because both the green and red buttons activate a function.

4.0 Configuration of an application in combination with Preset 0

Suppose a DR4018 is used to control five switches with three two-light signals.

Schematically the connection of this looks as follows:

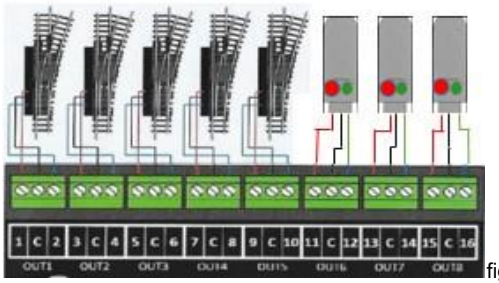

fig. 6

The turnouts are connected to the outputs OUT 1 to OUT10. The 3 two-light signals are connected to the outputs OUT11 to OUT16. For two-light signals - just as for the turnouts - groups of 2 outputs are required, so that the preset = 0 is sufficient in this respect; however, the properties of the turnout outputs are not the same as for the signals and the respective CVs must therefore be adapted.

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The contents of the DR4018 will look like this:

DR4018 Preset 0 5x Wissel 3x Sein combi

Configuratie

CV	Val	
47	0	= Preset
107	70	= Donkertijd
108	10	= Dimwaarde
109	14	= PWM periode
110		
111	3	= Fade-snelheid
112	183	= Knippersnelheid

Sein OUT Config

OUT	CV	Val
1-4	131	0
5-8	132	0
9-12	133	0
13-16	134	0

Fmap sein			OUT's			
Sein	CV	Val	1-4	5-8	9-12	12-16
1	143	0	1	2	4	8
2	167	0	1	2	4	8
3	191	0	1	2	4	8
4	215	0	1	2	4	8

DR4018				Configuratie		Pulstijd	
OUT		Fmap	Aansluiting	CV	Val	CV	Val
					143		**128**
1	1a	1	Wissel #1 Recht	113	143	238	128
2	1b	2	Wissel #1 Afbuig	114	143	239	128
3	2a	4	Wissel #2 Recht	115	143	240	128
4	2b	8	Wissel #2 Afbuig	116	143	241	128
5	3a	16	Wissel #3 Recht	117	143	242	128
6	3b	32	Wissel #3 Afbuig	118	143	243	128
7	4a	64	Wissel #4 Recht	119	143	244	128
8	4b	128	Wissel #4 Afbuig	120	143	245	128
9	5a	1	Wissel #5 Recht	121	143	246	128
10	5b	2	Wissel #5 Afbuig	122	143	247	128
11	6a	4	DB Hp # 1 Groen	123	31	248	128
12	6b	8	DB Hp # 1 Rood	124	31	249	128
13	7a	16	DB Hp # 2 Groen	125	31	250	128
14	7b	32	DB Hp # 2 Rood	126	31	251	128
15	8a	64	DB Hp # 3 Groen	127	31	252	128
16	8b	128	DB Hp # 3 Rood	128	31	253	128

DR4018		Fmap AAN				Fmap UIT			
Adres	Toepassing	CV	Val	CV	Val	CV	Val	CV	Val
1	Wissel #1	141	1	142	0	144	2	145	0
2	Wissel #2	147	4	148	0	150	8	151	0
3	Wissel #3	153	16	154	0	156	32	157	0
4	Wissel #4	159	64	160	0	162	128	163	0
5	Wissel #5	165	0	166	1	168	0	169	2
6	DB Hp # 1	171	0	172	4	174	0	175	8
7	DB Hp # 2	177	0	178	16	180	0	181	32
8	DB Hp # 3	183	0	184	64	186	0	187	128

fig. 6

The configuration of OUT11 to OUT 16 has been changed from PULS at full strength to permanent on with fading.

For this, CVs 123 to 128 must each be set to a value of 31. There is no need to change the coupling of the DCC addresses with the output: 3 points have made way for 3 two-light signals, each of which - like the points - is controlled by a combination of one DCC address with two outputs. The turnouts resp. the signals are controlled as follows (**GR** = green button; **RO** = red button):

- Address [1] **GR** = Substitute # 1 straight
- Address [1] **RO** = Substitute # 1
- Address [2] **GR** = Substitute # 2 straight
- Address [2] **RO** = Substitute # 2
- Address [3] **GR** = Substitute # 3 right
- Address [3] **RO** = Substitute # 3
- Address [4] **GR** = Substitute # 4 straight
- Address [4] **RO** = Substitute # 4
- Address [5] **GR** = Substitute # 5 right
- Address [5] **RO** = Substitute # 5
- Address [6] **GR** = Signal # 1 safe (green)
- Address [6] **RO** = Signal # 1 unsafe (red)
- Address [7] **GR** = Signal # 2 safe (green)
- Address [7] **RO** = Signal # 2 unsafe (red)
- Address [8] **GR** = Signal # 3 safe (green)
- Address [8] **RO** = Signal # 3 unsafe (red)

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5.0 Preset 7: use as a decoder for 4 NS 3-light signals with number box

This application is configured with Preset = 7

Schematically the connection of this looks as follows:

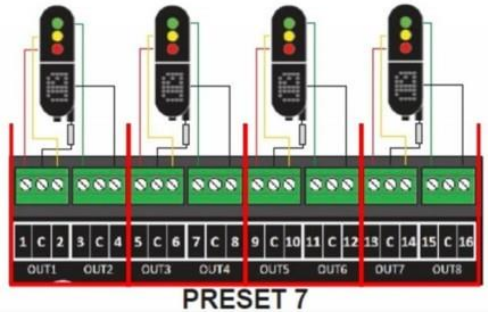

fig. 7

Setting the DR4018 with Preset = 7 results in 16 DCC addresses becoming available, which are divided into 4 groups of 4 addresses with a group for each signal. So 4 signals can be connected as follows: Signal 1 is connected to OUT1 to OUT4 Signal 2 is connected to OUT5 to OUT8 Signal 3 is connected to OUT9 to OUT12 Signal 4 is connected to OUT12 to OUT16

In order for the DR4018 to work as “NS light signal” for 4 units, the following must be realized:

- Set the DR 4018 with Preset 7 by giving CV47 the value 7
- Give the DR 4018 the desired starting address
- Connect the signals according to the above diagram

The contents of the DR4018 look like this, with starting address is 1.

DR4018 Preset 7 = 4x NS drielichtsein met cijferbak

Configuratie		
CV	Val	
47	7	= Preset
107	70	= Donkertijd
108	10	= Dimwaarde
109	14	= PWM periode
110		
111	1	= Fade-snelheid
112	183	= Knippersnelheid

Sein OUT Config			
OUT	CV	Val	
1-4	131	1	= NS drielicht + cijfer
5-8	132	1	= NS drielicht + cijfer
9-12	133	1	= NS drielicht + cijfer
13-16	134	1	= NS drielicht + cijfer

Fmap sein			OUT's			
Sein	CV	Val	1-4	5-8	9-12	12-16
1	143	1	1	2	4	8
2	167	2	1	2	4	8
3	191	4	1	2	4	8
4	215	8	1	2	4	8

DR4018				Configuratie		Pulstijd		DR4018		Fmap AAN				Fmap UIT			
OUT		Fmap	Aansluiting	CV	Val	CV	Val	Adres	Toepassing	CV	Val	CV	Val	CV	Val	CV	Val
1	1a	1	NS sein#1 rood	113	31	238	128	1	NS sein #1	141	0	142	0	144	0	145	0
2	1b	2	NS sein#1 geel	114	31	239	128	2	NS sein #1	147	0	148	0	150	0	151	0
3	2a	4	NS sein#1 groen	115	31	240	128	3	NS sein #1	153	0	154	0	156	0	157	0
4	2b	8	NS sein#1 cijferb.	116	31	241	128	4	nachtdimming	159	0	160	0	162	0	163	0
5	3a	16	NS sein#2 rood	117	31	242	128	5	NS sein #2	165	0	166	0	168	0	169	0
6	3b	32	NS sein#2 geel	118	31	243	128	6	NS sein #2	171	0	172	0	174	0	175	0
7	4a	64	NS sein#2 groen	119	31	244	128	7	NS sein #2	177	0	178	0	180	0	181	0
8	4b	128	NS sein#2 cijferb.	120	31	245	128	8	nachtdimming	183	0	184	0	186	0	187	0
9	5a	1	NS sein#3 rood	121	31	246	128	9	NS sein #3	189	0	190	0	192	0	193	0
10	5b	2	NS sein#3 geel	122	31	247	128	10	NS sein #3	195	0	196	0	198	0	199	0
11	6a	4	NS sein#3 groen	123	31	248	128	11	NS sein #3	201	0	202	0	204	0	205	0
12	6b	8	NS sein#3 cijferb.	124	31	249	128	12	nachtdimming	207	0	208	0	210	0	211	0
13	7a	16	NS sein#4 rood	125	31	250	128	13	NS sein #4	213	0	214	0	216	0	217	0
14	7b	32	NS sein#4 geel	126	31	251	128	14	NS sein #4	219	0	220	0	222	0	223	0
15	8a	64	NS sein#4 groen	127	31	252	128	15	NS sein #4	225	0	226	0	228	0	229	0
16	8b	128	NS sein#4 cijferb.	128	31	253	128	16	nachtdimming	231	0	232	0	234	0	235	0

fig. 8

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All outputs are configured as permanent on full strength with fading (CV113 to CV128 is 31) with the value for CV111 = 1 (smallest fade rate) The SeinOUT configuration is set to “NS three-light signal” (Sein = 1)

Finally, the output groups of the 4 signals must be linked to their respective DCC addresses. For this, 4 CVs are used as follows: CV143 for signal 1 CV167 for signal 2 CV 191 for signal 3 CV 214 for signal 4

Preset 7 sets the following links via the Function Mapping:

- Address 1 to 4 (signal 1) is linked to via CV143 = 1 OUT 1 to OUT 4
- Address 5 to 8 (signal 2) is linked to via CV167 = 2 OUT 5 to OUT 8
- Address 9 to 12 (signal 3) is linked to via CV191 = 4 OUT 9 to OUT12
- Addresses 13 to 16 (signal 4) are linked to via CV215 = 8 OUT12 to OUT16

The table below shows the full possibilities of this “signal Function Mapping to:

	CV	UITGANGEN			
		1 –4	5—8	9-12	13-16
SEIN 1	**143**	1	2	4	8
SEIN 2	**167**	1	2	4	8
SEIN 3	**191**	1	2	4	8
SEIN 4	**215**	1	2	4	8

fig. 9

How does the configuration of the DR4018 for 16 addresses come about in this configuration? Signal configurations (Preset 7 to 12) use a kind of “signal generator”, which is activated as soon as one of the CVs 131 to 134 is set to a non-zero value. The CVs of the outputs Function Map are all set to 0 because of the activation of this “signal Fmap”, because the Function Map is part of the signal generator. The value of these CVs indicates the signal type as follows:

CV		Range	Waarde
131	Sein 1, configuratie OUT 1 t/m 4	0 - 255	0
	Als deze CV's een waarde ongelijk aan 0 bevatten schakelen de uitgangen volgens de seinregels De CV's die normaal de uitgangen besturen zijn buiten werking (CV-waarde = 0)		
	Waarde: Functie 0 Geen seinbeeld generator 1 NS drielicht sein 2 DB Hoofdsein 3 DB Voor- en Hoofdsein 4 DB Voorsein 5 NMBS sein		
132	Sein 2, configuratie OUT 5 t/m 8	0 - 255	0
133	Sein 3, configuratie OUT9 t/m 12	0 - 255	0
134	Sein 4, configuratie OUT 13 t/m 16	0 - 255	0

fig.10

For this “signal generator” the outputs are automatically configured in groups of 4, with a lamp color / function associated with each output.
In addition, the addressing in groups of 4 is combined with a fixed division per type of signal, as shown in the following section, for example for the operation of the NS signals.

Control of the signals

The signal images can be called manually by switching the 1e 3 addresses of the group OUT1 + OUT2. The 4e address is used for dimming the signal lamps (night mode).

For the NS three-light signal with number box with start address 1, this works as follows:

1. Address [1] **RO** + address [2] **RO** + address [3] **RO = Red** lamp on
2. Address [1] **GR** + address [2] **RO** + address [3] **RO = Green** lamp on
3. Address [1] **RO** + address [2] **GR** + address [3] **RO = Yellow** lamp on
4. Address [1] **GR** + address [2] **GR** + address [3] **RO = Green** lamp flashing with **figure** On
5. Address [1] **RO** + address [2] **RO** + address [3] **GR = Yellow** lamp with **figure** On
6. Address [1] **GR** + address [2] **RO** + address [3] **GR = Green** lamp flashing on
7. Address [1] **RO** + address [2] **GR** + address [3] **GR = Yellow** lamp flashing on
8. Address [1] **GR** + address [2] **GR** + address [3] **GR = Yellow** lamp on with digit flashing

a. Address [4] **RO** switches the **night mode off**

b. Address [4] **GR** switches the **night mode on**

For controlling the signals with train control software, this software must be able to simultaneously control 3 addresses in succession.

5.1 Configuring a combination of applications with Preset 7

Example 1: The DR4018 is used to control 2 points in combination with 3 NS three-light signals

Schematically the connection of this looks as follows:

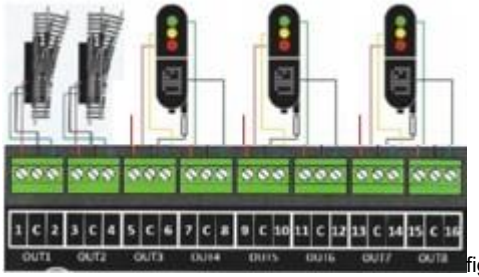

fig. 11

To control the NS three-light signals, the DR4018 is set with Preset = 7. With this preset, the DR4018 is set up with 16 addresses.
The switches must be sent to one address for both "straight" and "deflection". Each three-light signal uses 3 addresses to control the signal images and 1 address for the “night mode”.

So, of the 16 available addresses, 14 will be used as follows: Switch 1 is connected to OUT1 and OUT2 with 1 address Switch 2 is connected to OUT3 and OUT4 with 1 address Signal 1

is connected to OUT5 to OUT8 with 4 addresses Signal 2
is connected to OUT9 to OUT12 with 4 addresses Signal 3
is connected to OUT13 to OUT16 with 4 addresses

For the application of points, the configuration of the DR4018 must be adapted as follows: The outputs OUT1 to 4 must be cleared for use other than signals and the signal configuration must be adjusted for this:

CV131 = 0 = [OUT1 - OUT4] is not a signal CV143 = 0
removes the Mapping from signal 1 (to [OUT 1 - OUT4])

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Then the properties of OUT1 to. 4 can be changed to use the 2 switches (pulse at full strength):

- CV113 = **143 =** Bit 0 - 3 (15) + Bit4 off (0) + Bit5 off (0) = Bit6 off (0) + Bit 7 on (128)
- CV114 = **143 =** Bit 0 - 3 (15) + Bit4 off (0) + Bit5 off (0) = Bit6 off (0) + Bit 7 on (128)
- CV115 = **143 =** Bit 0 - 3 (15) + Bit4 off (0) + Bit5 off (0) = Bit6 off (0) + Bit 7 on (128)
- CV116 = **143 =** Bit 0 - 3 (15) + Bit4 off (0) + Bit5 off (0) = Bit6 off (0) + Bit 7 on (128) The outputs

OUT1 to 4 must be coupled again:

- Address 1 FMAP on (switch # 1 “Straight”) is linked to OUT1 (Group A) via CV 141 = 1
- Address 1 FMAP off (switch # 1 “Deflection”) is linked to OUT2 (Group A) via CV 144 = 2
- Address 2 FMAP on (switch # 2 “Straight”) is linked to OUT3 (Group A) via CV 147 = 4
- Address 2 FMAP off (switch # 2 “Deflection”) is linked to OUT4 (Group A) via CV 150 = 8

The contents of the DR4018 now look like this:

DR4018 Preset 7 Combi 3x NS drielichtsein met cijferbak en 2x wissel

Configuratie

CV	Val	
47	7	= Preset
107	70	= Donkertijd
108	10	= Dimwaarde
109	14	= PWM periode
110		
111	1	= Fade-snelheid
112	183	= Knippersnelheid

Sein OUT Config

OUT	CV	Val	
1-4	131	0	= geen sein
5-8	132	1	= NS drielicht + cijfer
9-12	133	1	= NS drielicht + cijfer
13-16	134	1	= NS drielicht + cijfer

Fmap sein			OUT's			
Sein	CV	Val	1-4	5-8	9-12	12-16
1	143	0	1	2	4	8
2	167	2	1	2	4	8
3	191	4	1	2	4	8
4	215	8	1	2	4	8

DR4018				Configuratie		Pulstijd		DR4018		Fmap AAN				Fmap UIT			
OUT		Fmap	Aansluiting	CV	Val	CV	Val	Adres	Toepassing	CV	Val	CV	Val	CV	Val	CV	Val
					31		**128**										
1	1a	1	Wissel #1 Recht	113	143	238	128	1	Wissel #1	141	1	142	0	144	2	145	0
2	1b	2	Wissel #1 Afbuig	114	143	239	128	2	Wissel #2	147	4	148	0	150	8	151	0
3	2a	4	Wissel #2 Recht	115	143	240	128	3	Vervallen	153	0	154	0	156	0	157	0
4	2b	8	Wissel #2 Afbuig	116	143	241	128	4	Vervallen	159	0	160	0	162	0	163	0
5	3a	16	NS sein#2 rood	117	31	242	128	5	NS sein #2	165	0	166	0	168	0	169	0
6	3b	32	NS sein#2 geel	118	31	243	128	6	NS sein #2	171	0	172	0	174	0	175	0
7	4a	64	NS sein#2 groen	119	31	244	128	7	NS sein #2	177	0	178	0	180	0	181	0
8	4b	128	NS sein#2 cijferb.	120	31	245	128	8	nachtdimming	183	0	184	0	186	0	187	0
9	5a	1	NS sein#3 rood	121	31	246	128	9	NS sein #3	189	0	190	0	192	0	193	0
10	5b	2	NS sein#3 geel	122	31	247	128	10	NS sein #3	195	0	196	0	198	0	199	0
11	6a	4	NS sein#3 groen	123	31	248	128	11	NS sein #3	201	0	202	0	204	0	205	0
12	6b	8	NS sein#3 cijferb.	124	31	249	128	12	nachtdimming	207	0	208	0	210	0	211	0
13	7a	16	NS sein#4 rood	125	31	250	128	13	NS sein #4	213	0	214	0	216	0	217	0
14	7b	32	NS sein#4 geel	126	31	251	128	14	NS sein #4	219	0	220	0	222	0	223	0
15	8a	64	NS sein#4 groen	127	31	252	128	15	NS sein #4	225	0	226	0	228	0	229	0
16	8b	128	NS sein#4 cijferb.	128	31	253	128	16	nachtdimming	231	0	232	0	234	0	235	0

fig. 12

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Example 2: the DR4018 is used to control 2 NS three-light signals with number box in combination with 1 NS cow head, 1 AKI and lighting

The connection of this looks as follows:

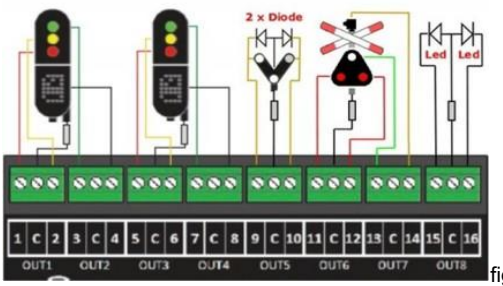

fig. 13

Given the presence of the 2 NS three-light signals, the DR4018 is set with Preset = 7. To enable the outputs OUT9 to OUT16 for use other than signals, the signal configuration must first be adjusted:

CV133 = 0 = no signal is connected to [OUT9 - OUT12] CV134 = 0 = to [OUT13 - OUT16] no signal is connected

CV191 = 0 removes the Mapping from signal 3 (to [OUT 9 - OUT12])

CV215 = 0 removes the Mapping from signal 4 (to [OUT 13 - OUT16])

As a result, the last 8 DCC addresses and the last 8 OUT outputs are completely free for other use.

The contents of the DR4018 now look like this:

DR4018 Preset 7 met combinatie 2x NS lichtsein 1x Koeienkop 1x AKI en 2x Lichtschakeling

Configuratie

CV	Val	
47	7	= Preset
107	70	= Donkertijd
108	10	= Dimwaarde
109	14	= PWM periode
110		
111	1	= Fade-snelheid
112	183	= Knippersnelheid

Sein OUT Config

OUT	CV	Val	
1-4	131	1	= NS drielicht + cijfer
5-8	132	1	= NS drielicht + cijfer
9-12	133	0	= geen sein
13-16	134	0	= geen sein

Fmap sein			OUT's			
Sein	CV	Val	1-4	5-8	9-12	12-16
1	143	1	1	2	4	8
2	167	2	1	2	4	8
3	191	0	1	2	4	8
4	215	0	1	2	4	8

DR4018				Configuratie		Pulstijd		DR4018		Fmap AAN				Fmap UIT			
OUT		Fmap	Aansluiting	CV	Val	CV	Val	Adres	Toepassing	CV	Val	CV	Val	CV	Val	CV	Val
					31		128										
1	1a	1	NS sein #1 rood	113	31	238	128	1	NS sein #1	141	0	142	0	144	0	145	0
2	1b	2	NS sein #1 geel	114	31	239	128	2	NS sein #1	147	0	148	0	150	0	151	0
3	2a	4	NS sein #1 groen	115	31	240	128	3	NS sein #1	153	0	154	0	156	0	157	0
4	2b	8	NS sein #1 cijferb.	116	31	241	128	4	nachtdimming	159	0	160	0	162	0	163	0
5	3a	16	NS sein#2 rood	117	31	242	128	5	NS sein #2	165	0	166	0	168	0	169	0
6	3b	32	NS sein#2 geel	118	31	243	128	6	NS sein #2	171	0	172	0	174	0	175	0
7	4a	64	NS sein#2 groen	119	31	244	128	7	NS sein #2	177	0	178	0	180	0	181	0
8	4b	128	NS sein#2 cijferb.	120	31	245	128	8	nachtdimming	183	0	184	0	186	0	187	0
9	5a	1		121	31	246	128	9		189	0	190	0	192	0	193	0
10	5b	2		122	31	247	128	10		195	0	196	0	198	0	199	0
11	6a	4		123	31	248	128	11		201	0	202	0	204	0	205	0
12	6b	8		124	31	249	128	12		207	0	208	0	210	0	211	0
13	7a	16		125	31	250	128	13		213	0	214	0	216	0	217	0
14	7b	32		126	31	251	128	14		219	0	220	0	222	0	223	0
15	8a	64		127	31	252	128	15		225	0	226	0	228	0	229	0
16	8b	128		128	31	253	128	16		231	0	232	0	234	0	235	0

fig. 14

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Note : if the DR4018 with this format would be used again without further adjustments, the DR4018 would only respond to addresses 1 to 8. This is due to the fact that all Function Mapping CVs from 189 and higher have the value = 0 to have. The properties of the outputs OUT9 to OUT16 must then be changed to use resp. the cow's head, the AKI and the lighting. For the **Cow's head (DCC addresses 9 and 10)** configuration **for OUT9 and OUT10** as follows:

a. Set the outputs OUT9 and OUT10 to **"Permanently on" with fading:**

- **CV121 = 31 =** Bit 0 - 3 (15) + Bit4 on (16) + Bit5 off (0) = Bit6 off (0) + Bit 7 off (0)
- **CV122 = 31 =** Bit 0 - 3 (15) + Bit4 on (16) + Bit5 off (0) = Bit6 off (0) + Bit 7 off (0)

b. Connect the outputs OUT9 and OUT10 to it **9. and 10.** address of the DR4018

CV190 = **1 =** OUT9 on (1) for Left Turn
CV193 = **0** (removes any older mappings, default is 0)
CV196 = **2 =** OUT10 on (2) for Right Turn
CV199 = **0** (removes any older mappings, default is 0)

For the **classic AKI with bell (DCC address 11)** configuration for **OUT11 to OUT14** as follows:

a. Set the outputs OUT11, OUT12 and OUT13 to **"Blinking" with fading (** *OUT12 in reverse phase):*

- **CV123 = 63 =** Bit 0 - 3 (15) + Bit4 on (16) + Bit5 on (32) = Bit6 off (0) + Bit 7 off (0)
- **CV124 = 191 =** Bit 0 - 3 (15) + Bit4 on (16) + Bit5 on (32) = Bit6 off (0) + Bit 7 on (128)
- **CV125 = 63 =** Bit 0 - 3 (15) + Bit4 on (16) + Bit5 on (32) = Bit6 off (0) + Bit 7 off (0) Set output OUT14 to **permanently on (** for the bell)
- **CV126 = 15 =** Bit 0 - 3 (15) + Bit4 out (0) + Bit5 out (0) = Bit6 out (0) + Bit 7 out (0)

b. Connect the outputs OUT11 to OUT14 to it **11. address** of the DR4018

CV202 = **44 =** OUT11 on (4) + OUT12 on (8) + OUT14 on (32)
CV205 = **16 =** OUT13 on (16) (only white flashing light)

It **12. to 14.** address of the DR4018 **unused:**

The **CVs 207 through 222** stay **all = 0** by Preset 7 For the **platform lighting (DCC address 15)** the

configuration for OUT15 becomes as follows:

a. Set output OUT15 to **"Permanently on" (fluorescent effect):**

CV127 = 76 = Bit 0 - 3 (12) + Bit4 off (0) + Bit5 off (0) = Bit6 on (64) + Bit 7 off (0)

b. Connect the output OUT15 to it **15. address** of the DR4018

CV226 = **64 =** OUT15 on (64)
CV229 = **0 = (** removes any old mappings, default is 0)

For the **building lighting (DCC address 16)** the configuration for OUT16 becomes as follows:

a. Set output OUT16 to **"Permanently on" (partially dimmed):**

CV128 = 12 = Bit 0 - 3 (12) + Bit4 out (0) + Bit5 out (0) = Bit6 out (0) + Bit 7 out (0)

b. Connect the output OUT16 to it **16. address** of the DR4018

CV232 = **128 =** OUT16 on (128)
CV235 = **0 = (** removes any old mappings, default is 0)

This completes the CV adjustments for these combined applications and the contents of the DR4018 look like this:

DR4018 application manual

DR4018 Preset 7 met combinatie 2x NS lichtsein 1x Koeienkop 1x AKI en 2x Lichtschakeling

Configuratie

CV	Val	
47	7	= Preset
107	70	= Donkertijd
108	10	= Dimwaarde
109	14	= PWM periode
110		
111	1	= Fade-snelheid
112	183	= Knippersnelheid

Sein OUT Config

OUT	CV	Val	
1-4	131	1	= NS drielicht + cijfer
5-8	132	1	= NS drielicht + cijfer
9-12	133	0	= geen sein
13-16	134	0	= geen sein

Fmap sein			OUT's			
Sein	CV	Val	1-4	5-8	9-12	12-16
1	143	1	1	2	4	8
2	167	2	1	2	4	8
3	191	0	1	2	4	8
4	215	0	1	2	4	8

DR4018				Configuratie		Pulstijd		DR4018		Fmap AAN				Fmap UIT			
OUT		Fmap	Aansluiting	CV	Val	CV	Val	Adres	Toepassing	CV	Val	CV	Val	CV	Val	CV	Val
1	1a	1	NS sein #1 rood	113	31	238	128	1	NS sein #1	141	0	142	0	144	0	145	0
2	1b	2	NS sein #1 geel	114	31	239	128	2	NS sein #1	147	0	148	0	150	0	151	0
3	2a	4	NS sein #1 groen	115	31	240	128	3	NS sein #1	153	0	154	0	156	0	157	0
4	2b	8	NS sein #1 cijferb.	116	31	241	128	4	nachtdimming	159	0	160	0	162	0	163	0
5	3a	16	NS sein#2 rood	117	31	242	128	5	NS sein #2	165	0	166	0	168	0	169	0
6	3b	32	NS sein#2 geel	118	31	243	128	6	NS sein #2	171	0	172	0	174	0	175	0
7	4a	64	NS sein#2 groen	119	31	244	128	7	NS sein #2	177	0	178	0	180	0	181	0
8	4b	128	NS sein#2 cijferb.	120	31	245	128	8	nachtdimming	183	0	184	0	186	0	187	0
9	5a	1	Koeienkop - L	121	31	246	128	9	Koeienkop - L	189	0	190	1	192	0	193	0
10	5b	2	Koeienkop - R	122	31	247	128	10	Koeienkop- R	195	0	196	2	198	0	199	0
11	6a	4	AKI - rood1	123	63	248	128	11	AKI met bel	201	0	202	44	204	0	205	16
12	6b	8	AKI-rood2	124	191	249	128	12	vervallen	207	0	208	0	210	0	211	0
13	7a	16	AKI- wit	125	63	250	128	13	vervallen	213	0	214	0	216	0	217	0
14	7b	32	AKI - bel	126	15	251	128	14	vervallen	219	0	220	0	222	0	223	0
15	8a	64	Licht Perron (TL)	127	76	252	128	15	Licht Perron (TL)	225	0	226	64	228	0	229	0
16	8b	128	Licht Gebouwen	128	12	253	128	16	Licht Gebouwen	231	0	232	128	234	0	235	0

fig. 15

The control of the different applications is as follows:

- **The combination of address [1] to address [4] the signal controls images of the first NS three-light signal**
- **The combination of address [5] to address [8] the signal controls images of the second NS three-light signal**
- Address [**9]** directs the cow's head “left”:
  - O **GREEN** switches the cow's head on in the “left turn” position
  - O **RED** switches off the cow's head
- Address**[10]** directs the cow's head to the right:
  - O **GREEN** switches the cow's head on in the “right turn” position
  - O **RED** switches off the cow's head
- Address [**11]** drives the classic AKI:
  - O **GREEN** switches on the AKI: red lights and bell on; flashing white light off.
  - O **RED** turns the AKI off and the blinking white light turns on
- Address [**15]** controls the platform lighting:
  - O **GREEN** switches the lighting on
  - O **RED** switches the lighting off
- Address [**16]** controls the Building Lighting:
  - O **GREEN** switches the lighting on
  - O **RED** switches the lighting off

Notice that with the AKI the address [11] Green activates the outputs OUT 11 to 13 (AKI with red lights and bell on) and deactivates OUT14 (AKI white light was active; now off) because CV205 has the value 16. Inverted: Red deactivates OUT 11 to 13 and activates OUT14

5.1.1 Activation of one output with multiple addresses.

Outputs can be activated and deactivated. However, an output can be linked to several switching addresses with function maps. If such an output is deactivated via one switching address, this does not mean that the function of that output will be switched off: the output can still be activated via another switching address. The following situation is for clarification:

Suppose we want to ring the bell of the AKI when the cow's head is set to “right”.

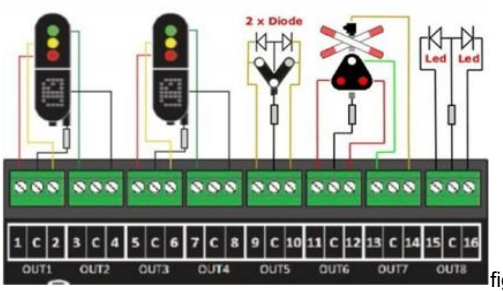

fig. 16

The Cow's Head is connected as follows:

OUT 9: “left”
OUT10: “right”

The AKI as follows:

OUT11: red lamp 1
OUT12: red lamp2
OUT13: white lamp
OUT14: the bell

The AKI has the following Mapping: AKI on:

CV202 = 44 = OUT11 on (4) + OUT12 on (8) + OUT14 on (32)

AKI from: **CV205 = 16 =** OUT13 on (16) [white flashing light on]

The Cow's Head has the following Mapping: Cow's Head on

the left **CV 190 = 1 =** OUT 9 on (1)

Cow head right **CV 196 = 2 =** OUT10 on (2)

Now to ring the bell at Cow Head “right”, the output on which the bell sits must be activated when switching Cow Head “right”, so OUT14 must be turned “on” by adding it in CV196: Cow Head Right:

CV 196 = 34 = OUT10 on (2) + OUT14 on (32)

Due to this setting, the cow head goes “right” (= address [10] GREEN) also ring the bell. At Cow's head “right” (= address [10] RED) the bell rings again because OUT14 is deactivated during this action.

If the Cow's head is now set to “right” and the AKI is switched on, the bell at OUT14 will ring again because OUT14 is activated in both CV196 and CV202.

If the AKI is then switched off again, the bell will not be switched off, despite the fact that the AKI is switched off (= address [11] RED) the bell deactivates.
The reason for this is that Cow's Head "right" is still active; via CV196 the bell on OUT14 is still active and only if **Cow's head is turned off “right” (= address 10] RED) the bell rings.**

6.0 The light signals of the DB

The (light) signaling system of the DB is characterized in that, just as is the case with the arm signals, use is made of pre-signals and main signals.
In principle, we can divide the main signals into block signals, entry signals and exit signals. The exit signal is actually a combination of a main signal and a barrier signal in one screen. The main / entrance signal consists of a combination of two (red / green) or three (red / green / yellow) lamps, indicating the following signal images:

- **Hp0 (** red) = stop / unsafe
- **Hp1 (** green) = safe
- **Hp2 (** green yellow) = slow driving due to expected deflecting alternate position (s)

The distant signal indicates the expected main signal position by means of four lamps placed diagonally below each other (yellow / yellow / green / green):

- **Vr0 (** yellow / yellow) = expected stop / unsafe (Hp0)
- **Vr1 (** green / green) = expect safe (Hp1)
- **Vr2 (** green yellow) = expect slow driving (Hp2)

The exit signal contains six lights (2x red / green / yellow / 2x white) with which the following signal images are possible:

- **Hp00 (** red / red) = stop, no passing for shunting allowed (combination of **Hp0** and **Sh0)**
- **Hp1 (** green) = safe
- **Hp2 (** green yellow) = slow driving due to deflecting alternate position (s)
- **Sh1 (** red + white / white) = stop, shunting ban lifted

In the next section, the different DB light signals are presented. Below the image of each light signal, the CV value is indicated, which must be entered for CV131 to CV134 in order to obtain the correct signal image;

Signal = 2 indicates that it is one **DB Main signal** regarding
Signal = 3 indicates that it is one **DB Voorsein** regarding **at the mast of a main signal Signal = 4** indicates that it is one **stand alone DB Voorsein** regarding

Examples of DB light signals Front signal (isolated),

Block signal, Inrijsein and exit signal

fig. 17

Pay attention: When connecting Viessmann signals to the DR4018, connect to the wiring **present diodes and resistors NOT remove!!!.**

Combination of distant signal before block signal, respectively. drive-in signal.

fig. 18

NB: Of course, the combination of the signal and the accompanying signal with only two signal images (unsafe / safe) can also be connected together to only 2 OUTs of a "Preset 2" DR4018. When main signal and distant signal are combined on one mast, the distant signal is extinguished if the main signal shows position Hp0 (red). For this reason, there are two definition options of the signal (3 and 4)

Combination of signal at the mast of the entry and exit signal

fig. 19

This main and pre-signal combination (Signal = 2 with Signal = 3) on one mast is controlled for the signal to be displayed via only one address series: that of the main signal.

6.1 Controlling DB signals with the DR4018

The setting of the DR4018 with a preset makes it possible to easily configure the various signaling options within the DB light signal system. The following preset options are reserved for this:

- Preset 2 8x DB Main signal (block signal)
- Preset 8 4x DB Main signal (entry and / or exit signal)
- Preset 9 4x DB Signaling belonging to the main signal
- Preset 10 2x combination of distant signal on the mast of the main signal
- Preset 11 4x DB Signal

6.2 Preset 2: 8x DB Main signal (block signal)

Preset 2 allows a quick definition of 8 DB signal units (and other variants of two-light signals).

The connection is schematically shown as follows:

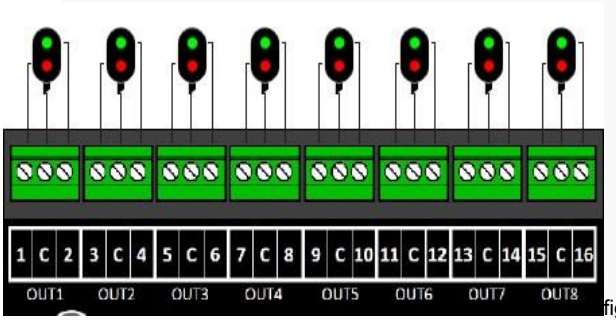

fig. 20

Preset 2

The contents of the DR4018 look like this:

DR4018 Preset 2 = 8x tweelichtsein met fading

Configuratie

CV	Val	
47	2	= Preset
107	70	= Donkertijd
108	10	= Dimwaarde
109	14	= PWM periode
110		
111	3	= Fade-snelheid
112	183	= Knippersnelheid

Sein OUT Config

OUT	CV	Val
1-4	131	0
5-8	132	0
9-12	133	0
13-16	134	0

Fmap sein			OUT's			
Sein	CV	Val	1-4	5-8	9-12	12-16
1	143	0	1	2	4	8
2	167	0	1	2	4	8
3	191	0	1	2	4	8
4	215	0	1	2	4	8

DR4018				Configuratie		Pulstijd	
OUT		Fmap	Aansluiting	CV	Val	CV	Val
1	1a	1	Sein # 1 Rood	113	31	238	128
2	1b	2	Sein # 1 Groen	114	31	239	128
3	2a	4	Sein # 2 Rood	115	31	240	128
4	2b	8	Sein # 2 Groen	116	31	241	128
5	3a	16	Sein # 3 Rood	117	31	242	128
6	3b	32	Sein # 3 Groen	118	31	243	128
7	4a	64	Sein # 4 Rood	119	31	244	128
8	4b	128	Sein # 4 Groen	120	31	245	128
9	5a	1	Sein # 5 Rood	121	31	246	128
10	5b	2	Sein # 5 Groen	122	31	247	128
11	6a	4	Sein # 6 Rood	123	31	248	128
12	6b	8	Sein # 6 Groen	124	31	249	128
13	7a	16	Sein # 7 Rood	125	31	250	128
14	7b	32	Sein # 7 Groen	126	31	251	128
15	8a	64	Sein # 8 Rood	127	31	252	128
16	8b	128	Sein # 8 Groen	128	31	253	128

DR4018		Fmap AAN				Fmap UIT			
Adres	Toepassing	CV	Val	CV	Val	CV	Val	CV	Val
1	Sein #1 rd/gr	141	1	142	0	144	2	145	0
2	Sein #2 rd/gr	147	4	148	0	150	8	151	0
3	Sein #3 rd/gr	153	16	154	0	156	32	157	0
4	Sein #4 rd/gr	159	64	160	0	162	128	163	0
5	Sein #5 rd/gr	165	0	166	1	168	0	169	2
6	Sein #6 rd/gr	171	0	172	4	174	0	175	8
7	Sein #7 rd/gr	177	0	178	16	180	0	181	32
8	Sein #8 rd/gr	183	0	184	64	186	0	187	128

fig. 21

6.3 Preset 8: 4x DB Main signal

A quick definition of 4 DB Main signal is possible via Preset 8. These can be entry and exit signals with 3 resp. 4 signal images or block signals with 2 signal images, if chosen, which cannot be controlled with a DR4018 configured with Preset 2.

Connection and possible signal images DB Uitrijsein

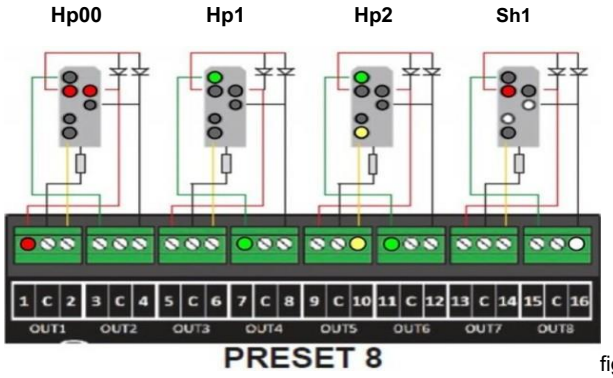

fig. 22

Connection and possible signal images for the other main signals

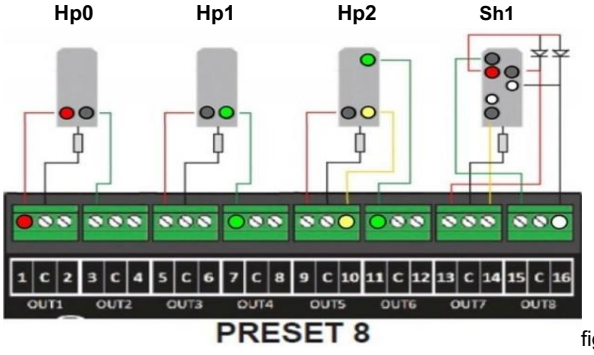

fig. 23

The contents of a DR4018 configured with preset 8 (CV47 = 8) and start address 1 are as follows:

DR4018 Preset 8 = 4x DB hoofdsein

Configuratie		
CV	Val	
47	8	= Preset
107	70	= Donkertijd
108	10	= Dimwaarde
109	14	= PWM periode
110		
111	1	= Fade-snelheid
112	183	= Knippersnelheid

Sein OUT Config			
OUT	CV	Val	
1-4	131	2	= DB hoofdsein
5-8	132	2	= DB hoofdsein
9-12	133	2	= DB hoofdsein
13-16	134	2	= DB hoofdsein

Fmap sein			OUT's			
Sein	CV	Val	1-4	5-8	9-12	12-16
1	143	1	1	2	4	8
2	167	2	1	2	4	8
3	191	4	1	2	4	8
4	215	8	1	2	4	8

DR4018				Configuratie		Pulstijd		DR4018		Fmap AAN				Fmap UIT			
OUT		Fmap	Aansluiting	CV	Val	CV	Val	Adres	Toepassing	CV	Val	CV	Val	CV	Val	CV	Val
1	1a	1	DB Hp #1 rood	113	31	238	128	1	DB Hp #1	141	0	142	0	144	0	145	0
2	1b	2	DB Hp #1 geel	114	31	239	128	2	DB Hp #1	147	0	148	0	150	0	151	0
3	2a	4	DB Hp #1 groen	115	31	240	128	3	DB Hp #1	153	0	154	0	156	0	157	0
4	2b	8	DB Hp #1 Sh1	116	31	241	128	4	nachtdimming	159	0	160	0	162	0	163	0
5	3a	16	DB Hp #2 rood	117	31	242	128	5	DB Hp #2	165	0	166	0	168	0	169	0
6	3b	32	DB Hp #2 geel	118	31	243	128	6	DB Hp #2	171	0	172	0	174	0	175	0
7	4a	64	DB Hp #2 groen	119	31	244	128	7	DB Hp #2	177	0	178	0	180	0	181	0
8	4b	128	DB Hp #2 Sh1	120	31	245	128	8	nachtdimming	183	0	184	0	186	0	187	0
9	5a	1	DB Hp #3 rood	121	31	246	128	9	DB Hp #3	189	0	190	0	192	0	193	0
10	5b	2	DB Hp #3 geel	122	31	247	128	10	DB Hp #3	195	0	196	0	198	0	199	0
11	6a	4	DB Hp #3 groen	123	31	248	128	11	DB Hp #3	201	0	202	0	204	0	205	0
12	6b	8	DB Hp #3 Sh1	124	31	249	128	12	nachtdimming	207	0	208	0	210	0	211	0
13	7a	16	DB Hp #4 rood	125	31	250	128	13	DB Hp #4	213	0	214	0	216	0	217	0
14	7b	32	DB Hp #4 geel	126	31	251	128	14	DB Hp #4	219	0	220	0	222	0	223	0
15	8a	64	DB Hp #4 groen	127	31	252	128	15	DB Hp #4	225	0	226	0	228	0	229	0
16	8b	128	DB Hp #4 Sh1	128	31	253	128	16	nachtdimming	231	0	232	0	234	0	235	0

fig. 24

The CVs for the output configuration have the value 31 for the outputs permanently on with fading.

The signal OUT CVs have the value 2, so that the signal images for DB Main signals are generated, of which 4 are configured on each of a series of 2 outputs with the Fmap signal CVs.

The signal images are controlled for the signal with start address 1 as follows:

1. **Address [1] RO + address [2] RO + address [3] RO = Hp0 or Hp00**
2. **Address [1] GR + address [2] RO + address [3] RO = Hp1**
3. **Address [1] RO + address [2] GR + address [3] RO = Hp2**
4. **Address [1] GR + address [2] GR + address [3] RO = Sh1**

6.4 Preset 9: 4x DB Headlight associated with the main signal

4 DB Signals can be configured via Preset 9, of which the address combinations for displaying the signal images correspond to those for displaying the associated main signals. In addition, the distant signal is extinguished at Hp0 (0) and Sh1, which applies to a distant signal which is mounted on the mast of the main signal.

Connection and possible signal images

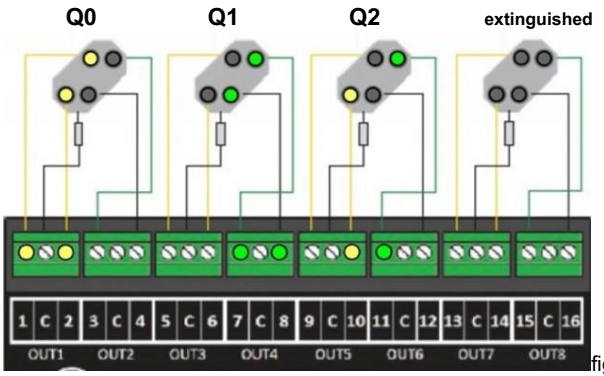

fig. 25

Preset 9

The contents of a DR4018 configured with preset 9 (CV47 = 9) and start address 1 are as follows:

DR4018 Preset 9 = 4x DB voorsein behorend bij hoofdsein

Configuratie		
CV	Val	
47	9	= Preset
107	70	= Donkertijd
108	10	= Dimwaarde
109	14	= PWM periode
110		
111	1	= Fade-snelheid
112	183	= Knippersnelheid

Sein OUT Config			
OUT	CV	Val	
1-4	131	3	= DB voorsein beh. bij hoofdsein
5-8	132	3	= DB voorsein beh. bij hoofdsein
9-12	133	3	= DB voorsein beh. bij hoofdsein
13-16	134	3	= DB voorsein beh. bij hoofdsein

Fmap sein			OUT's			
Sein	CV	Val	1-4	5-8	9-12	12-16
1	143	1	1	2	4	8
2	167	2	1	2	4	8
3	191	4	1	2	4	8
4	215	8	1	2	4	8

DR4018				Configuratie		Pulstijd		DR4018		Fmap AAN				Fmap UIT			
OUT		Fmap	Aansluiting	CV	Val	CV	Val	Adres	Toepassing	CV	Val	CV	Val	CV	Val	CV	Val
1	1a	1	DB Vr #1 geel1	113	31	238	128	1	DB Vr #1	141	0	142	0	144	0	145	0
2	1b	2	DB Vr #1 geel2	114	31	239	128	2	DB Vr #1	147	0	148	0	150	0	151	0
3	2a	4	DB Vr #1 groen1	115	31	240	128	3	DB Vr #1	153	0	154	0	156	0	157	0
4	2b	8	DB Vr #1 groen2	116	31	241	128	4	DB Vr #1	159	0	160	0	162	0	163	0
5	3a	16	DB Vr #2 geel1	117	31	242	128	5	DB Vr #2	165	0	166	0	168	0	169	0
6	3b	32	DB Vr #2 geel2	118	31	243	128	6	DB Vr #2	171	0	172	0	174	0	175	0
7	4a	64	DB Vr #2 groen1	119	31	244	128	7	DB Vr #2	177	0	178	0	180	0	181	0
8	4b	128	DB Vr #2 groen2	120	31	245	128	8	DB Vr #2	183	0	184	0	186	0	187	0
9	5a	1	DB Vr #3 geel1	121	31	246	128	9	DB Vr #3	189	0	190	0	192	0	193	0
10	5b	2	DB Vr #3 geel2	122	31	247	128	10	DB Vr #3	195	0	196	0	198	0	199	0
11	6a	4	DB Vr #3 groen1	123	31	248	128	11	DB Vr #3	201	0	202	0	204	0	205	0
12	6b	8	DB Vr #3 groen2	124	31	249	128	12	DB Vr #3	207	0	208	0	210	0	211	0
13	7a	16	DB Vr #4 geel1	125	31	250	128	13	DB Vr #4	213	0	214	0	216	0	217	0
14	7b	32	DB Vr #4 geel2	126	31	251	128	14	DB Vr #4	219	0	220	0	222	0	223	0
15	8a	64	DB Vr #4 groen1	127	31	252	128	15	DB Vr #4	225	0	226	0	228	0	229	0
16	8b	128	DB Vr #4 groen2	128	31	253	128	16	DB Vr #4	231	0	232	0	234	0	235	0

fig. 26

The CVs for the output configuration have the value 31 for the outputs permanently on with fading.

The signal OUT CVs have the value 3, so that the signal images for DB Signals belonging to the Main signal are generated, of which 4 are configured on each of a series of 2 outputs with the Fmap signal CVs.

The signal images are controlled for the signal with start address 1 as follows:

1. **Address [1] GR + address [2] RO + address [3] RO = Vr0**
2. **Address [1] GR + address [2] RO + address [3] GR = Vr1**
3. **Address [1] RO + address [2] GR + address [3] GR = Vr2**
4. **Address [1] RO + address [2] RO + address [3] RO = Vr extinguished**

6.5 Preset 10: 2x Combination DB Main Signal and DB Voorsein

Preset 10 allows 2 combinations of a main signal with a signal to be configured, characterized in that each of the 2 combinations is controlled by a series of 4 addresses. In addition, the distant signal is extinguished at Hp0 (0) and Sh1, which applies to a distant signal which is mounted on the mast of the main signal.

The connection is schematically shown as follows:

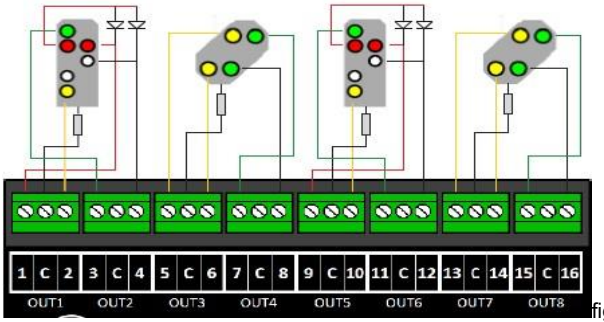

fig. 27

Preset 10

The contents of a DR4018 configured with preset 10 (CV47 = 10) and start address 1 are as follows:

DR4018 Preset 10 = 2x combinatie DB hoofdsein en DB voorsein

Configuratie		
CV	Val	
47	10	= Preset
107	70	= Donkertijd
108	10	= Dimwaarde
109	14	= PWM periode
110		
111	1	= Fade-snelheid
112	183	= Knippersnelheid

Sein OUT Config			
OUT	CV	Val	
1-4	131	2	= DB hoofdsein
5-8	132	3	= DB voorsein bij Hp
9-12	133	2	= DB hoofdsein
13-16	134	3	= DB voorsein bij Hp

Fmap sein			OUT's			
Sein	CV	Val	1-4	5-8	9-12	12-16
1	143	3	1	2	4	8
2	167	12	1	2	4	8
3	191	0	1	2	4	8
4	215	0	1	2	4	8

DR4018				Configuratie	Pulstijd		DR4018		Fmap AAN				Fmap UIT			
OUT		Fmap	Aansluiting	CV	Val	CV	Val	Adres	Toepassing	CV	Val	CV	Val	CV	Val	CV	Val
1	1a	1	DB Hp #1 rood	113	31	238	128	1	DB Hp # 1+Vr # 1	141	0	142	0	144	0	145	0
2	1b	2	DB Hp #1 geel	114	31	239	128	2	DB Hp # 1+Vr # 1	147	0	148	0	150	0	151	0
3	2a	4	DB Hp #1 groen	115	31	240	128	3	DB Hp # 1+Vr # 1	153	0	154	0	156	0	157	0
4	2b	8	DB Hp #1 Sh1	116	31	241	128	4	nachtdimming	159	0	160	0	162	0	163	0
5	3a	16	DB Vr # 1 geel 1	117	31	242	128	5	DB Hp # 2 +Vr # 2	165	0	166	0	168	0	169	0
6	3b	32	DB Vr # 1 geel 2	118	31	243	128	6	DB Hp # 2 +Vr # 2	171	0	172	0	174	0	175	0
7	4a	64	DB Vr # 1 groen 1	119	31	244	128	7	DB Hp # 2 +Vr # 2	177	0	178	0	180	0	181	0
8	4b	128	DB Vr # 1 groen 2	120	31	245	128	8	nachtdimming	183	0	184	0	186	0	187	0
9	5a	1	DB Hp # 2 rood	121	31	246	128			189	0	190	0	192	0	193	0
10	5b	2	DB Hp # 2 geel	122	31	247	128			195	0	196	0	198	0	199	0
11	6a	4	DB Hp # 2 groen	123	31	248	128			201	0	202	0	204	0	205	0
12	6b	8	DB Hp #2 Sh1	124	31	249	128			207	0	208	0	210	0	211	0
13	7a	16	DB Vr # 2 geel 1	125	31	250	128			213	0	214	0	216	0	217	0
14	7b	32	DB Vr # 2 geel 2	126	31	251	128			219	0	220	0	222	0	223	0
15	8a	64	DB Vr # 2 groen 1	127	31	252	128			225	0	226	0	228	0	229	0
16	8b	128	DB Vr # 2 groen 2	128	31	253	128			231	0	232	0	234	0	235	0

fig. 28

The CVs for the output configuration have the value 31 for the outputs permanently on with fading.

The signal OUT CVs have the value 2, respectively. 3, so that the signals are generated on the OUTs 1-4 and 9-12 for DB Main signals and those on the OUTs 5-8 and 13-16 are the ones at the resp. DB Main signals belonging to DB signal signals are.

With the Fmap CVs the first combination is connected to OUT 1-8 and the second combination to OUT 9 -16 (CV 143 = 3 and CV167 = 12) with which each main and pre-signal combination is linked to the same address series.

Because CV191 = 0 and CV215 = 0, the DR4018 is configured for 8 addresses.

The signal images are controlled for the signal with start address 1 as follows:

1. **Address [1] RO + address [2] RO + address [3] RO = Hp0 (0) and Fri extinguished**
2. **Address [1] RO + address [2] RO + address [3] GR = Hp1** and **Q1**
3. **Address [1] RO + address [2] GR + address [3] GR = Hp2** and **Q2**
4. **Address [1] GR + address [2] GR + address [3] RO = Sh1** and **Fri extinguished**

6.6 Preset 11: 4x DB Signal on own mast

Preset 11 allows 4 DB Front Signals, which are mounted on its own individual mast, to be configured.

Connection and possible signal images

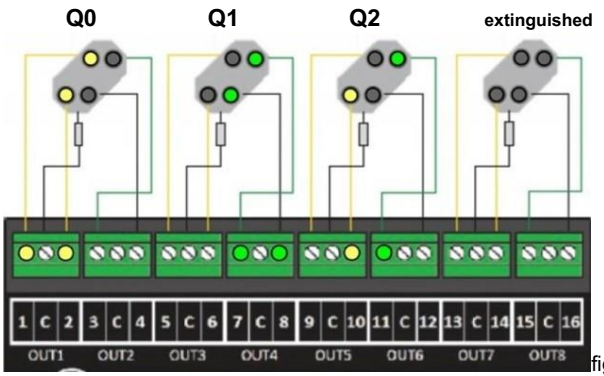

fig. 29

Preset 11

DR4018 application manual

The contents of a DR4018 configured with preset 11 (CV47 = 11) and start address 1 are as follows:

DR4018 Preset 11 = 4x DB voorsein (vrijstaand)

Configuratie

CV	Val	
47	11	= Preset
107	70	= Donkertijd
108	10	= Dimwaarde
109	14	= PWM periode
110		
111	1	= Fade-snelheid
112	183	= Knippersnelheid

Sein OUT Config

OUT	CV	Val	
1-4	131	4	= DB voorsein
5-8	132	4	= DB voorsein
9-12	133	4	= DB voorsein
13-16	134	4	= DB voorsein

Fmap sein			OUT's			
Sein	CV	Val	1-4	5-8	9-12	12-16
1	143	1	1	2	4	8
2	167	2	1	2	4	8
3	191	4	1	2	4	8
4	215	8	1	2	4	8

DR4018				Configuratie		Pulstijd		DR4018		Fmap AAN				Fmap UIT			
OUT		Fmap	Aansluiting	CV	Val	CV	Val	Adres	Toepassing	CV	Val	CV	Val	CV	Val	CV	Val
1	1a	1	DB Vr #1 geel1	113	31	238	128	1	DB Vr #1	141	0	142	0	144	0	145	0
2	1b	2	DB Vr #1 geel2	114	31	239	128	2	DB Vr #1	147	0	148	0	150	0	151	0
3	2a	4	DB Vr #1 groen1	115	31	240	128	3	DB Vr #1	153	0	154	0	156	0	157	0
4	2b	8	DB Vr #1 groen2	116	31	241	128	4	nachtdimming	159	0	160	0	162	0	163	0
5	3a	16	DB Vr #2 geel1	117	31	242	128	5	DB Vr #2	165	0	166	0	168	0	169	0
6	3b	32	DB Vr #2 geel2	118	31	243	128	6	DB Vr #2	171	0	172	0	174	0	175	0
7	4a	64	DB Vr #2 groen1	119	31	244	128	7	DB Vr #2	177	0	178	0	180	0	181	0
8	4b	128	DB Vr #2 groen2	120	31	245	128	8	nachtdimming	183	0	184	0	186	0	187	0
9	5a	1	DB Vr #3 geel1	121	31	246	128	9	DB Vr #3	189	0	190	0	192	0	193	0
10	5b	2	DB Vr #3 geel2	122	31	247	128	10	DB Vr #3	195	0	196	0	198	0	199	0
11	6a	4	DB Vr #3 groen1	123	31	248	128	11	DB Vr #3	201	0	202	0	204	0	205	0
12	6b	8	DB Vr #3 groen2	124	31	249	128	12	nachtdimming	207	0	208	0	210	0	211	0
13	7a	16	DB Vr #4 geel1	125	31	250	128	13	DB Vr #4	213	0	214	0	216	0	217	0
14	7b	32	DB Vr #4 geel2	126	31	251	128	14	DB Vr #4	219	0	220	0	222	0	223	0
15	8a	64	DB Vr# 4 groen1	127	31	252	128	15	DB Vr #4	225	0	226	0	228	0	229	0
16	8b	128	DB Vr# 4 groen2	128	31	253	128	16	nachtdimming	231	0	232	0	234	0	235	0

fig. 30

The CVs for the output configuration have the value 31 for the outputs permanently on with fading.

The signal OUT CVs have the value 4, so that the signal images for free-standing DB signals are generated, of which 4 are configured on each of a series of 2 outputs with the Fmap signal CVs.

The signal images are controlled for the signal with start address 1 as follows:

1. **Address [1] RO + address [2] RO + address [3] RO = Vr0**
2. **Address [1] GR + address [2] RO + address [3] RO = Vr1**
3. **Address [1] RO + address [2] GR + address [3] RO = Vr2**
4. **Address [1] GR + address [2] GR + address [3] RO = Vr extinguished**

7.0 Configuration of application combinations with Preset 8

Example 1

A combination of 1x DB entry, 1x exit and 1x block signal, as well as 3x cross signals. The DR4018 is preset with preset = 8 and the whole is connected as follows:

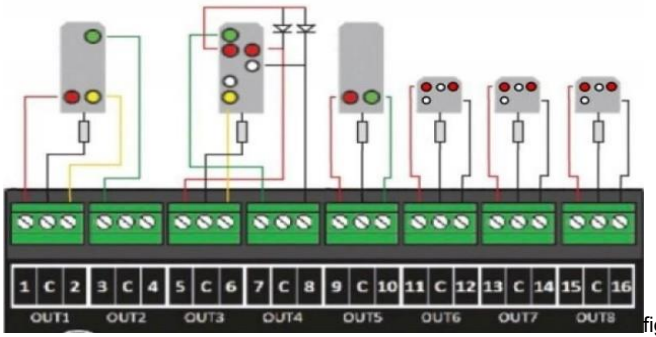

fig. 31

DR4018 application manual

The contents of a DR4018 configured with preset 8 (CV47 = 8) and start address 1 are as follows:

DR4018 Preset 8 = 4x DB hoofdsein

Configuratie

CV	Val	
47	8	= Preset
107	70	= Donkertijd
108	10	= Dimwaarde
109	14	= PWM periode
110		
111	1	= Fade-snelheid
112	183	= Knippersnelheid

Sein OUT Config

OUT	CV	Val	
1-4	131	2	= DB hoofdsein
5-8	132	2	= DB hoofdsein
9-12	133	0	= geen sein
13-16	134	0	= geen sein

Fmap sein			OUT's			
Sein	CV	Val	1-4	5-8	9-12	12-16
1	143	1	1	2	4	8
2	167	2	1	2	4	8
3	191	0	1	2	4	8
4	215	0	1	2	4	8

DR4018				Configuratie		Pulstijd		DR4018		Fmap AAN				Fmap UIT			
OUT		Fmap	Aansluiting	CV	Val	CV	Val	Adres	Toepassing	CV	Val	CV	Val	CV	Val	CV	Val
1	1a	1	DB Hp #1 rood	113	17	238	128	1	DB Hp #1- inrij	141	0	142	0	144	0	145	0
2	1b	2	DB Hp #1 geel	114	17	239	128	2	DB Hp #1 inrij	147	0	148	0	150	0	151	0
3	2a	4	DB Hp #1 groen	115	17	240	128	3	DB Hp #1 inrij	153	0	154	0	156	0	157	0
4	2b	8		116	17	241	128	4	nachtdimming	159	0	160	0	162	0	163	0
5	3a	16	DB Hp #2 rood	117	17	242	128	5	DB Hp #2 uitrij	165	0	166	0	168	0	169	0
6	3b	32	DB Hp #2 geel	118	17	243	128	6	DB Hp #2 uitrij	171	0	172	0	174	0	175	0
7	4a	64	DB Hp #2 groen	119	17	244	128	7	DB Hp #2 uitrij	177	0	178	0	180	0	181	0
8	4b	128	DB Hp #2 Sh1	120	17	245	128	8	nachtdimming	183	0	184	0	186	0	187	0
9	5a	1	DB Hp #3 rood	121	17	246	128	9	DB Hp #3 blok	189	0	190	2	192	0	193	1
10	5b	2	DB Hp #3 groen	122	17	247	128	10	DB Hp #4 sper	195	0	196	8	198	0	199	4
11	6a	4	DB Hp #3 Sh0	123	17	248	128	11	DB Hp #5 sper	201	0	202	32	204	0	205	16
12	6b	8	DB Hp #3 Sh1	124	17	249	128	12	DB Hp #6 sper	207	0	208	128	210	0	211	64
13	7a	16	DB Hp #4 Sh0	125	17	250	128	13		213	0	214	0	216	0	217	0
14	7b	32	DB Hp #4 Sh1	126	17	251	128	14		219	0	220	0	222	0	223	0
15	8a	64	DB Hp #4 Sh0	127	17	252	128	15		225	0	226	0	228	0	229	0
16	8b	128	DB Hp #4 Sh1	128	17	253	128	16		231	0	232	0	234	0	235	0

fig. 32

The CVs for the output configuration have the value 17 for the outputs permanently on with fading (17 = Bit 0-3 (1) + Bit 4 on (16) + Bit 5 out (0) + Bit 6 out (0) + Bit 7 out (0)) The Signal OUT CVs 131 and 132 are given the value 2, corresponding to the signal images for DB Main signals; CVs 133 and 134 have the value 0, because no signal generator is used for the associated outputs. The Fmap CVs of these outputs are also set to 0.

The signal images are controlled for signal # 1 with start address 1 as follows:

1. **Address [1] RO + address [2] RO + address [3] RO = Hp0**
2. **Address [1] GR + address [2] RO + address [3] RO = Hp1**
3. **Address [1] RO + address [2] GR + address [3] RO = Hp2**
4. **Address [1] GR + address [2] GR + address [3] RO = Sh1**

Addresses 5, 6 and 7 apply to signal # 2

For signal # 3 applies

1. **Address [9] RO = Hp0 or Sh0**
2. **Address [9] GR = Hp1 or Sh1**

Addresses 10, 11 and 12 apply to signals # 4 to # 6

Notes on setting the properties of the outputs

The value 1 for Bit 0-3 produces the maximum dimmed value. This can be selected if the connected light signals show a too bright signal image.
A disadvantage of this setting is that the desired fading (Bit 4 = on) no longer works because the set brightness value is the minimum and there is therefore no “space” for fading. In addition, the night dimmer cannot be used because when switched on it provides a higher brightness than the set brightness value is 1.

It appears that the dimming value specified via CV108 is subtracted from the value set via CV113 to CV128 when the night dimmer is switched on. As a result, with the value 26 the night dimmer results in the value 26 - 10 = 16, which corresponds to the brightness value 0 = off.

At values lower than 26, switching on the night dimming mode results in an inversely proportionate greater brightness.

Conclusion: When using the night dimmer CV108 = 10, the value specified in CVs 113 to 128 must be at least 27.

Another method for dimming that does not have these drawbacks is to use a step-down power supply. Details in section 10.0; p. 37

Example 2

A combination of 6 points and 1 DB Main signal; an example where the “last” signal can still find a place on the “turnout decoder”.
It is important to realize that this combination can be realized with Preset = 0 even though Preset = 0 gives a maximum of 8 addresses, while the proposed combination requires 10 addresses!

The whole is connected as follows:

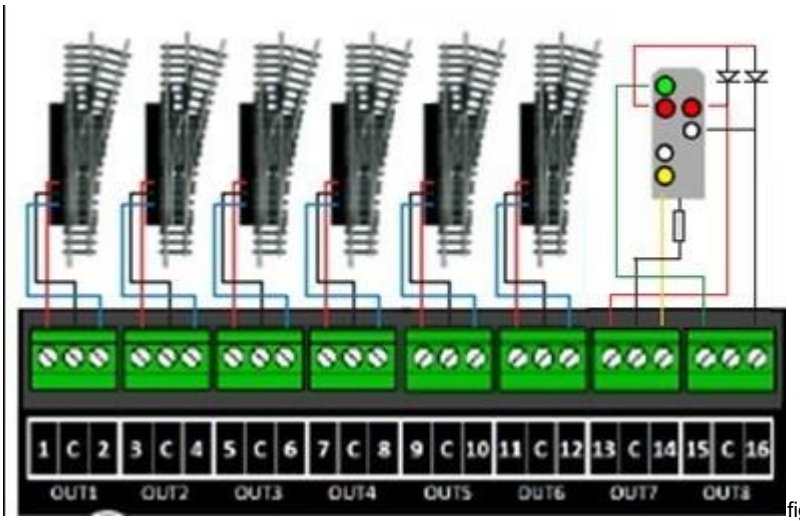

fig. 33

DR4018 application manual

The contents of a DR4018 configured with preset 8 (CV47 = 8) and start address 1 are as follows:

DR4018 Preset 0 = 8x Wissel/Sein schakeling met puls

Configuratie

CV	Val	
47	0	= Preset
107	70	= Donkertijd
108	10	= Dimwaarde
109	14	= PWM periode
110		
111	1	= Fade-snelheid
112	183	= Knippersnelheid

Sein OUT Config

OUT	CV	Val
1-4	131	0
5-8	132	0
9-12	133	0
13-16	134	2

Fmap sein			OUT's			
Sein	CV	Val	1-4	5-8	9-12	12-16
1	143	0	1	2	4	8
2	167	0	1	2	4	8
3	191	8	1	2	4	8
4	215	0	1	2	4	8

DR4018				Configuratie		Pulstijd	
OUT		Fmap	Aansluiting	CV	Val	CV	Val
					143		**128**
1	1a	1	Wissel #1 Recht	113	143	238	128
2	1b	2	Wissel #1 Afbuig	114	143	239	128
3	2a	4	Wissel #2 Recht	115	143	240	128
4	2b	8	Wissel #2 Afbuig	116	143	241	128
5	3a	16	Wissel #3 Recht	117	143	242	128
6	3b	32	Wissel #3 Afbuig	118	143	243	128
7	4a	64	Wissel #4 Recht	119	143	244	128
8	4b	128	Wissel #4 Afbuig	120	143	245	128
9	5a	1	Wissel #5 Recht	121	143	246	128
10	5b	2	Wissel #5 Afbuig	122	143	247	128
11	6a	4	Wissel #6 Recht	123	143	248	128
12	6b	8	Wissel #6 Afbuig	124	143	249	128
13	7a	16	DB Hp #1 rood	125	31	250	128
14	7b	32	DB Hp #1 groen	126	31	251	128
15	8a	64	DB Hp #1 geel	127	31	252	128
16	8b	128	DB Hp #1 Sh1	128	31	253	128

DR4018		Fmap AAN				Fmap UIT			
Adres	Toepassing	CV	Val	CV	Val	CV	Val	CV	Val
1	Wissel #1	141	1	142	0	144	2	145	0
2	Wissel #2	147	4	148	0	150	8	151	0
3	Wissel #3	153	16	154	0	156	32	157	0
4	Wissel #4	159	64	160	0	162	128	163	0
5	Wissel #5	165	0	166	1	168	0	169	2
6	Wissel #6	171	0	172	4	174	0	175	8
7	niet gebruikt	177	0	178	0	180	0	181	0
8	niet gebruikt	183	0	184	0	186	0	187	0
9	DB Hp #1	189	0	190	0	192	0	193	0
10	DB Hp #1	195	0	196	0	198	0	199	0
11	DB Hp #1	201	0	202	0	204	0	205	0
12	Nachtdimming	207	0	208	0	210	0	211	0
		213	0	214	0	216	0	217	0
		219	0	220	0	222	0	223	0
		225	0	226	0	228	0	229	0
		231	0	232	0	234	0	235	0

fig. 34

For the purpose of the signal, the properties of the relevant outputs with CV125 to CV128 = 31 are configured to permanent on at full strength with fading. Signal OUT configuration for OUT13 to OUT16 is set to DB Main signal **(CV134 = 2). With the Fmap signal, the outputs OUT12 to OUT16 are connected to the 9e to 12e address (CV191 = 8). The number of addresses of the DR4018 has thus also increased to 16, of which it is 7e and 8e address not used (The** Fmap ON and Fmap OFF CVs are set to 0)

8.0 The wing signals of the DB

For the main signals, a distinction is made between signals with two or three positions

1) signals with two signal positions; DB single arm signal, signal positions Hp0 (stop) and **Hp1 (driving) DB dual signal, signal positions Hp0 (** stop) and **Hp2 (** drive slowly

2) signals with three signal positions; DB dual arm signal, signal positions Hp0 (Stop), **Hp1 (** to drive), **Hp2 (** drive slowly)

3) Combination of DB exit signal with DB barrier signal;

8.1 Signaling with two signal positions

DB single arm signal, signal positions Hp0 (stop) and Hp1 (driving) DB spersein, signal positions Sh0 (stop) and Sh1 (shunting allowed)

Connection of a single arm signal

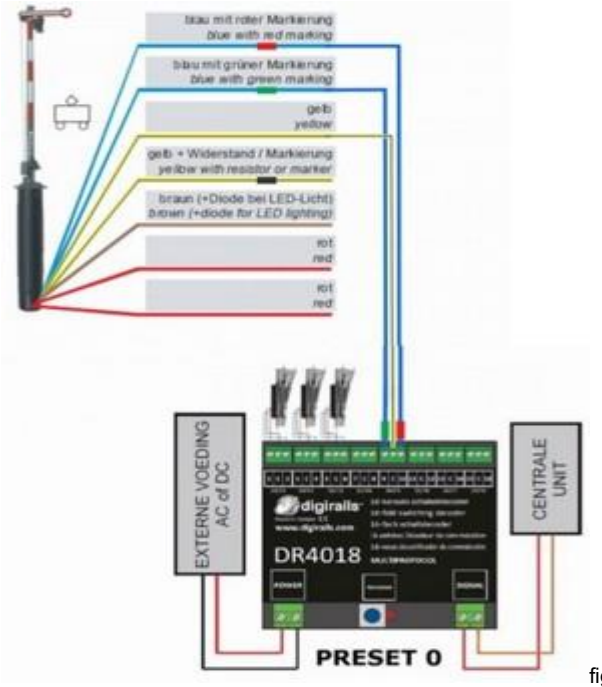

fig. 35

The yellow wire without the black mark / resistor should be connected to the “C” (common +) of the desired output of the DR4018 (in the example the output is chosen #5).

The blue wire with green marking (signal safe) is connected to the left OUT of the desired output (in this example OUT9).

The blue wire with the red marking (signal unsafe) is connected to the right output of the desired OUT (in the example, OUT10).

The DR4018 is set with Preset 0 because these signals work in the same way as turnout switches.

If the DR4018 is set with start address 41, then the signal connected to Output # 5 will respond to DCC address 45:

- Address [45] **RO** = Hp0
- Address [45] **GR** = Hp1

A dual arm signal with the signal positions Hp0 and Hp2 is connected in the same way as above.

8.2 Signaling with three signal positions

A signal with three signal positions (**Hp0 / Hp1 / Hp2)** requires connection to two OUT outputs; one for the signal positions Hp0 and Hp1 and one for the signal position Hp2

Schematically this looks like this:

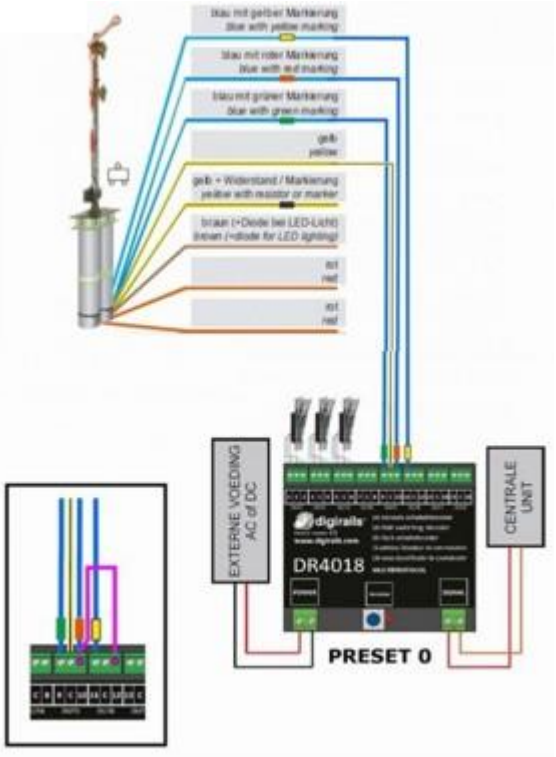

fig. 36

Red and green are connected to Output # 5 as in the first example. The blue wire with the yellow marking (Hp2) is connected to the left output of Output
#6; so OUT11.

If the DR4018 is set with start address 41, the signal connected to Output # 5 will respond to DCC addresses 45 and 46:

- Address [45] **RO =** Hp0
- Address [45] **GR =** Hp1
- Address [46] **GR =** Hp2

If it is desirable that the signal can also be set to unsafe via address 46, a wire must be connected between the terminals “9” and “12”. The signal then responds as follows:

- Address [45] **RO =** Hp0
- Address [45] **GR =** Hp1
- Address [46] **RO =** Hp0
- Address [46] **GR =** Hp2

The connection between 9 and 12 can also be realized via Function-Folders: with CV175 = 2, OUT5 # 10 is internally connected in the DR4018 to OUT6 # 12.

8.3 Combination of DB exit signal with DB Spersein

This is a combination of an exit signal with a leading spar.

This combination also requires a connection to two OUT outputs; one for the exit signal with the signal positions Hp0 and Hp1 and one for the spar with the signal positions Sh0 and Sh1

Schematically it looks like this:

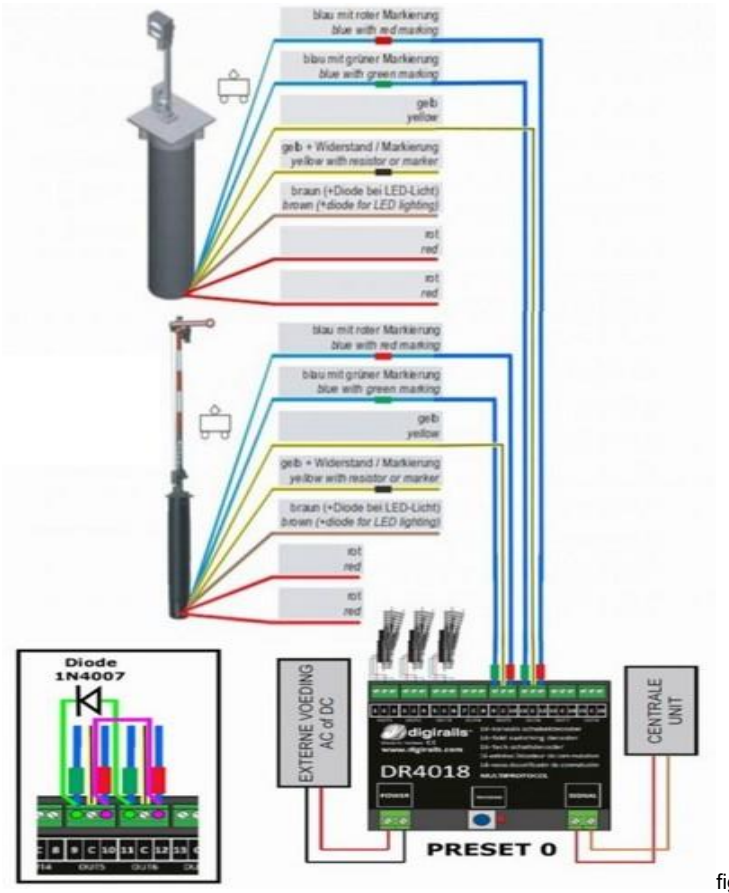

fig. 37

If the DR4018 is set with start address 41, the exit signal will respond to DCC address 45 and the reverse signal to DCC address 46. The signals will respond as follows:

- Address [45] **RO =** Hp0
- Address [45] **GR =** Hp1
- Address [46] **RO =** Sh0
- Address [46] **GR =** Sh1

The following modifications can be made to link the signals as a function of the displayed signal images. The signals then respond as follows:

- Address **[45]** RO = Hp0 and Sh0
- Address **[45]** GR = Hp1 and Sh1
- Address **[46]** RO = Sh0 and Hp0
- Address **[46]** GR = Sh1

The jumpers, one with a diode, are shown in purple and green in the connection diagram:

- A jumper (purple) between terminals OUT10 and OUT12
- A connection with diode (green) between terminals OUT9 and OUT11

The connections can also be realized via Function Folders:

- Address [45] RO must be connected to OUT10 (Fmap value = 2) and to OUT12 (Fmap value = 8) The corresponding CV169 will have the value 2 + 8 = 10 (address [45] RO: Exit signal = Hp0 and Spersein = Sh0)

- Address [45] GR must be connected to OUT9 (Fmap value = 1) and to OUT11 (Fmap value = 4) The corresponding CV166 will have the value 1 + 4 = 5 (address [45] GR: Exit signal = Hp1 and Spersein = Sh1)

- Address [46] RO must be connected to OUT12 (Fmap value = 8) and to OUT10 (Fmap value = 2) The corresponding CV175 will have the value 8 + 2 = 10 (address [46] RO: Spersein = Sh0 and Uitrijsein = Hp0)

- Address [46] GR must be connected to OUT11 (address [46]
  GR: Spersein = Sh1)

2e example of a combination of DB Uitrijsein with DB Spersein

Combination of an exit signal in the form of an arm signal with three signal positions (Hp0 / Hp1 / Hp2) with a mechanical spear in front of it.

In terms of functionality, this combination is completely equivalent to the exit light signal with the signal positions Hp00 / Hp1 / Hp2 / Sh1 The DR4018 configured with Preset 8.

The combination requires connection to two OUT outputs (in the example to the outputs OUT9 to 12); one for the signal positions Hp0 and Hp1 and one for the signal positions Hp2 and Sh1. In this example, the starting address of the DR4018 is set to 41.

Schematically this looks like this:

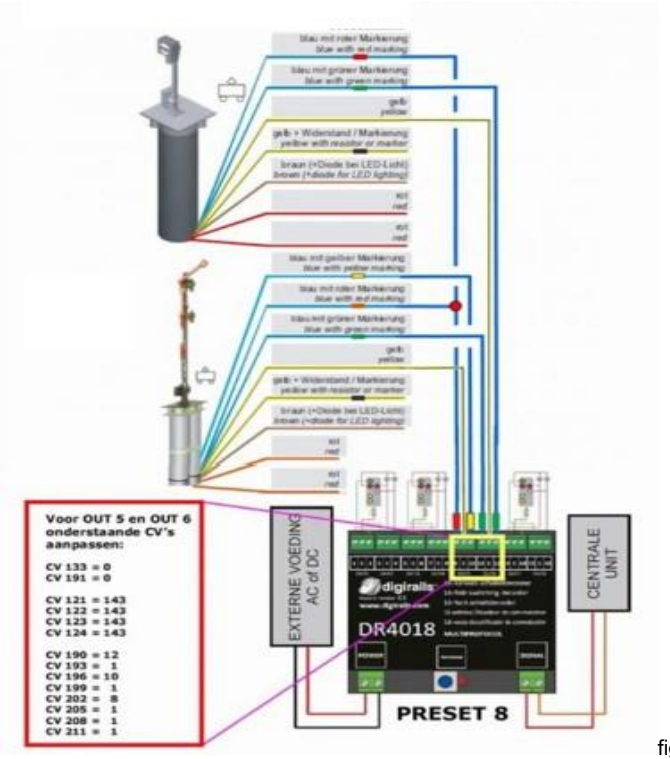

fig. 38

Make sure that both the blue wire / red marking of the arm signal and the blue wire / red marking of the spar signal are both connected to OUT9, so that they are always set to “unsafe” at the same time. The other combination modes are realized via Function mapping.

Explanation of the CVs to be changed:

1. CV133 = 0 removes the signal definition from OUT9 to OUT12
2. CV199 = 0 removes the Function mapping for the 3 the signal at addresses 49 to 52
3. CV121 to CV124 = 143 sets the outputs OUT9 to OUT12 to PULSE for solenoid coils.
4. Set up the required Function mapping as follows:

CV190 = 12 links address [49] GR to outputs OUT11 and OUT12 CV193 = 1 links address [49] RO to outputs OUT 9 CV196 = 10 links address [50] GR to outputs OUT10 and OUT12 CV199 = 1 links address [50] RO at the outputs OUT 9 CV202 = 8 links address [51] GR to outputs OUT12 CV205 = 1 links address [51] RO at outputs OUT 9 CV208 = 1 links address [50] GR to outputs OUT 9 (for safety) CV211 = 1 couples address [50] GR to the outputs OUT 9 (for safety)

After the modifications for the combination, the contents of the DR4018 will look like this:

fig. 39

The control of the signal images is realized by addresses **49 to 51:**

1. address [49] **RO =** Main signal unsafe (Hp0) and Spersein (Sh0, shunting not allowed)
2. address [49] **GR =** Main signal safe (Hp1) and Spersein (Sh1, shunting allowed)
3. address [50] **RO =** Main signal unsafe (Hp0) and Spersein (Sh0)
4. address [50] **GR =** Slow travel main signal (Hp2) and Spersein (Sh1)
5. address [51] **RO =** Main signal unsafe (Hp0) and Spersein (Sh0)
6. address [51] **GR =** Main signal unsafe (Hp0) and Spersein (Sh1, shunting allowed)
   - address [52] is not used, both RO and GR both set the position Hp0 with Sh0 to be sure

9.0 Preset 12 4x NMBS signal

4 light signals of the Belgian Railways can be configured via preset 12.

The connection is schematically shown as follows:

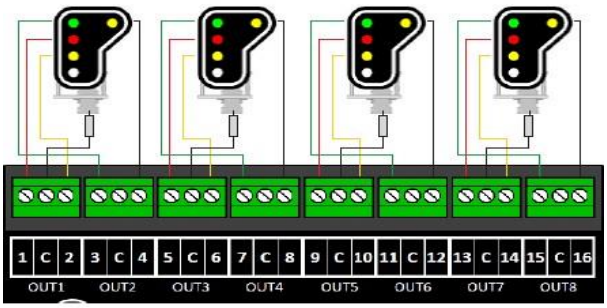

fig. 40

The contents of a DR4018 configured with preset 12 (CV47 = 12) and start address 41 are as follows:

DR4018 Preset 12 = 4x NMBS hoofdsein

Configuratie

CV	Val	
47	12	= Preset
107	70	= Donkertijd
108	10	= Dimwaarde
109	14	= PWM periode
110		
111	1	= Fade-snelheid
112	183	= Knippersnelheid

Sein OUT Config

OUT	CV	Val	
1-4	131	5	= NMBS hoofdsein
5-8	132	5	= NMBS hoofdsein
9-12	133	5	= NMBS hoofdsein
13-16	134	5	= NMBS hoofdsein

Fmap sein			OUT's			
Sein	CV	Val	1-4	5-8	9-12	12-16
1	143	1	1	2	4	8
2	167	2	1	2	4	8
3	191	4	1	2	4	8
4	215	8	1	2	4	8

DR4018				Configuratie		Pulstijd		DR4018		Fmap AAN				Fmap UIT			
OUT		Fmap	Aansluiting	CV	Val	CV	Val	Adres	Toepassing	CV	Val	CV	Val	CV	Val	CV	Val
					31		128										
1	1a	1	NMBS #1 rood	113	31	238	128	41	NMBS #1	141	0	142	0	144	0	145	0
2	1b	2	NMBS #1 geel1	114	31	239	128	42	NMBS #1	147	0	148	0	150	0	151	0
3	2a	4	NMBS #1 groen	115	31	240	128	43	NMBS #1	153	0	154	0	156	0	157	0
4	2b	8	NMBS #1 geel2	116	31	241	128	44	nachtdimming	159	0	160	0	162	0	163	0
5	3a	16	NMBS #2 rood	117	31	242	128	45	NMBS #2	165	0	166	0	168	0	169	0
6	3b	32	NMBS #2 geel1	118	31	243	128	46	NMBS #2	171	0	172	0	174	0	175	0
7	4a	64	NMBS #2 groen	119	31	244	128	47	NMBS #2	177	0	178	0	180	0	181	0
8	4b	128	NMBS #2 geel2	120	31	245	128	48	nachtdimming	183	0	184	0	186	0	187	0
9	5a	1	NMBS #3 rood	121	31	246	128	49	NMBS #3	189	0	190	0	192	0	193	0
10	5b	2	NMBS #3 geel1	122	31	247	128	50	NMBS #3	195	0	196	0	198	0	199	0
11	6a	4	NMBS #3 groen	123	31	248	128	51	NMBS #3	201	0	202	0	204	0	205	0
12	6b	8	NMBS #3 geel2	124	31	249	128	52	nachtdimming	207	0	208	0	210	0	211	0
13	7a	16	NMBS #4 rood	125	31	250	128	53	NMBS #4	213	0	214	0	216	0	217	0
14	7b	32	NMBS #4 geel1	126	31	251	128	54	NMBS #4	219	0	220	0	222	0	223	0
15	8a	64	NMBS #4 groen	127	31	252	128	55	NMBS #4	225	0	226	0	228	0	229	0
16	8b	128	NMBS #4 geel2	128	31	253	128	56	nachtdimming	231	0	232	0	234	0	235	0

fig. 41

The CVs for the output configuration have the value 31 for the outputs permanently on with fading.

The control of the signal images takes place for example for signal # 3 as follows:

1. **Address [49] RO + address [50] RO + address [51] RO = section closed (red)**
2. **Address [49] GR + address [50] RO + address [51] RO = track section to standard gauge closed** (red blink)
3. **Address [49] RO + address [50] GR + address [51] RO = section open; next section is closed** (yellow 1 + 2)
4. **Address [49] GR + address [50] GR + address [51] RO = track section to standard gauge open; next** track section closed (yellow 1 + 2 flashing)
5. **Address [49] RO + address [50] RO + address [51] GR = speed limitation at next signal** (green + yellow horizontal)
6. **Address [49] GR + address [50] RO + address [51] GR = track section open (green)**
7. **Address [49] RO + address [50] GR + address [51] GR = track section to standard gauge open** (green blink)
8. **Address [49] GR + address [50] GR + address [51] GR = track section to standard gauge open;** next section is closed (green + yellow vertical)

10.0 Dimming light signals using a “step-down” power supply

Instead of adjusting the brightness of light signals with CV108, you can choose to reduce the voltage applied to the signal lamps (LEDS) using a step-down power supply. These power supply modules (for example LM2596 DC-DC) are widely available via the internet.

The connection with the DR4018 looks as follows:

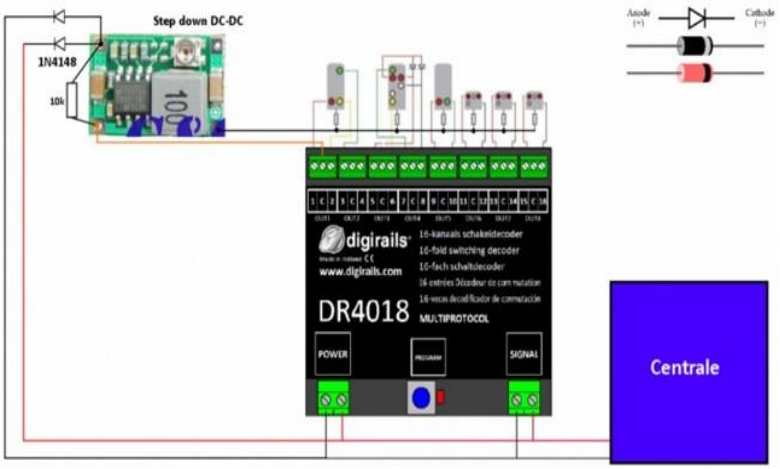

fig. 42

The module is connected as follows:

- The + input of the module at the C-connection
- For the - input of the module, a connection is made to both poles of the “power” connection **with a diode in each wire (1N4148)** with cathode on the module.
- The + output of the module at the common plus connection of the signals
- For the power supply to work stably, a 10kOhm resistor must be connected across the + input and - input of the module.
- The module output is not used.

With the screw on the potentiometer of the module, the brightness of the signal lamps can be adjusted as desired.

11.0 More stable programming with the DR4018

The DR4018 is made as a Multi protocol decoder. This means that during programming it must be determined which protocol is offered.

To make this recognition of the protocol more stable, the following steps can be taken before starting CV programming:

- Set the speed control to address 9999 (the POM address of the decoder)
- Switch the lighting on with F0 on and then off again (DCC-9999 is now regularly switched to the output)
- Put the DR4018 in programming mode; it will now remain stable until it is turned off again