

# DR5013 DIGIREVERSE Instruction manual

(2021-07-06)



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# 1 General Information

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### Please note this manual!

This manual currently contains only the basic information and will be extended step by step. Suggestions, improvements, additions, comments or suggestions are always welcome.

[support@digikeijs.com](mailto:support@digikeijs.com)

## 1.2 Warranty and warranty conditions

All our products come with a 24-month manufacturer's warranty. Please read these operating instructions carefully.

Damage to the product caused by non-compliance with these instructions will invalidate the warranty.

ATTENTION: The warranty is void if the housing of the product is opened.

## 1.3 Legal information

Printing errors and mistakes, technical or other changes as well as changes in the availability of individual products are expressly reserved.

Data and illustrations are non-binding. All changes to hardware, firmware and software are reserved.

We reserve the right to change the design of the product, the software and / or the firmware without prior notice.

### Copyright

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# 2.0 Product overview

## 2.1 General product information

The DR5013 operates either with sensor tracks (short-circuit-free) or via "short-circuit detection" to switch over the reversing loop. The polarity of the reversing loop can also be changed via a switch command. The busy signal of the sections (T, S1, S2) can be done via LocoNet® or external output (for GND or CS feed-back). A short-circuit message can be output via LocoNet or via the SHORT output of the module. An integrated Railcom® detector for address evaluation and POM reading is also included. An electronic high-speed MOSFET relay with 3 ampere load capacity for switching over ensures absolutely trouble-free and wear-free reversing of polarity of the reversing loop. There is also a USB port for configuration and firmware updates.

## 2.2 Technical specifications

The terminals are designed for a cross-section of 0.5mm<sup>2</sup>.

	Outputs	Loading capacity of the reversing loop	Inputs	
<b>DR5013</b>	External Short-circuit Message External feedback Reverse loop (CS current sensor) External feedback Reverse loop (GND Ground switching)	3A	Sensor track 1 Sensor track 2 Feedback unit Reverse loop occupied Railcom® Detector reversing loop	

## 2.3 Hardware Overview

1	Sensor track 2
2	Sensor track 1
3	Track C (Railcom® Detector and Feedback Reverse Loop)
4	Track T (Railcom® Detector and Feedback Reverse Loop)
5	Short Feedback
6	Short Feedback external Short circuit detected
7	FB-CS Track "Ground" brown
8	FB-CS Feedback <b>external</b> (current sensor) Connection of feedback 1-16 to DR4088CS <b>loop track</b>
9	FB-GND Feedback <b>external</b> (switches to GND) <b>loop track</b>
10	GND Connection "C" on DR4088GND
11	LocoNet® connection 1
12	LocoNet® connection 2
13	Track Input K
14	Track Input J
15	<b>USB Status LED</b> green RX red TX
16	USB 2.0 connection



17	<b>Status LED</b> blue Phase position reversing loop rotated red Short circuit green Operating voltage available
18	Reversing switch (When the button is pressed, the DR5013 changes the polarity of the reversing loop.)

# 3.0 CONFIGURATION SOFTWARE

**ATTENTION!!!!** NEVER connect the DR5013 to the PC via USB when the TRACK INPUT of the DR5013 is connected to the TrackOut (main track or programming track) of the central unit!

**This can destroy the DR5013, the central unit and/or the USB interface in the PC.**

**The USB connection to the PC must only be used to configure the DR5013!**

## 3.1 introductory remarks

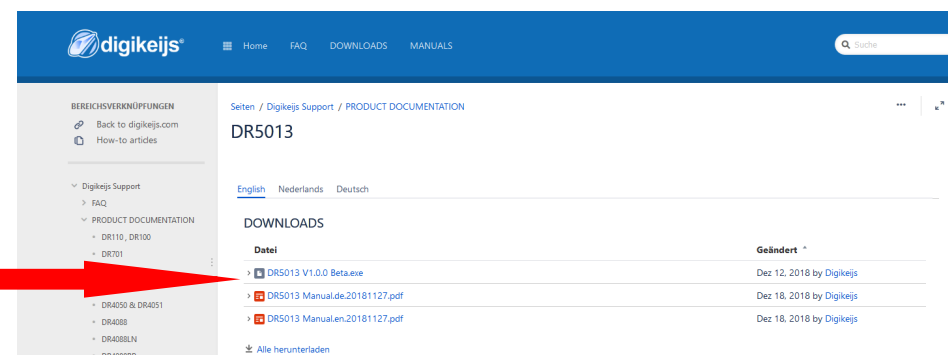
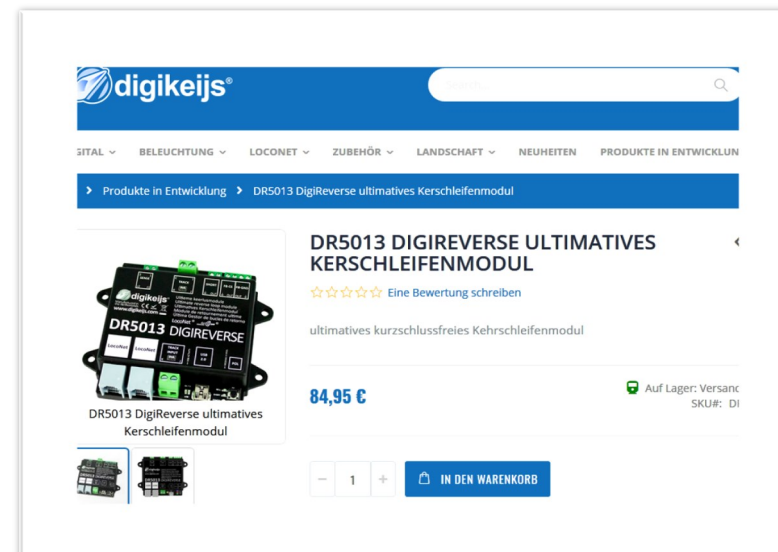
A USB connection to the PC is required to configure the DR5013.  
To do this, you will need the supplied USB cable (a so-called USB A to USB mini cable).

### System requirements:

- Intel Pentium or AMD Athlon 64 processor
- Microsoft Windows 7 with Service Pack 1, Windows 8.1, or Windows 10
- 1 GB RAM for 32 Bit; 2 GB RAM for 64 Bit
- 100 MB free hard disk space
- Monitor with a resolution of 1,024 x 768 (1280 x 800 recommended)

## 3.2 Download Software

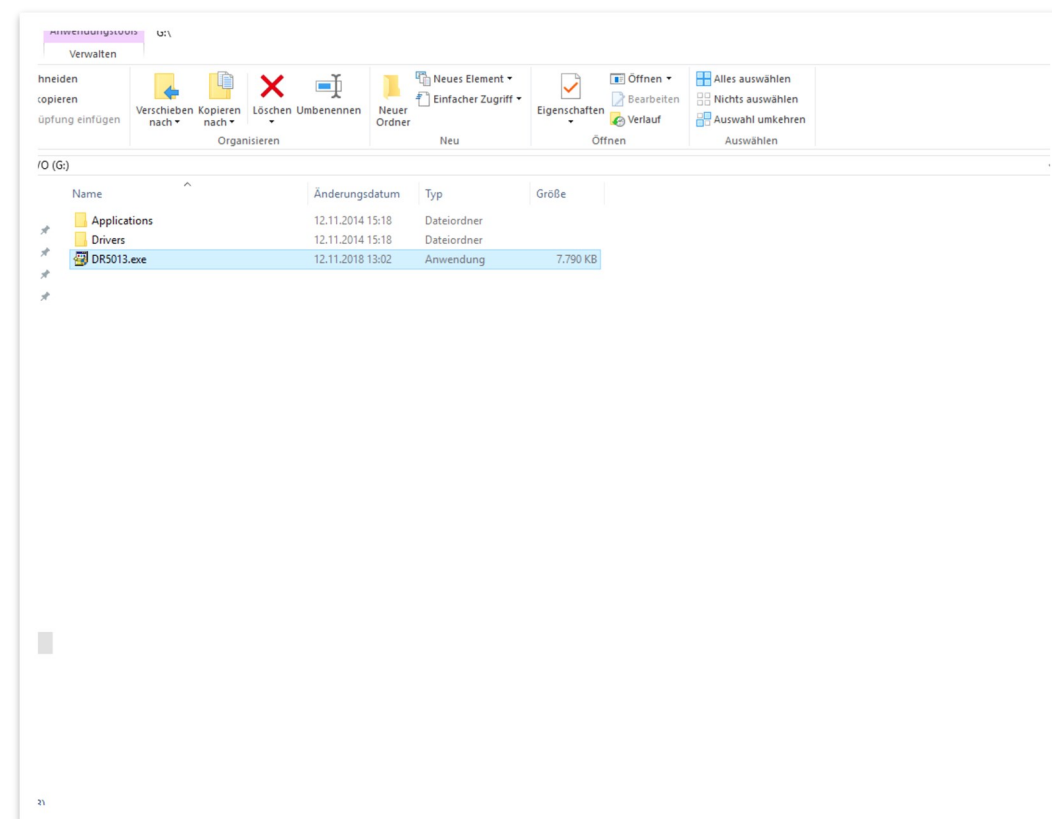
Do not connect the DR5013 to the PC until the software has been installed.  
The software can be downloaded from the DIGIKEIJS website.



## 3.3 Install software

After you have successfully downloaded the software, the installation can be started by double-clicking on the DR5013xx.exe file.

Make sure that you have administrator rights on your PC.



### Important !!!

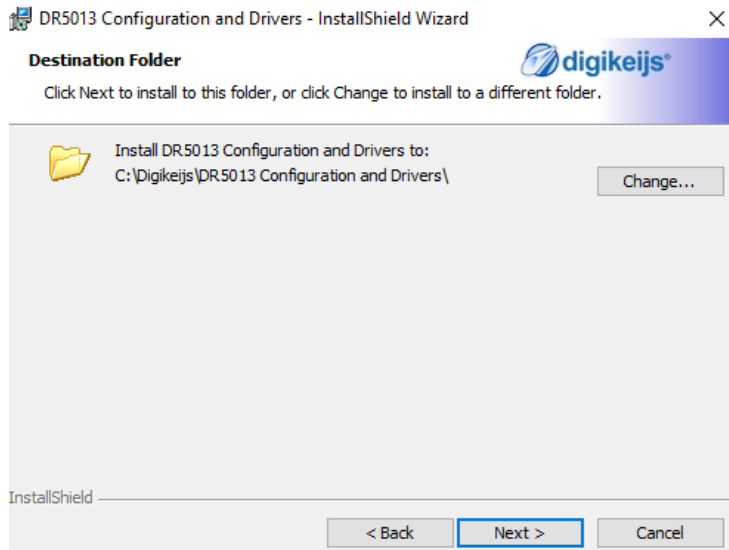
Do not connect the DR5013 to the PC until the software and driver have been successfully installed.



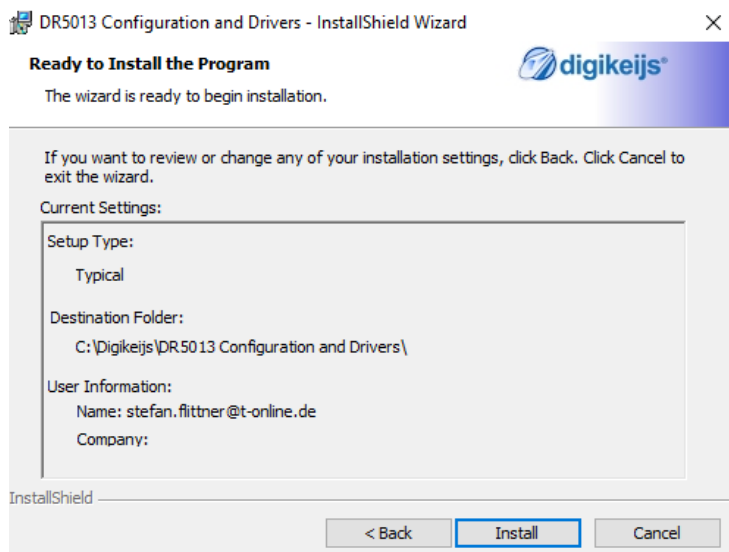
The following screen appears after a few seconds. Click "Next".



If you want to change the location of the software, you can do so on the next screen. However, it is recommended to leave the settings as they are and click "Next".



Now follows a short overview of the settings. Click on "Install" if you agree.



Now the configuration software will be installed and Windows will ask you a few times if you trust Digikeij's software. When all this is complete, the last screen appears. Press "Finish" and the drivers and configuration program are installed.



## 3.4 Connecting the DR5013 to the PC via USB

With the desktop symbol the software can be started. Do not start the software until the following steps have been performed!

First connect the PC with the supplied USB cable and then with the DR5013. Windows "detects" the new hardware and installs the drivers.

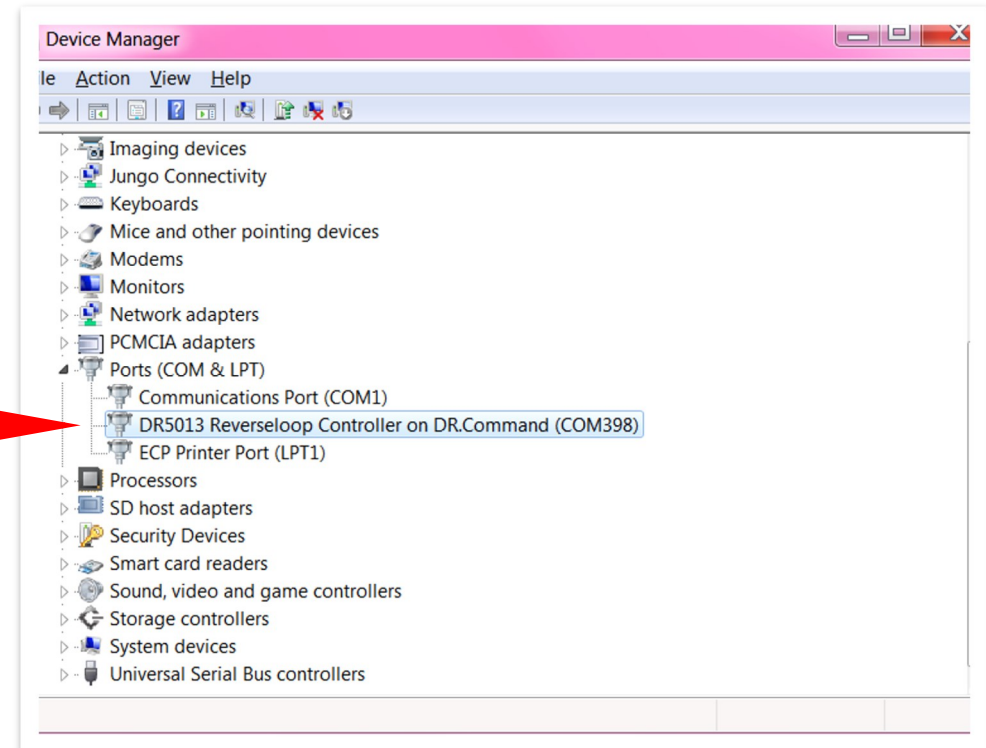
Wait until this process is completed and you receive a message from Windows that the hardware has been installed correctly.

Windows will assign and reserve a COM port to the DR5013.

(The numbering of the COM ports depends on the configuration of the PC)

Here the COM398 port is used.

**COM398** is the communication port for the **DR.Command** protocol.



# 4.0 Programming



All pictures shown here usually show the **factory settings** of the DR5013. However, some pictures show **more information** than is available in the **factory settings**, which has the reason to clarify which options and settings are available in the DR5013.

In addition, the settings **can deviate** as soon as you have created an **individual configuration** for your own application. you need.

**ATTENTION!!!!** NEVER connect the DR5013 to the PC via USB when the TRACK INPUT of the DR5013 is connected to the TrackOut (main track or programming track) of the central unit!

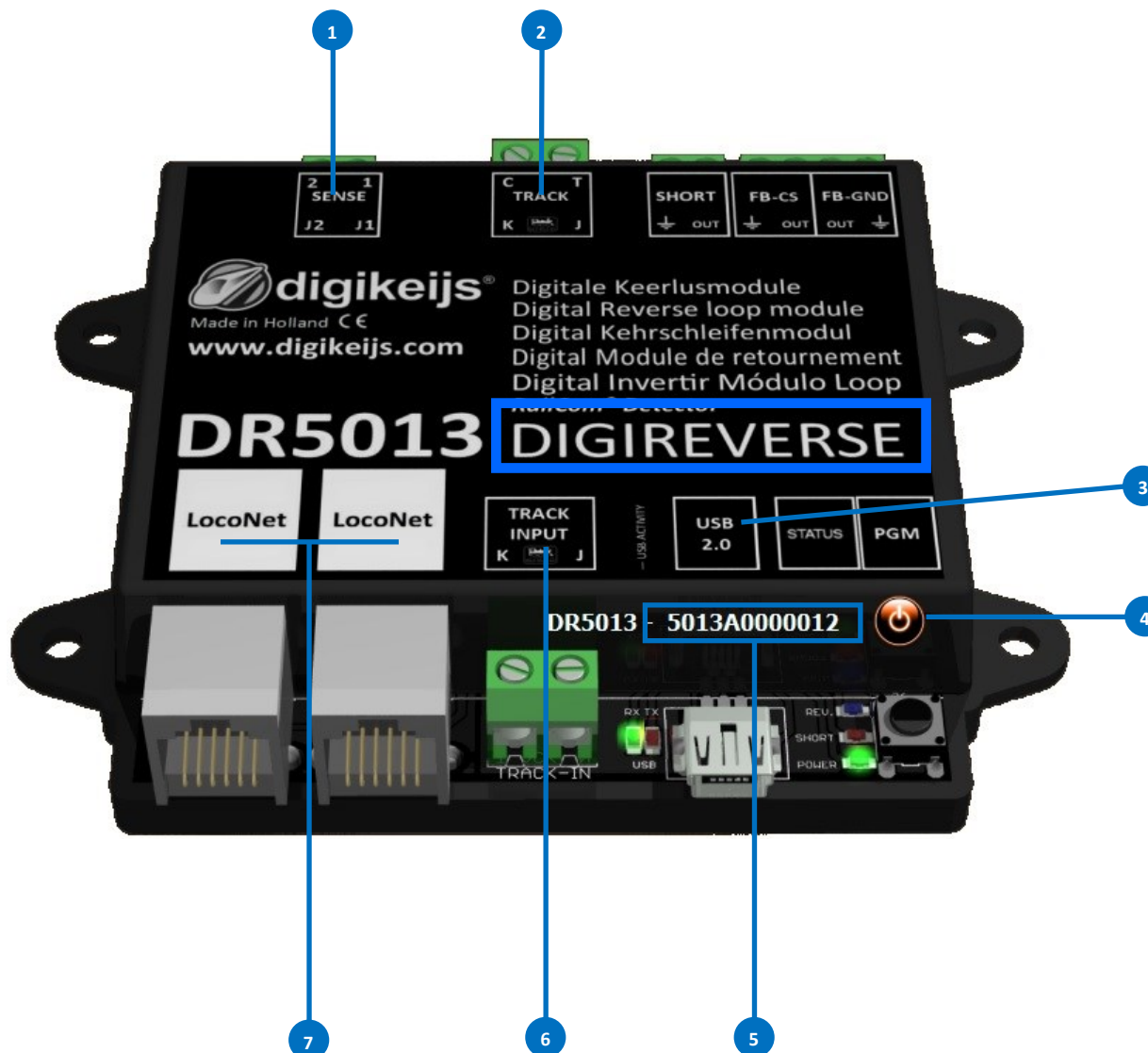
**This can destroy the DR5013, the central unit and/or the USB interface in the PC.**

**The USB connection to the PC must only be used to configure the DR5013!**

## 4.1 Overview Configuration Software

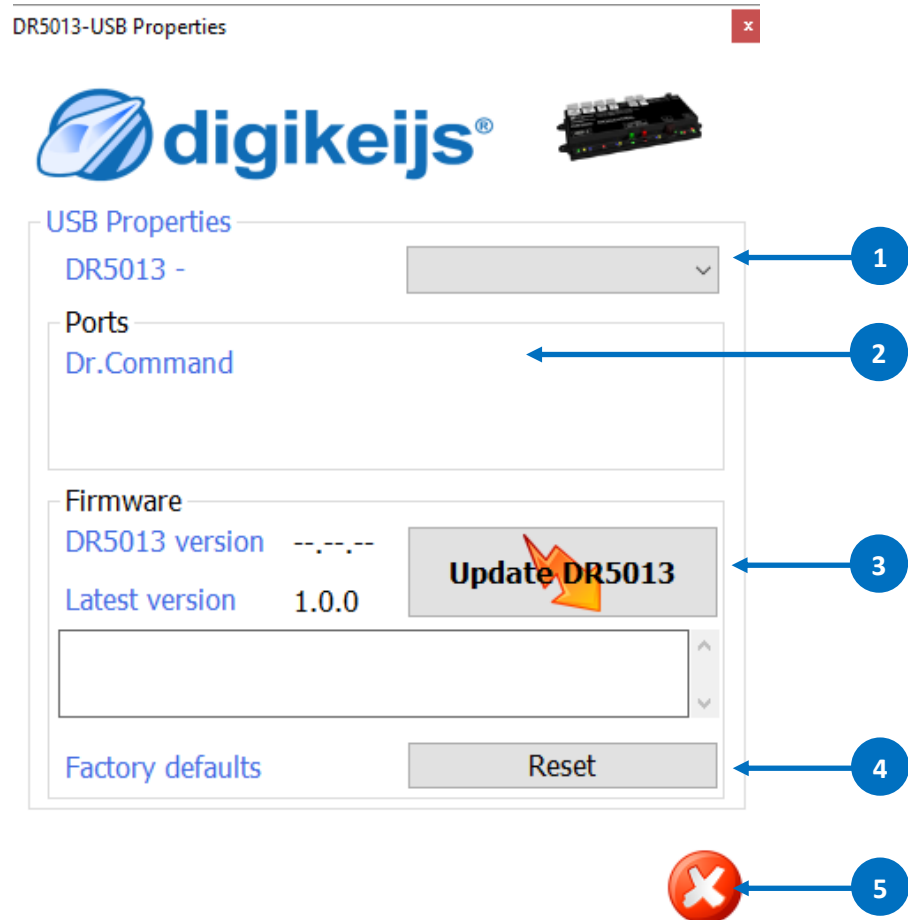
The various options can be easily accessed by clicking on the respective connections.

- 1 Properties of sensor tracks
- 2 Features Global Detector
- 3 USB Features / Firmware Upgrade
- 4 Exit software
- 5 DR5013 Serial number
- 6 Module Properties
- 7 LocoNet® Features
- 8 instruction manual



## 4.2 USB 2.0 Features

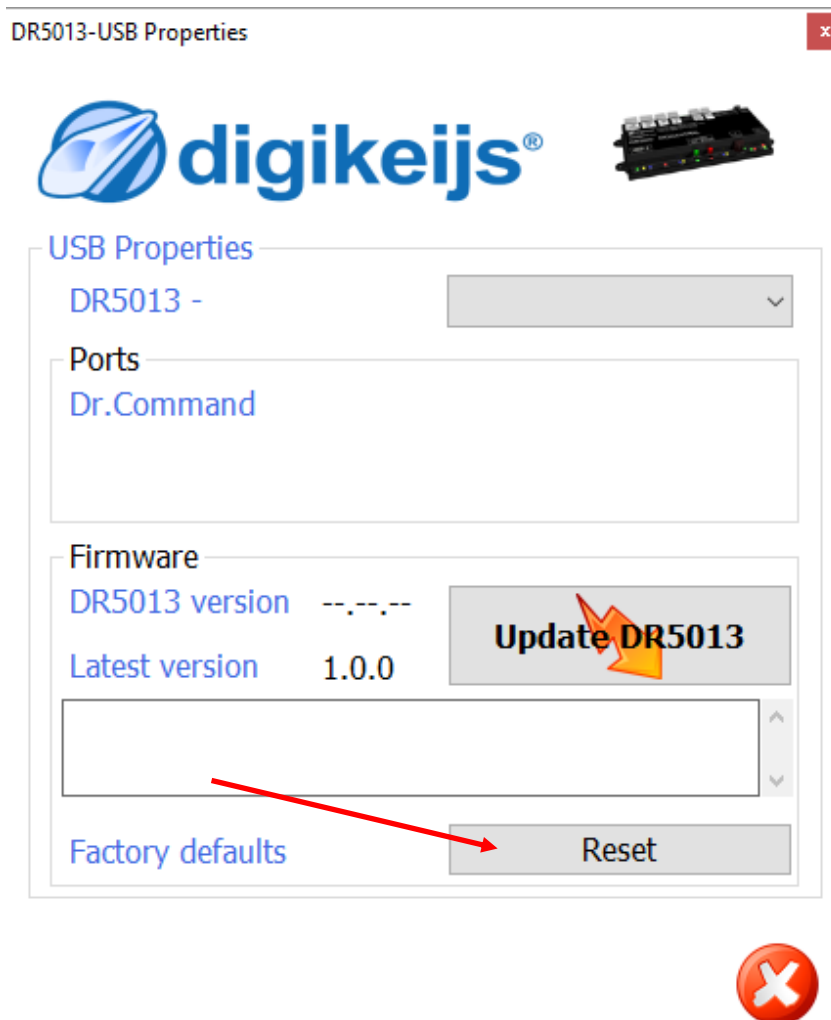
- 1) The selected DR5013 has been connected via USB and the serial number is read.
- 2) COM port number for the Dr.Command protocol.
- 3) Update the firmware of the DR5013.
- 4) Reset to factory settings.
- 5) Cancel



## 4.3 Restoring the factory settings

It is possible to reset the DR5013 settings to the factory defaults.

The USB menu in the configuration software allows you to activate the reset, which resets the DR5013 settings to factory defaults.



## 4.4 Updating the Soft- and Firmware

The development of the DR5013 software continues and is constantly being improved. With firmware updates, you can equip the DR5013 with the latest software. The new firmware is integrated in a new configuration software. Before a firmware update is performed, it is recommended to save the current settings using the "Import/Export Settings" function.

You must first install the latest version of the configuration software before the current firmware update is available.

### Method:

- 1) Disconnect the DR5013 from the PC.
- 2) Download the new version from our website.
- 3) Install the configuration software.
- 4) Connect the DR5013 to the USB cable and the PC.
- 5) Open the configuration software.
- 6) Go to the USB2.0 menu.
- 7) Use the "Update DR5013" button to activate the firmware update.

**IMPORTANT: Do not disconnect the DR5013 from the PC when updating the firmware! This may cause the DR5013 to become unusable.**

**IMPORTANT!!! Before the firmware update, the DR5013 automatically saves the settings. However, it may happen that the DR5013 module is reset to the factory settings. Therefore, check all settings of the DR5013 after an update!**



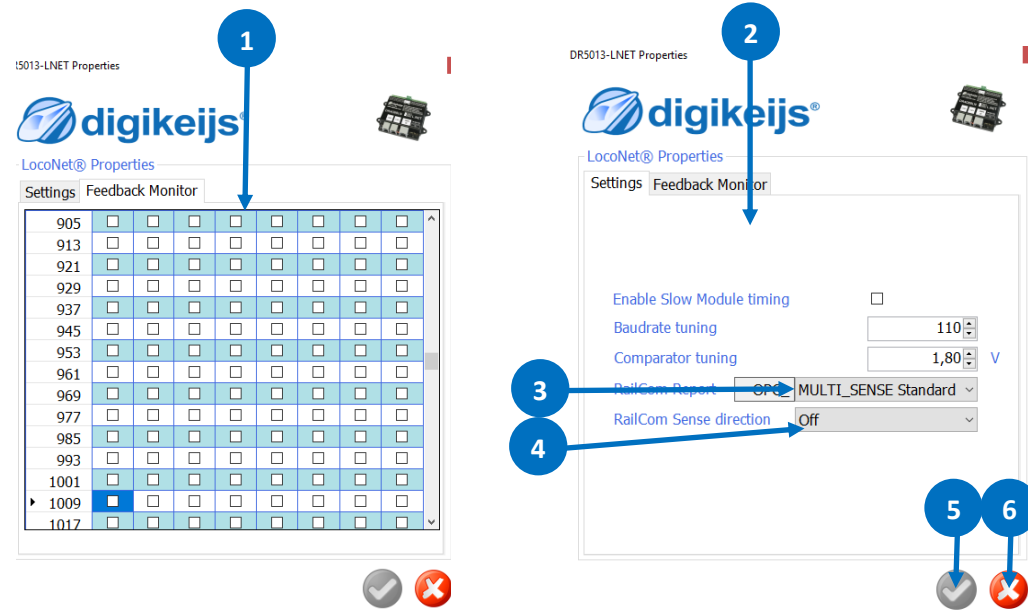


## 4.5 Firmware Versions

Version	date	Beschreibung
1.0.0	01.11.2018	First beta version for beta testers
1.0.0	10.10.2018	First instructions
1.0.0	11.11.2018	Connection examples

## 4.5 LocoNet® Features

- 1) LocoNet® Feedback Monitor. The different colors indicate the different feedback busses.
- 2) Slow Module Timing. This option can be activated if there are problems with Loconet.
- 3) **RailCom Report.** Here you select which LocoNet commands are used to send the RailCom message.  
*MULTI\_SENSE\_Standard*  
*MULTI\_SENSE\_Long*  
*MULTI\_SENSE\_Both*  
 The original OPC\_MULTI\_SENSE command is used (Digitrax and Bluecher compatible).  
 There is a restriction of the address ranges "locomotive address or block address" when the derailing direction is sent.  
 The new OPC\_MULTI\_SENSE\_L command is used: No restriction of the address ranges.
- 4) **RailCom Sense direction.** Here you can select how the derailment direction is reported to the control panel in the case of "MULTI\_SENSE\_Standard".  
*off*  
*in Blockadresse*  
*in Lokadresse*  
 Both commands (Long and Standard) are transmitted to the central unit.  
 No rerail direction is transmitted.  
 The track-laying direction is transmitted in the block address (restriction of the block addresses to a maximum of 2048).  
 The track-laying direction is transmitted in the locomotive address (restriction of locomotive addresses to a maximum of 4095).
- 5) Accept current settings.
- 6) Cancel.



## 4.6.0 Module properties

- 1) Display Logging Window.
- 2) Select language.
- 3) Module address in LocoNet®.
- 4) Waiting time after the central unit has transmitted power on before the track voltage is activated in the reversing loop.
- 5) Report feedback contacts after switching on.
- 6) Waiting time after switching on before the contacts are reported.
- 7) Waiting time until the track voltage is switched off if a short circuit has been detected.
- 8) **Short circuit Send message via LocoNet® (track voltage is switched off globally).**  
*None* Do not send a short circuit message via LocoNet®.  
*CP\_OFF* Send short circuit message via LocoNet®.  
*OPC\_PEER\_XFER* Send short circuit message via LocoNet®. (Uhlenbrock® Specification)  
*Both* Send both messages via LocoNet.
- 9) Switch the track voltage on again automatically after a short circuit.
- 10) Waiting time after a short shot before the track voltage is reactivated.

- 11) Module Setting Export/Import
- 12) Accept current settings
- 13) Cancel
- 14) Railcom® Use channel 2 for additional address recognition.  
Up to 4 addresses can then be detected simultaneously by one detector.
- 15) Number of bits to be counted before a busy message is issued.\*
- 16) Number of Railcom bits to be counted before direction recognition takes place.\*
- 17) Waiting time until the direction recognition is measured in a stable way.\*
- 18) Railcom® Detection with Logging

\*The lower the value, the faster the detection is.

**Notice!** Not all functions are supported by all decoders. Please refer to the respective decoder manual for details.



## 4.6.1 Module Properties

1. Digitrax® specification for reporting 'short' locomotive addresses.  
Standard: Report 0x7D in high quality byte.  
Alternative: Report 0x00 in high quality byte.
2. Block addresses are sent by Digitrax® only in even numbers. However, the DR5013 can also send linear (even and odd) block addresses, extending the reporting range by 2048.
3. Report the speed of the locomotives to the control centre via Railcom®.
4. To prevent too many messages from being sent to the central unit when the value changes quickly, a "Delta" value can be set here. (\*See example)
5. Report the signal quality of the Railcom® messages to the control centre.  
The messages are reported by the decoder in %.  
**0%** All commands have arrived (track or locomotive clean).  
**100%** of the commands have not arrived (track or locomotive dirty).

6. All QoS messages below this value are not reported to the central unit.
7. A "Delta" value can be set here so that too many messages are not sent to the central unit when the value changes quickly.
8. „Report the "tank contents" of the locomotives to the central unit via Railcom®.

**\*Example:**

1.	last measured	value =10	
	newly measured	value =6	<b>Delta = 4</b>
2.	last measured	value =3	
	newly measured	value =9	<b>Delta = 6</b>
3.	last measured	value =12	
	newly measured	value =1	<b>Delta = 11</b>

Parameter "Delta" = 6 The values 2. and 3. are reported, 1. is suppressed.

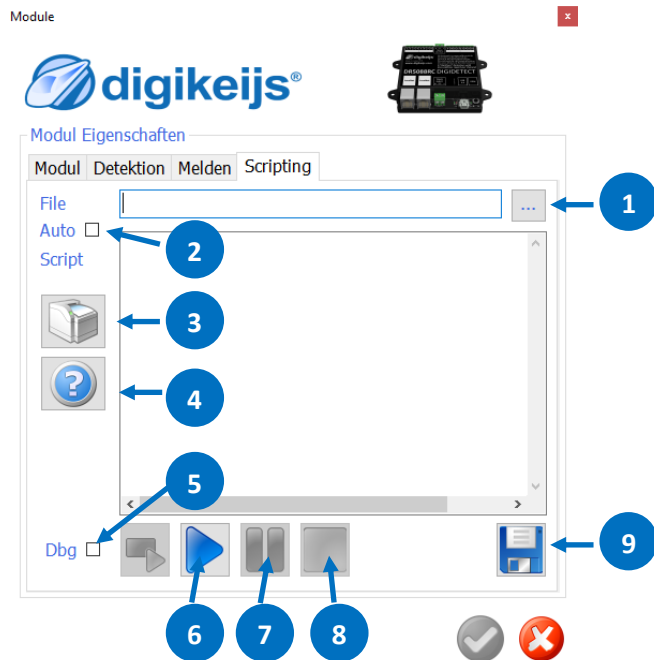
**Notice!** Not all functions are supported by all decoders. Please refer to the respective decoder manual for details.



## 4.7 Scripting DR. Script

DR Script is a BASIC / Assembler similar, text based programming language. With Dr. Script you have the possibility to control even complex processes with the help of a product of the DR50xx series. Further information about Dr. Script can be found in the separate documentation.

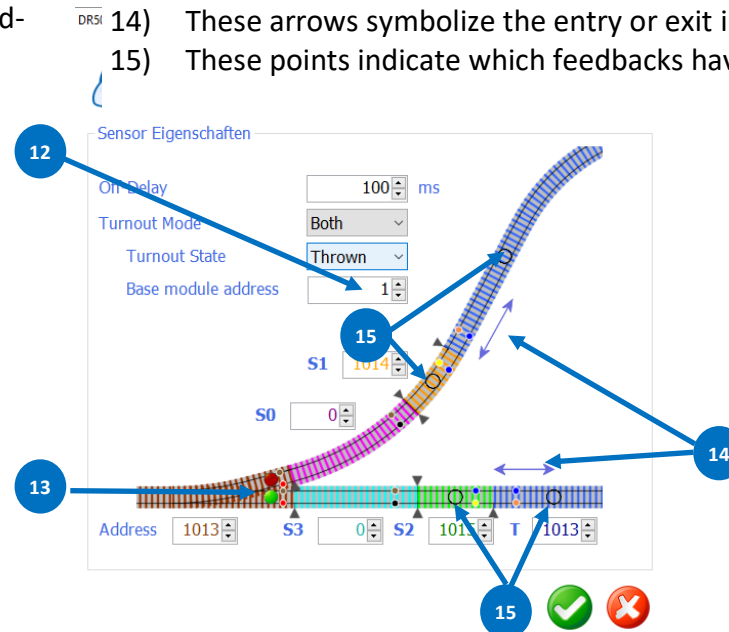
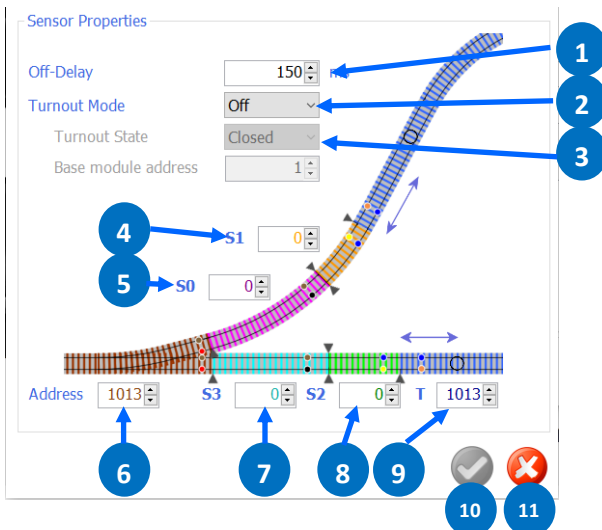
- 1) Open script. If this check mark is set.
- 2) If this box is checked, the last script called is automatically started after the DR50xx has been started.
- 3) Select printer.
- 4) Call help. Debug mode.
- 5) Debug mode.
- 6) Start the selected script.
- 7) Stop selected script (PAUSE).
- 8) Stop the selected script.
- 9) Save script.



## 4.8 Properties of sensor tracks

The properties of the sensor tracks and the feedback number are assigned to the reversing loop here.

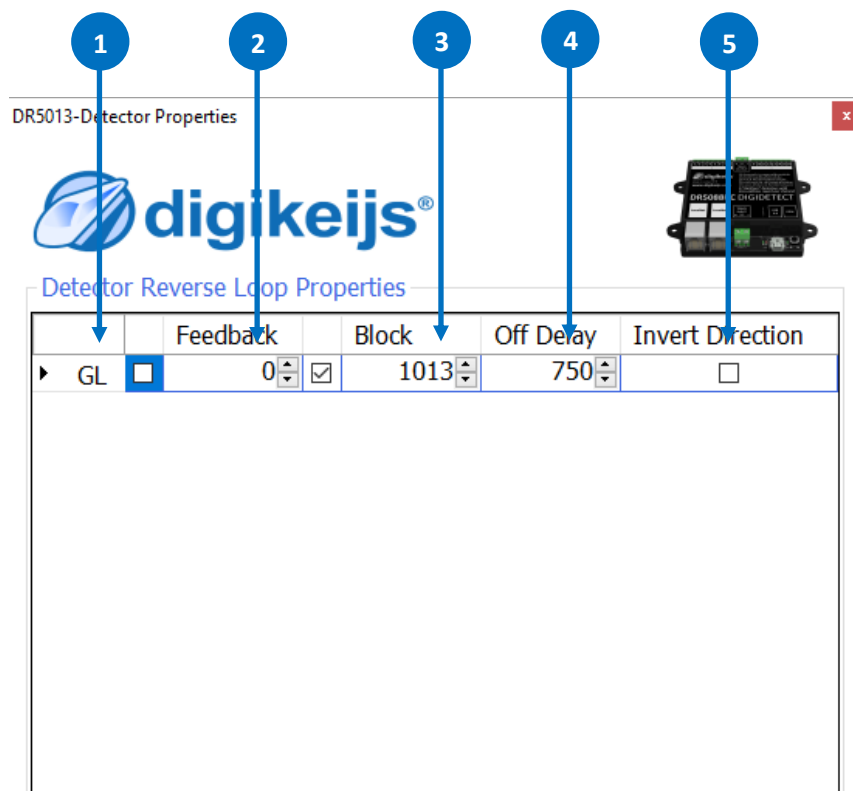
- 1) Switch-off delay Feedback in **ms**.
- 2) turnout mode  
Mode how the turnout address is used.  
*Off* No action.
- 3) *Follow* The polarity of the reversing loop follows the position of the turnout.  
*Set* S1 and S2 set the turnout.  
*Both* Both (Follow, Set) options are considered
- 4) Turnout status  
Condition of the turnout when the reversing loop is in its initial position.
- 5) *Closed* Position of the turnout straight
- 6) *Thrown* Position of the turnout curved
- 7) Feedback number Sensor track 1 (**S1**)  
(Sensor track for polarity switching)
- 8) Feedback number Sensor track (**S0**)  
(Reversing loops Enter entry indicator **\*optional\*** if not used Feedback indicator number "0".)
- 6) turnout address Entrance turnout of the reversing loop
- 7) Feedback number Sensor track (**S3**)  
(Reversing loops Enter entry indicator **\*optional\*** if not used Feedback indicator number "0".)
- 8) Feedback number Sensor track 2 (**S2**)  
(Sensor track for polarity switching)
- 9) Feedback number Reverse loop track (**T**)
- 10) Accept current settings.
- 11) Cancel
- 12) First switch (1.magnetic article address) to be addressed.  
setting:  
0 = Roco® (shift of magnetic article addresses +4)  
1 = Magnetic article addresses Standards-compliant to RCN 213  
**(default setting!)**
- 13) turnout position indicator
- 14) These arrows symbolize the entry or exit into the reversing loop.
- 15) These points indicate which feedbacks have triggered.



## 4.9 Features Global Detector

Here the properties of the Global Detector are assigned to the reversing loop. The Global Detector comprises the sections S1, S2 and T of the reversal loop.

- 1) Detector input on the module. (If a check mark is removed here, the corresponding detector is deactivated).
- 2) Feedback address of the normal occupancy detector (current sensor).
- 3) Block number linked to the detector output (Railcom® detector).
- 4) Switch-off delay of the feedback devices.
- 5) The DR5013 detects the track direction of the locomotive.  
With this option you can reverse the direction.
- 6) Accept current settings.
- 7) Cancel



# 5.0 Connection examples

In the 2-wire system, different polarities of the tracks meet at the turnout of the reversing loop. If a vehicle now bridges the separation points at the entrance or exit, a short circuit occurs. The ultimate DR5013 reversing loop module can be used to eliminate this problem. The connection examples shown here give an overview of how the DR5013 can be wired in different situations and which settings are necessary in the configuration software. The most common options are presented here, which are generally sufficient.

**Basically, the DR5013 module has three different modes (operating modes):**

1. **Current difference** measurement, also known as "short-circuit detection". (Example 5.1,5.2)
2. **Sensor controlled**, "short-circuit free" with 4 sensor track sections. (Example 5.3)
3. **Turnout controlled**, "short-circuit free", the turnout position controls the polarity of the reversing loop, or the reversing loop controls the turnout. (Example 5.4, 5.5)

All return media events from the DR5013 (S0, S1, S2, S3, Track (T), Railcom®, short-circuit message etc.) are automatically sent to the central unit via Lo-coNet® and can be evaluated there. If Loconet® is not available, this function is of course omitted.

**Attention! In all the connection examples shown here, you must make sure that the DR5013 (track input) is supplied with the same control unit or booster as the track sections S0 and S3!**

**Please note that there are of course further possibilities and special cases which cannot be shown here!**




## 5.1 Connection DR5013 Short-circuit detection

This connection example shows the use of the DR5013 with short-circuit detection. The entry/exit switch must be switched manually or with a control program.

### Functionality:

As soon as the locomotive reaches the separation point on both sides, the DR5013 detects this and switches the polarity of the reversing loop so that it corresponds to the entrance. The locomotive drives in the direction of the exit. As soon as the locomotive crosses the separation point at the exit, the DR5013 detects this and switches the polarity of the reversing loop to match the polarity of the exit. The turnout must be switched manually or via a control program. It may be necessary to add switching decoders and further feedback modules for switch control and evaluation of the external feedback connections.

### Terminal assignment:

- S0 <not used>
- S1 <not used>
- S2 <not used>
- S3 <not used>
-  reversing tracks

No changes to the DR5013 factory settings are necessary for this wiring example!

If you want to make the settings yourself, make the following settings in the DR5013 Config Tool:

### Sensor track settings:

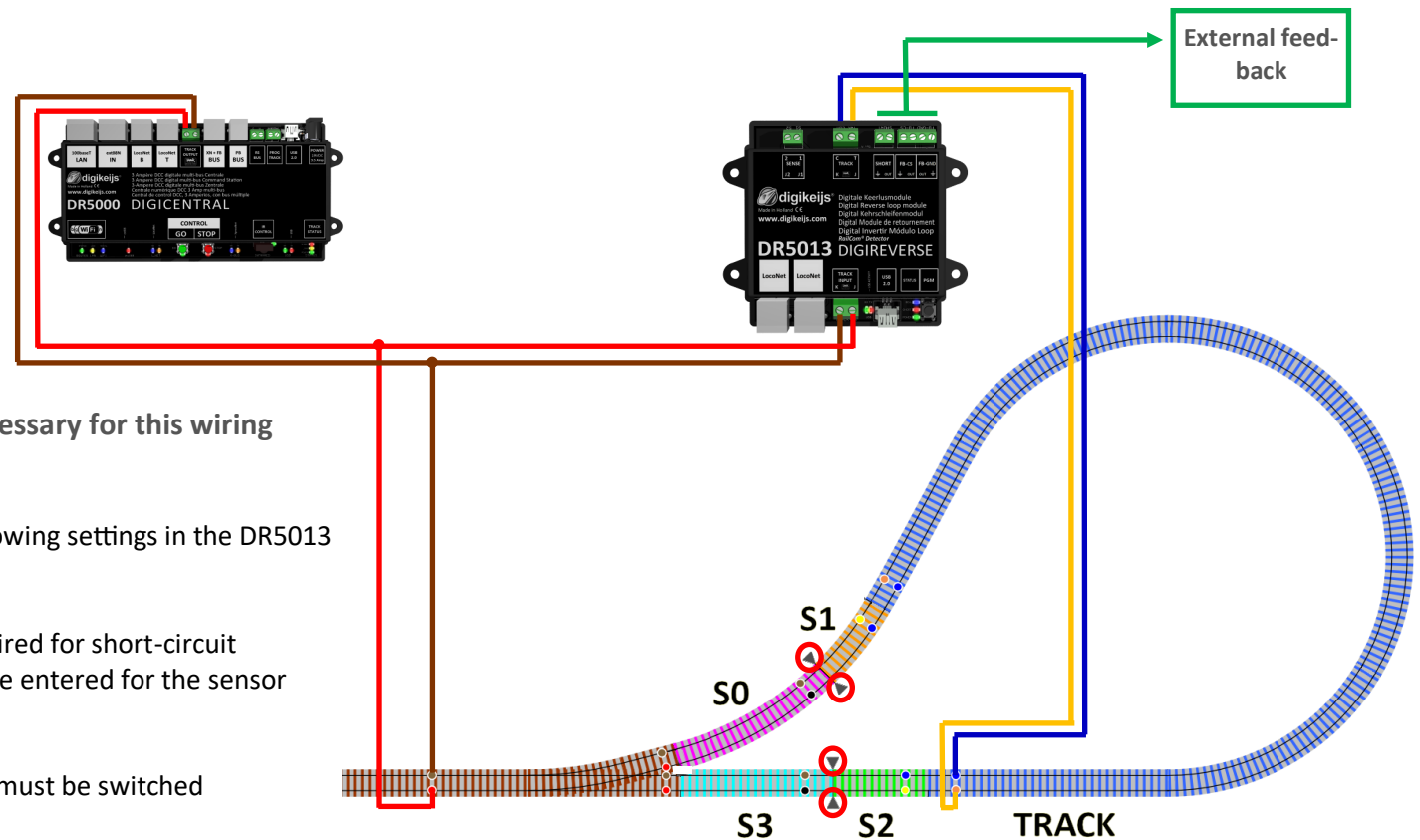
The feedback sensors sensor track S0 to S3 are not required for short-circuit detection. If short-circuit detection is used, a "0" must be entered for the sensor tracks (S0,S1,S2 and S3) in the settings under item 4.9.

### Switch mode:

The turnout mode must be set to Off here. The turnout must be switched externally.

### Turnout status:

The basic position of the turnout is not applicable.




## 5.2 DR5013 short circuit detection and LocoNet® connection®

This connection example shows the use of the DR5013 with short-circuit detection. The entry/exit turnout must be switched manually or with a control program. Via LocoNet® various information (Railcom® information, short-circuit message, etc.) is transmitted to the control centre and can be evaluated accordingly.

### Functionality:

The turnout is e.g. bent: As soon as the locomotive reaches the two-sided separation point, the DR5013 detects this and switches the polarity of the reversing loop so that it corresponds to the entrance. As soon as the locomotive reaches the area of the reversing loop (track), it is reported as occupied to the control centre via LocoNet® with the integrated occupancy detector and can, for example, be evaluated with a control program. At the same time, the Railcom® data of the locomotive (address, QoS messages, etc.) are read out in the entire reversing loop track and also reported to the control centre. The locomotive drives in the direction of the exit. As soon as the locomotive crosses the separation point at the exit, the DR5013 detects this and switches the polarity of the reversing loop to match the polarity of the exit. The turnout must be switched manually or via a control program. It may be necessary to add further feedback signals here. It may be necessary to add switching decoders and further feedback modules for switch control and evaluation of the external feedback connections.

### Terminal assignment:

- S0 <not used>
- S1 <not used>
- S2 <not used>
- S3 <not used>
- Track reversing tracks
-  Necessary track separation

Here we describe which settings are to be made in the DR5013 config tool.

### Sensor track settings:

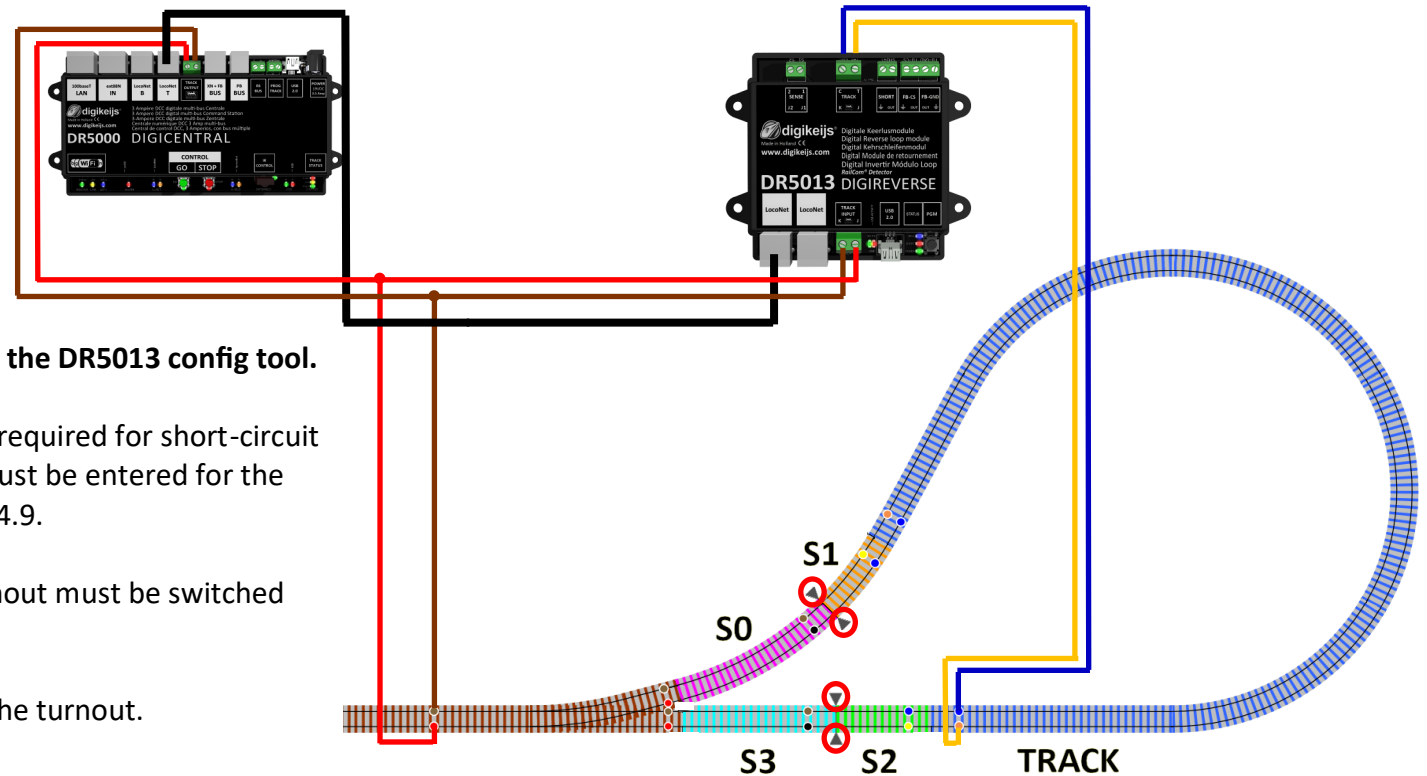
The feedback sensors sensor track S0 to S3 are not required for short-circuit detection. If short-circuit detection is used, a "0" must be entered for the sensor tracks (S0,S1,S2 and S3) in the settings item 4.9.

### Turnout mode:

The turnout mode must be set to Off here. The turnout must be switched externally.

### Turnout status:

Both settings are possible for the basic position of the turnout.




## 5.3 Connection DR5013 with sensor tracks (S0,S1,S2,S3) and LocoNet®

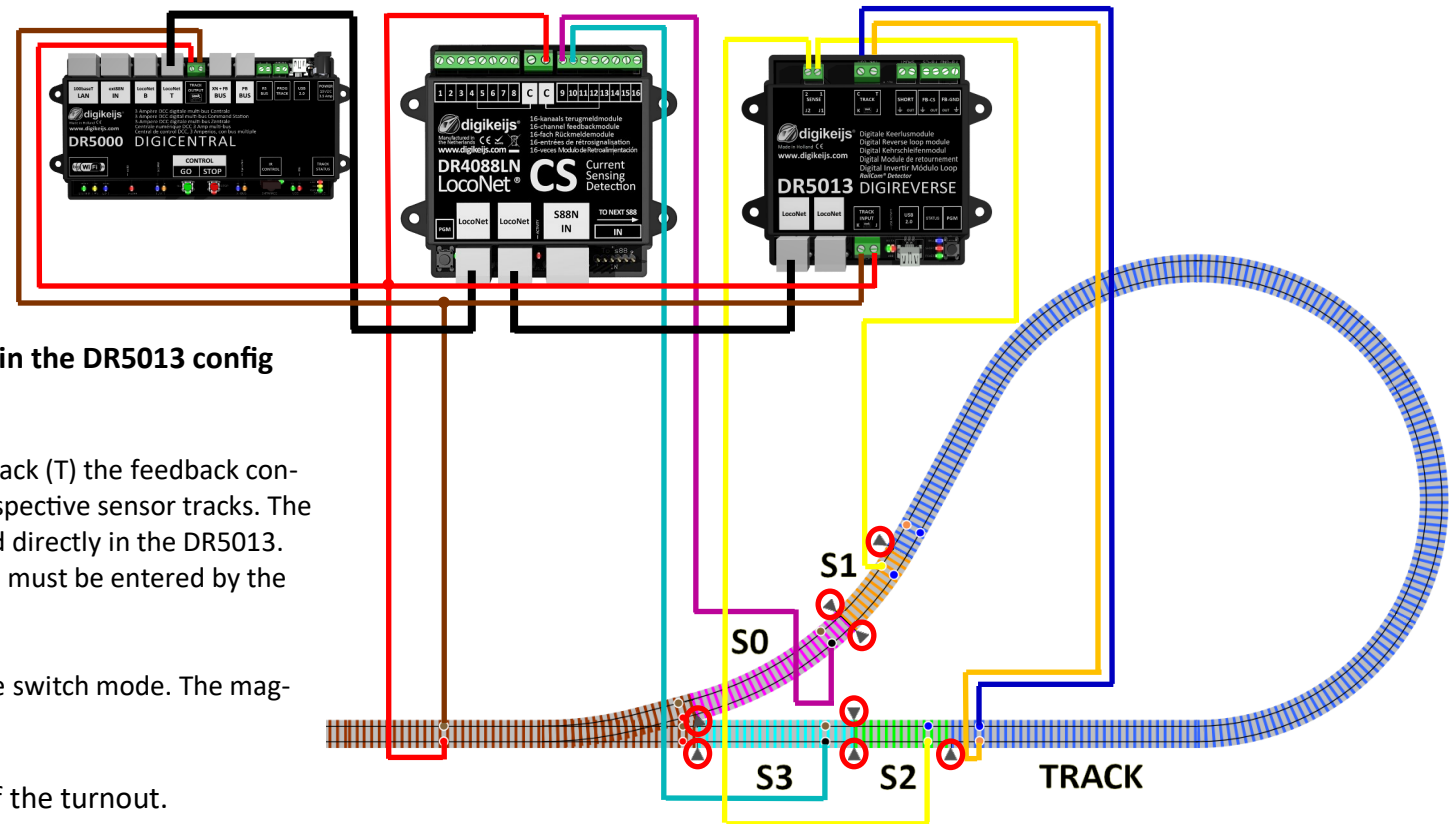
This connection example shows the use of the DR5013 in conjunction with sensor tracks (S0,S1,S2,S3). With this connection, the DR5013 automatically reverses the polarity (short-circuit-free) and may be able to switch the entry/exit switch automatically on exit. LocoNet® transmits various information (Railcom® information, feedback, short-circuit message, etc.) to the control centre and can be evaluated accordingly.

### Functionality:

The turnout is e.g. bent: The locomotive reaches the entry detector S0. The DR5013 now knows the position of the locomotive and thus the direction in which it enters the reversing loop. The DR5013 switches the polarity of the reversing loop in such a way that the polarity matches the entry. Next, sensor track 1 (S1) is approached. S1 triggers only a busy signal via LocoNet® with the integrated occupancy detector (the polarity of the KS has already been switched from S0). If the locomotive reaches the area of the reversing loop track, this is reported as occupied to the central station via LocoNet® with the integrated occupancy detector and can be evaluated, for example, with a control program. At the same time, the Railcom® data of the locomotive (address, QoS messages, etc.) are read out in the entire reversing loop track (S1,S2,Track) and also reported to the central station. The locomotive reaches sensor track 2 (S2). The DR5013 now recognizes that the locomotive is on its way to the exit of the reversing loop. The polarity of the reversing loop is switched according to the polarity of the exit. In addition, the DR5013 can "correct" the turnout at this moment so that a smooth exit is possible. If the turnout is in a straight line, the sequence is the same except that the order of the sensor tracks is different (S3,S2 -> S1).

### Terminal assignment:

- S0 Entrance to Sensor track 1
- S1 Sensor track 1
- S2 Sensor track 2
- S3 Entrance to sensor track 2
- Track reversing track
-  Necessary track separation



Here we describe which settings are to be made in the DR5013 config tool.

### Sensor track settings:

In the input fields of the sensor tracks S0, S1, S2, S3, Track (T) the feedback contacts must be entered which are to be used for the respective sensor tracks. The feedback numbers for S1,S2 and Track (T) are assigned directly in the DR5013. For the sensor tracks S0 and S3 the feedback numbers must be entered by the DR4088LN-CS which are defined there.

### Turnout mode:

In this example, the settings set should be used for the switch mode. The magnetic article address of the turnout must be entered.

### Turnout status:

Both settings are possible for the basic position of the turnout.

## 5.4 DR5013 connection with sensor tracks (S1,S2) and LocoNet

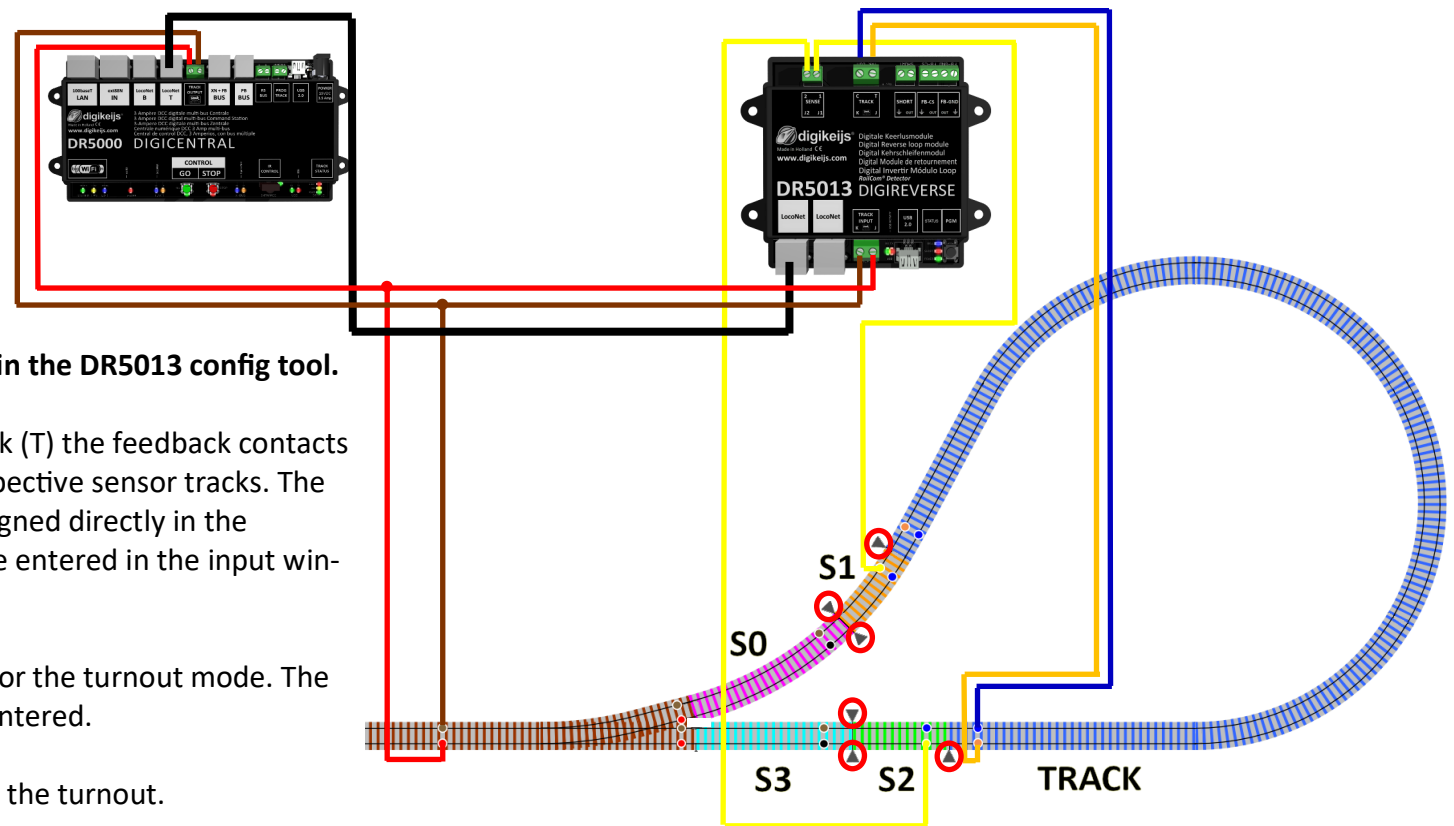
This connection example shows the use of the DR5013 in conjunction with sensor tracks (S1,S2). With this connection, the DR5013 automatically reverses the polarity (short-circuit-free) and may be able to switch the entry/exit switch automatically on exit. Via LocoNet® various information (Railcom® information, feedback, short-circuit message, switch setting commands, etc.) is transmitted to the central unit and can be evaluated accordingly.

### Functionality:

The turnout was e.g. switched to bent. The DR5013 "reads" the executed turnout circuit via the track Input/LocoNet® and thus recognizes which polarity is required in the reversing loop and adjusts it if necessary. As soon as the locomotive reaches the area of the reversing loop (track), it is reported as occupied to the control centre via LocoNet® with the integrated occupancy detector and can, for example, be evaluated with a control program. At the same time, the Railcom® data of the locomotive (address, QoS messages, etc.) are read out in the entire reversing loop track (S1,S2,Track) and also reported to the control centre. The locomotive reaches sensor track 2 (S2). The DR5013 now recognizes that the locomotive is on its way to the exit. The polarity of the reversing loop is switched according to the polarity of the exit. In addition, the DR5013 can "correct" the turnout at this moment so that a smooth exit is possible. If the turnout is in a straight line, the sequence is the same except that the order of the sensor tracks is different (S2 -> S1).

### Terminal assignment:

- S0 <not used>
- S1 Sensor track 1
- S2 Sensor track 2
- S3 <not used>
- Track reversing track
- Necessary track separation



Here we describe which settings are to be made in the DR5013 config tool.

### Sensor track settings:

In the input fields of the sensor tracks S1, S2, Track (T) the feedback contacts must be entered which are to be used for the respective sensor tracks. The feedback numbers for S1,S2 and Track (T) are assigned directly in the DR5013. Since S0 and S3 are not used, a 0 must be entered in the input windows for S0 and S3.

### Turnout mode:

In this example the settings Both should be used for the turnout mode. The magnetic article address of the turnout must be entered.

### Turnout status:

Both settings are possible for the basic position of the turnout.

## 5.5 DR5013 connection with sensor tracks (S1,S2) without LocoNet®

This connection example shows the use of the DR5013 in conjunction with sensor tracks (S1,S2). The occupied signal of the KS is transmitted via an external feedback unit, in this case a DR4088CS. With this connection, the DR5013 automatically reverses polarity (short-circuit-free). The entry/exit switch must be switched manually or via a control program. Without LocoNet®, no information that is available for connection via LocoNet® (Railcom® information, feedback, short-circuit message, etc.) can be transmitted to the control centre.

### Functionality:

The turnout was e.g. switched to bent. The DR5013 "reads" the turnout circuit via the track input and recognizes which polarity is needed in the reversing loop and adjusts it if necessary. When the locomotive travels through the area of the reversing loop (track), the DR5013 recognizes the area as occupied and forwards this information to the external feedback output (FB-CS). Via the DRR4088CS shown here, the reversing loop track is reported as occupied to the central unit and can be evaluated, for example, with a control program. The locomotive reaches sensor track 2 (S2). The DR5013 now detects that the locomotive is on its way to the exit and switches the polarity of the reversing loop according to the polarity of the exit. In this example, the turnout cannot be switched by the DR5013 because there is no connection via LocoNet® to the central unit. Here the control program must intervene. Further feedback sensors may also be necessary. If the turnout is straight, the sequence is the same only that the order of the sensor tracks is different (S2 -> S1).

### Terminal assignment:

- S0 <not used>
- S1 Sensor track 1 exit
- S2 Sensor track 2 exit
- S3 <not used>
- Track reversing tracks
- Necessary track separation
- FB-CS External feedback unit reversing loop

Here we describe which settings are to be made in the DR5013 config tool.

**Sensor track settings:** (The transfer via LocoNet® is not possible.)

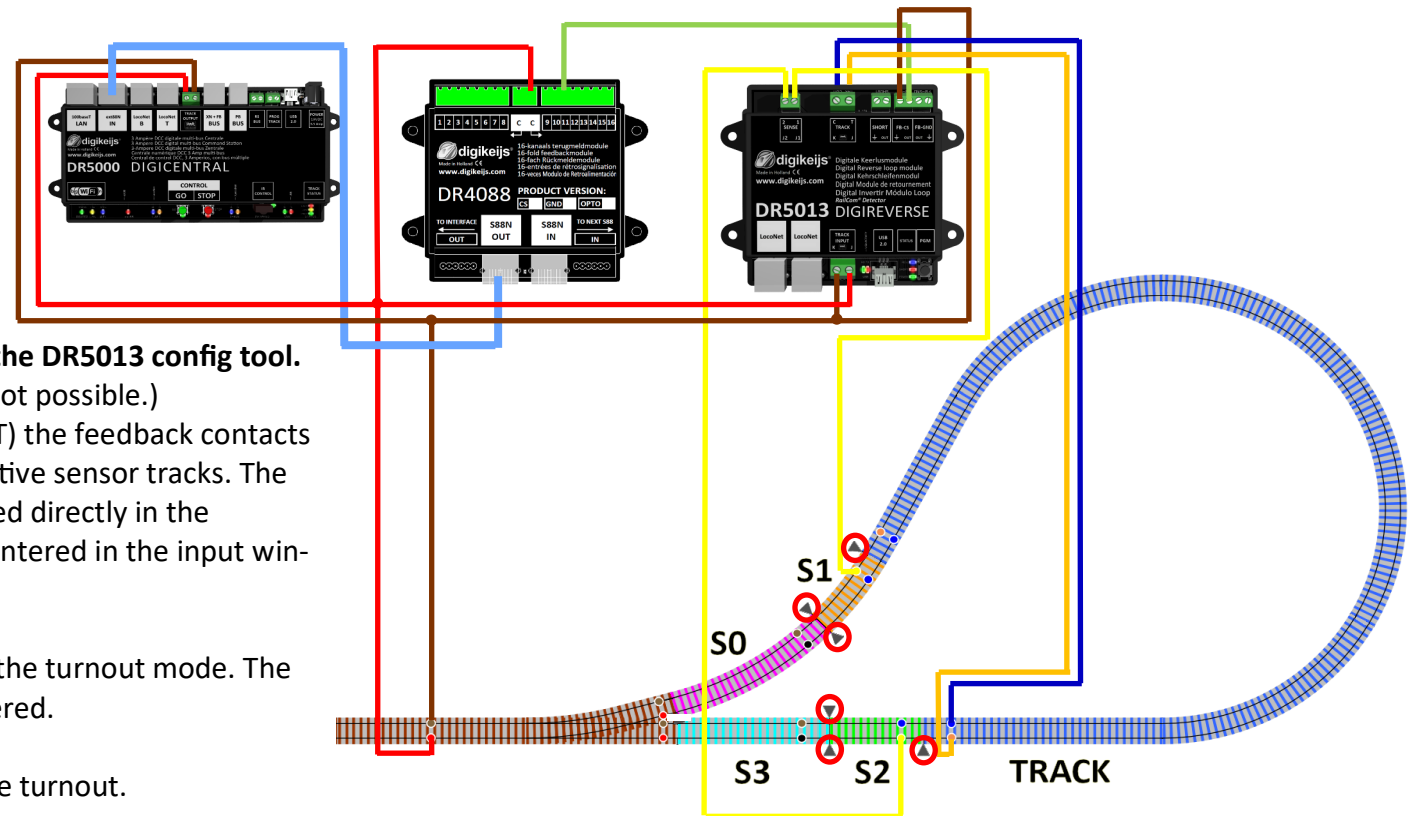
In the input fields of the sensor tracks S1, S2, Track (T) the feedback contacts must be entered which are to be used for the respective sensor tracks. The feedback numbers for S1,S2 and Track (T) are assigned directly in the DR5013. Since S0 and S3 are not used, a 0 must be entered in the input windows for S0 and S3.

### Turnout mode:

In this example the settings Both should be used for the turnout mode. The magnetic article address of the turnout must be entered.

### Turnout status:

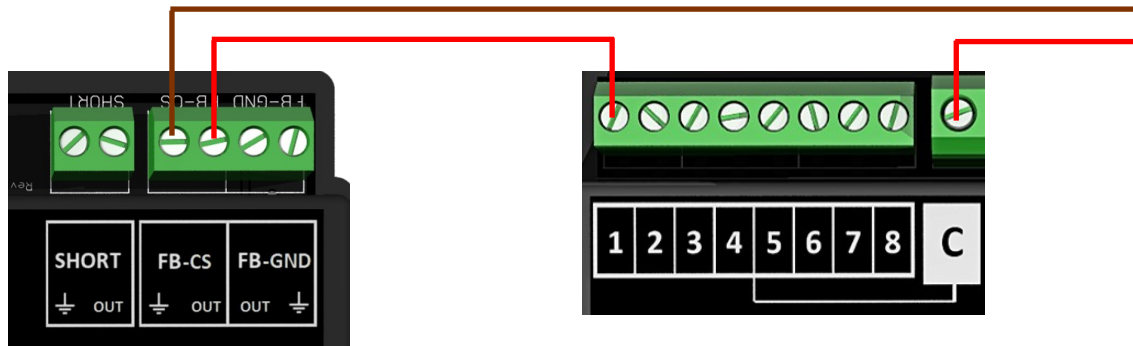
Both settings are possible for the basic position of the turnout.





## 5.6 DR5013 external feedback connection

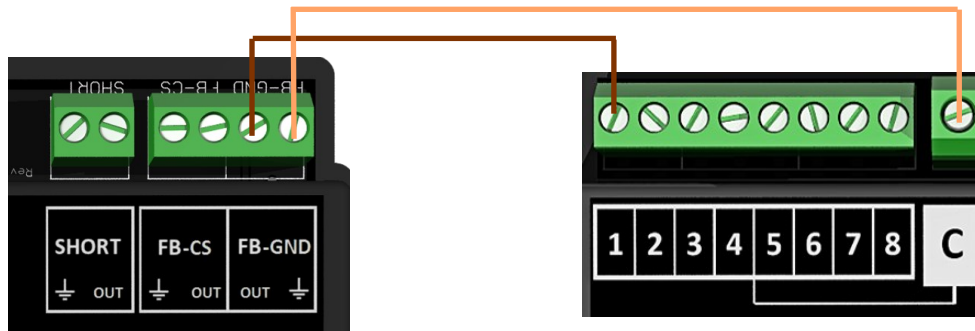
The DR5013 has three external feedback outputs. With these feedback outputs, the busy signal of the reversing loop (FB current sensor, GND signal to ground) and a short circuit signal of the reversing loop can be reported to an external feedback.



**Track Out digital central.**

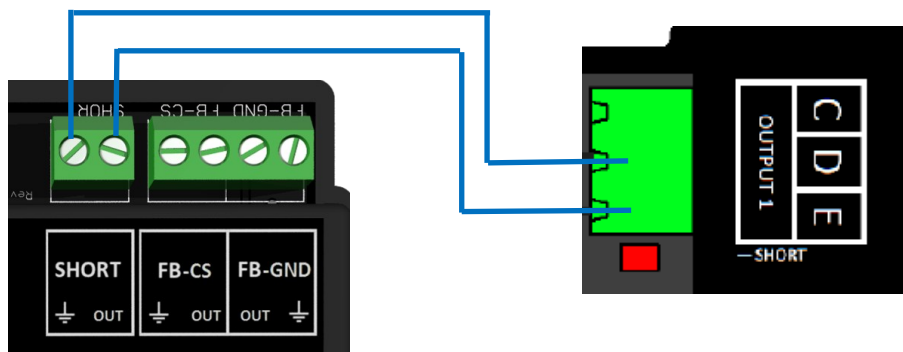
Occupancy message of the reversing loop as current sensor (DR4088xx-CS).

**Attention:** Simultaneous use of the external feedback units FB-CS and FB-GND is not possible.



Occupied signal of the reversing loop against „ground“ (DR4088xx-GND).

**Attention:** Simultaneous use of the external feedback units FB-CS and FB-GND is not possible.



**Emergency stop** (short-circuit) message to a digital system that has a CDE booster connection.

## 6.0 Commissioning instructions DR5013 with sensor tracks S0,S1,S2,S3 (with connection to PC)

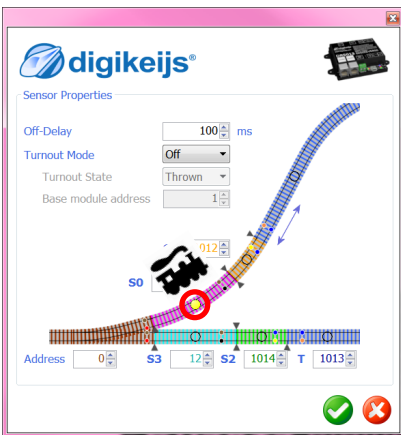
To check the connection of the DR5013, use this procedure. This can be used to test if the wiring is correct and there is no fault. To do this, the DR5013 must be **connected** to the PC via USB and the configuration tool must be started. **Note:** A connection via USB to the DR5000 or any other digikeijs device connected via USB must be **disconnected** first. If this note is observed, the test can be carried out without any problems even with active track voltage.

### Test sequence of the feedback units S0,S1,S2,S3 using the App:

Place the locomotive on the sensor track **S0**.

The feedback **S0** in the app now shows the assignment (**yellow dot**).

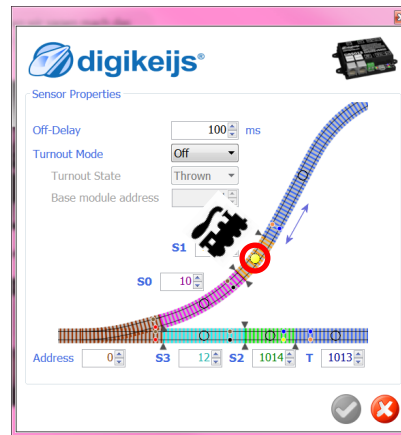
—> If no busy message is displayed, the wiring or the address assignment in the app of **S0** must be checked.



Place the locomotive on the sensor track **S1**.

The feedback **S1** in the app now shows the assignment (**yellow dot**).

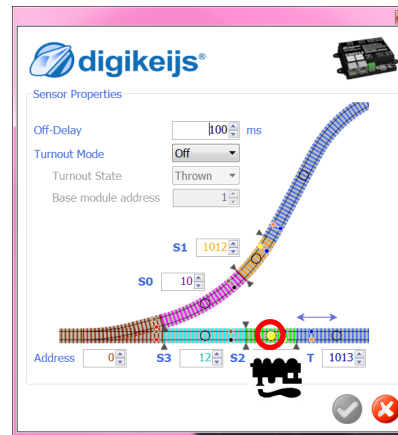
—> If no busy message is displayed, the wiring or the address assignment in the app of **S1** must be checked.



Place the locomotive on the sensor track **S2**.

The feedback **S2** in the app now shows the assignment (**yellow dot**).

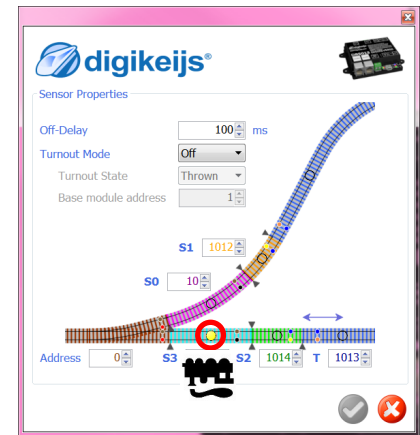
—> If no busy message is displayed, the wiring or the address assignment in the app of **S2** must be checked.



Place the locomotive on the sensor track **S3**.

The feedback **S3** in the app now shows the assignment (**yellow dot**).

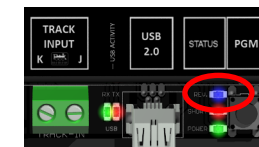
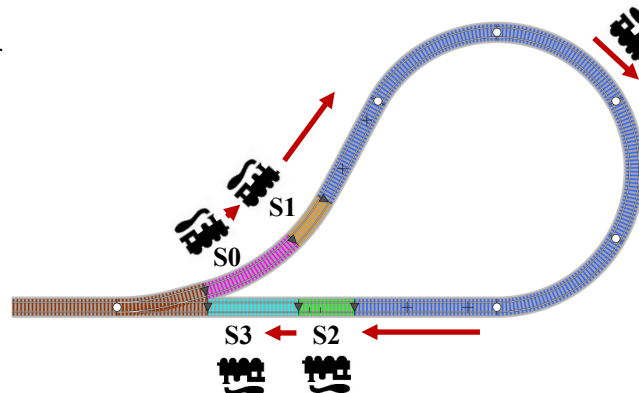
—> If no busy message is displayed, the wiring or the address assignment in the app of **S3** must be checked.



At the end of the test series, place the locomotive on the sensor track **S0** and drive in direction **S1** over the double track separation point into the reversing loop track (**T**).

If the **blue LED does not** light up or a **short circuit** is triggered at the DR5013, the track connections at the track input of the DR5013 must be replaced.

Finally go through the complete reversing loop again to test the connection completely: **S0 -> S1 -> T -> S2 -> S3**



Blue LED Indication of polarity of the reversing loop track

## 6.1 Commissioning instructions DR5013 with sensor tracks S0,S1,S2,S3 (without connection to PC)

To check the connection of the DR5013 without a USB connection to the PC, use this procedure. This can be used to test if the wiring is correct and there is no error.

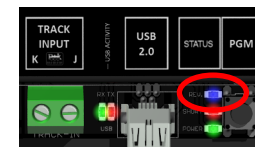
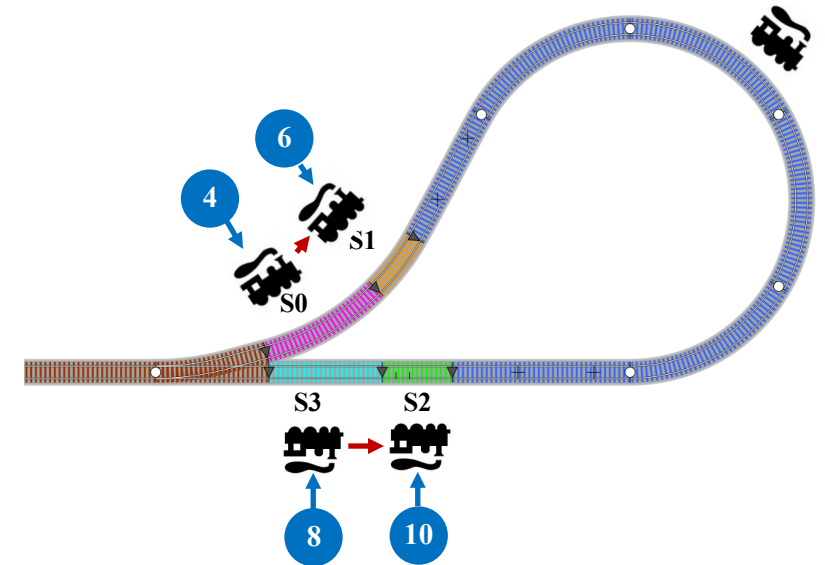
### DR5013 Check connection:

This allows you to test whether S0, S1, S2 and S3 have been wired correctly:

- 1) Switch off track voltage.
- 2) Remove all locomotives and other loads from the sensor tracks (S0, S1, S2, S3).
- 3) Switch on track voltage.
- 4) Place the locomotive on the sensor track S0 and observe whether the **blue LED lights up**. If the **blue LED** does not light up, check the wiring or the address assignment in the app of S0!
- 5) Remove locomotive from sensor track S0.
- 6) Place the locomotive on the sensor track S1 and observe whether the **blue LED lights up**. If the **blue LED** does not light up, check wiring of S1!
- 7) If both tests (4. & 6.) show that the **blue LED** is lit, the sensor tracks S0 and S1 are wired correctly.

The next step is to perform the function test with the sensor tracks S2 and S3. can be carried out.

- 8) Place the locomotive on the sensor track S3 and observe whether the **blue LED is not illuminated**. If the **blue LED lights up**, check the wiring or the address assignment in the app of S3!
- 9) Remove the locomotive from the S3 sensor track.
- 10) Place the locomotive on the sensor track S2 and observe whether the **blue LED is not illuminated**. If the **blue LED lights up**, check the wiring of S2!
- 11) If both tests (9. & 10.) show that the **blue LED** is not lit, the sensor tracks S3 and S2 on the DR5013 are wired correctly.
- 12) At the end of the test series, place the locomotive on the sensor track S0 and drive in direction S1 over the double track separation point into the reversing loop track (T). If the **blue LED does not** light up or a **short circuit** is triggered at the DR5013, the track connections at the track input of the DR5013 must be replaced.
- 13) Finally go through the complete reversing loop again to test the connection completely: S0 -> S1 -> T -> S2 -> S3



Blue LED Indication of polarity of the reversing loop track

