

r.LiNK Video-inserter

RL2-NBT

**Compatible with BMW vehicles with
Business/Professional NBT navigation systems or
radios with 6.5", 8.8" or 10.2" monitor
with 4 + 2pin HSD LVDS connector**

**Video-inserter for rear-view camera
and two additional video sources**

Product features

- Video-inserter for factory-infotainment systems
- 2 CVBS video-inputs for after-market devices (e.g. DVD-Player, DVB-T tuner)
- FBAS Rear-view camera video-input
- Automatic switching to rear-view camera input on engagement of reverse gear
- Activatable parking guide lines for rear-view camera (not for all vehicles)
- Picture-in-picture mode combining after-market rear-view and front camera picture(s) with factory parking sensor graphic (not for all vehicles)
- Video-in-motion (ONLY for connected video-sources)
- Video-inputs NTSC compatible
- Ultra-wide picture mode 24:9 (only with ultra-wide screens 8.8" and 10.2")

Contents

1. Prior to installation

- 1.1. Delivery contents
- 1.2. Checking the compatibility of vehicle and accessories
- 1.3. Boxes and connectors
 - 1.3.1. Video-interface
 - 1.3.2. CAN-bus box
- 1.4. Dip-switch settings
 - 1.4.1. Enabling the interface's video inputs (dip 2-3)
 - 1.4.2. Rear-view camera setting (dip 5)
 - 1.4.3. Monitor selection (dip 7-8)
- 1.5. Dip-switch settings of CAN-Box

2. Installation

- 2.1. Place of installation
- 2.2. Connection schema
- 2.3. Connecting video-interface and CAN-box
- 2.4. Connection to the factory monitor
- 2.5. Connection to the head-unit
- 2.6. Connecting peripheral devices
 - 2.6.1. After-market rear-view camera
 - 2.6.1.1. Case 1: CAN-box detects reverse gear
 - 2.6.1.2. Switching of picture formats – Activation PIP
 - 2.6.1.3. Case 2: CAN-box does not detect reverse gear
 - 2.6.1.4. Video signal connection of rear-view camera
 - 2.6.2. After-market front camera
 - 2.6.3. After-market video-source
 - 2.6.4. Audio-insertion
- 2.7. Connecting video-interface and keypad
- 2.8. Picture settings and guide lines

3. Interface operation

- 3.1. By iDrive-buttons
- 3.2. By keypad

4. Specifications

5. Frequently asked questions

6. Technical support

Legal Information

By law, watching moving pictures while driving is prohibited, the driver must not be distracted. We do not accept any liability for material damage or personal injury resulting, directly or indirectly, from installation or operation of this product. This product should only be used while standing or to display fixed menus or rear-view-camera video when the vehicle is moving, for example the MP3 menu for DVD upgrades.

Changes/updates of the vehicle's software can cause malfunctions of the interface. We offer free software-updates for our interfaces for one year after purchase. To receive a free update, the interface must be sent in at own cost. Labor cost for and other expenses involved with the software-updates will not be refunded.

1. Prior to installation

Read the manual prior to installation.

Technical knowledge is necessary for installation. The place of installation must be free of moisture and away from heat sources.

1.1. Delivery contents



Take down the serial number of the interface and store this manual for support purposes: _____

If the HSD2 image cable of the vehicle harness is too short for the installation, an HSD2 extension can be ordered separately with item number CAB-HSD2-MF100B.

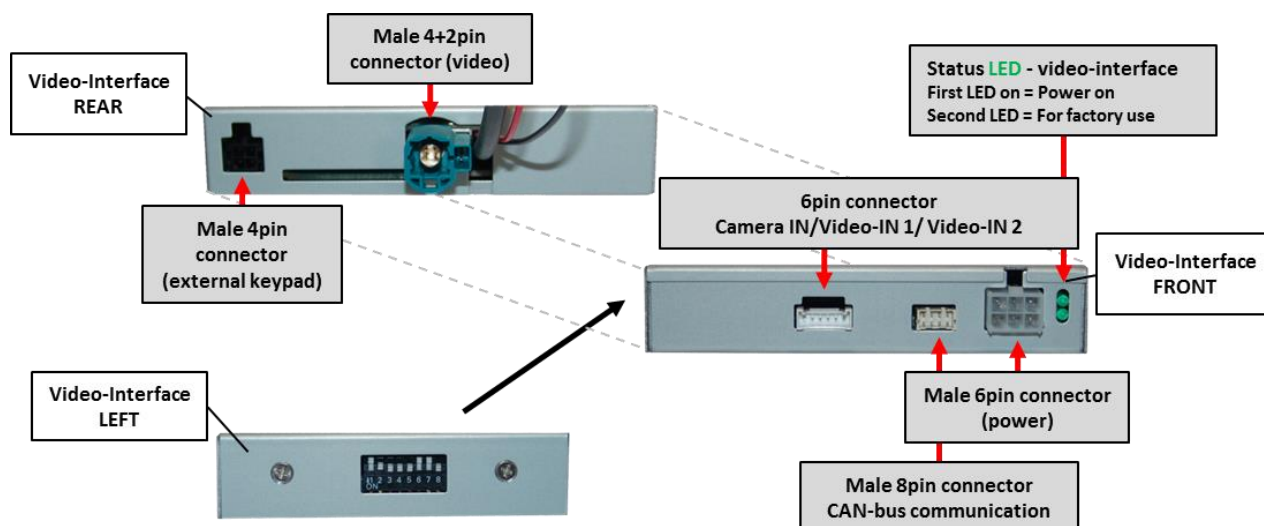
1.2. Checking the compatibility of vehicle and accessories

Compatibility		
Brand	Model	Navigation
BMW	All 1series (F20/F21), all 3series (F30/F31/F32/F33), all X1 (F48) and all other F-series vehicles from approx 06/2012 with	Radios and Business navigation - F-series - 6.5" or 7" monitor
	All 1series (F20/F21), all 3series (F30/F31/F32/F33), all X1 (F48) and all other F-series vehicles from approx 06/2012. All mentioned vehicles only til approx 05/2016 - (with old main menu)	Professional navigation NBT - F-series - 8.8" or 10.25" monitor
Mini	from about 2014	Radio Visual Boost - 6.5" monitor
	from about 2014 til about 2016/2017 (vehicles with old main menu)	Professional navigation NBT - 8.8" monitor
Limitations		
<i>Ultra-wide mode</i>	Only available for ultra-wide screens 8.8"/10.2"	
<i>Video only</i>	The interface inserts ONLY video signals into the infotainment. For sound use the factory-audio-AUX-input or a FM-modulator.	
<i>Factory rear-view camera</i>	Automatic switch-back from inserted video to factory rear-view camera only while reverse gear is engaged. To delay the switch-back time, additional electronics is required.	
<i>Guide lines / PDC</i>	If the CAN-box does not receive the required information from the vehicle CAN-bus, neither guide-lines nor PDC will be supported.	
<i>Video input formats</i>	only NTSC	

1.3. Boxes and connectors

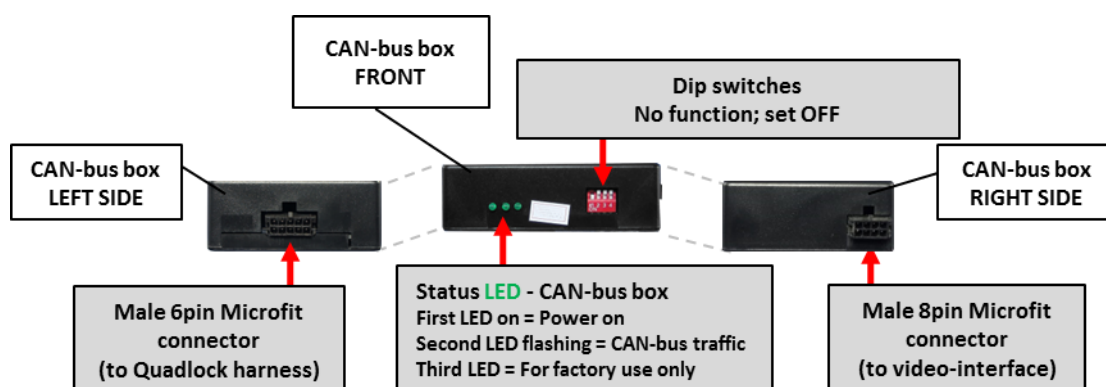
1.3.1. Video-interface

The video-interface converts the connected after-market sources video signals to an LVDS signal which is the inserted into the factory monitor on certain trigger options.



1.3.2. CAN-box

The CAN-bus box reads digital signals from the CAN-bus and converts them for the video-interface.



1.4. Dip-switch settings

Some settings must be selected by the dip-switches on the video-interface. Dip position down is ON and position up is OFF.



Dip	Function	ON (down)	OFF (up)
1	RGB-input	enabled	disabled
2	CVBS AV1-input	enabled	disabled
3	CVBS AV2-input	enabled	disabled
4	RGB-input resolution	VGA 800x480	NTSC 400x240 or 480x240
5	Rear-view cam type	after-market	factory or none
6	No function	-	set OFF
7	PDC	enabled	disabled
8	Monitor selection	Try both positions of dip 8 to find the best picture (quality and size)	

See following chapters for detailed information.

1.4.1. Enabling the interface's video inputs (dip 2-3)

Only the enabled video inputs can be accessed when switching through the interface's video sources. It is recommended to enable only the required inputs for the disabled will be skipped when switching through the video-interfaces inputs.

1.4.2. Rear-view camera setting (dip 5)

If set to OFF, the interface switches to factory LVDS picture while the reverse gear is engaged to display factory rear-view camera or factory optical park system picture.

If set to ON, the interface switches to its rear-view camera input CAM while the reverse gear is engaged.

1.4.3. PDC setting (dip 7)

If set to ON, the PDC car graphic will be shown on the display. If set to Off, the PDC car graphic will disappear.

1.4.4. Monitor selection (dip 8)

Dip 8 is for monitor-specific video settings which cannot be predicted as even within the same head-unit version, the monitor specifications may vary. Try both positions of dip 8 to find the best picture while a working video source is connected to the chosen input of the interface, to receive the best picture quality and size. It is possible to first hot plug through the dip combinations, but if you do not experience any change of picture, retry and disconnected the 6pin power plug of the video-box between every change of the dip setting.

1.5. Dip-switch settings of the CAN-box

All 4 dip-switches of the CAN-box have no function for normal use and must be set to OFF.

Dip position down is ON and position up is OFF.



Vehicle/Navigation	Dip 1	Dip 2	Dip 3	Dip 4
All vehicles	OFF	OFF	OFF	OFF

2. Installation

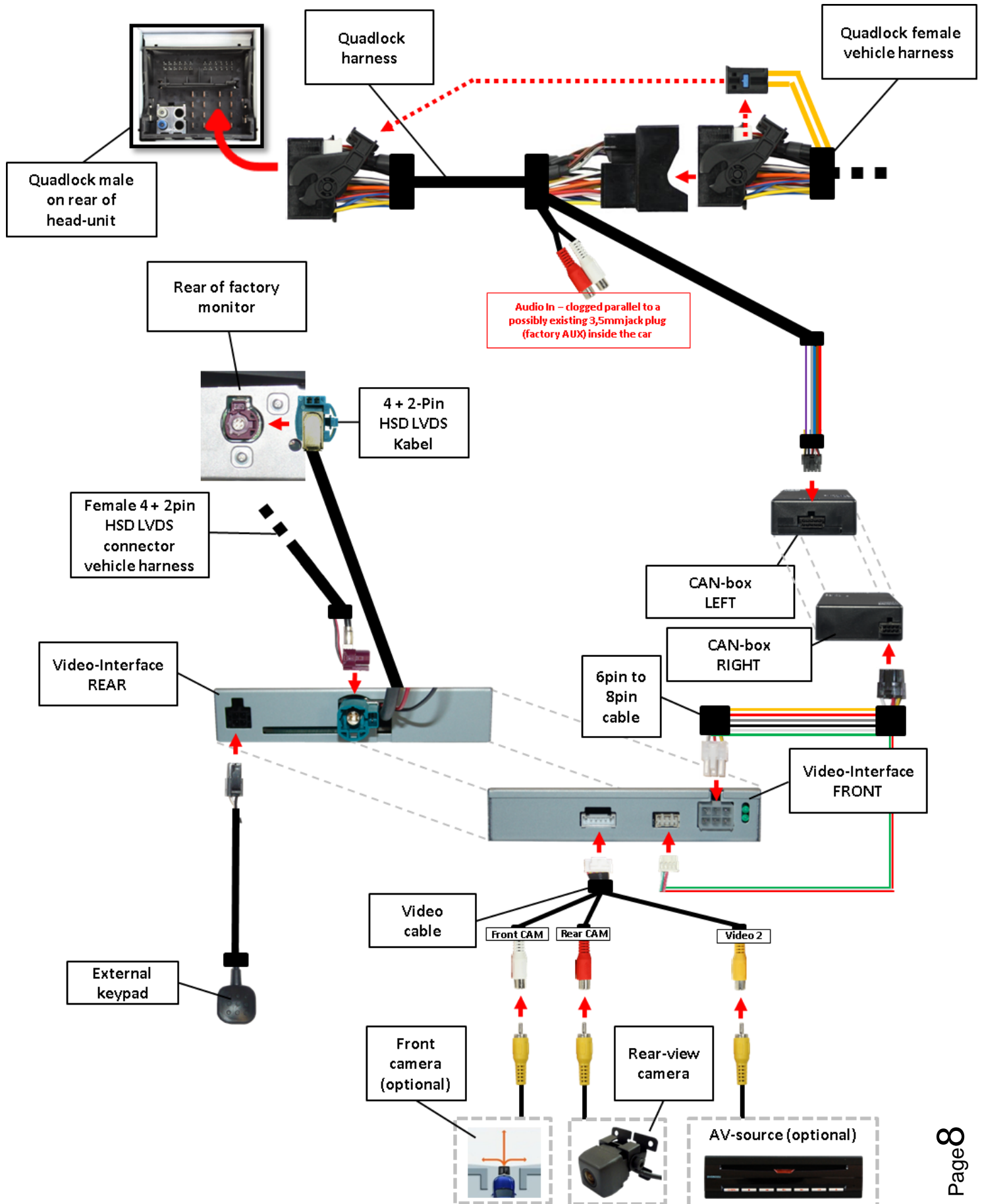
Switch off ignition and disconnect the vehicle's battery! The interface needs a permanent 12V source. If according to factory rules disconnecting the battery is to be avoided, it is usually sufficient to put the vehicle in sleep-mode. In case the sleep-mode does not show success, disconnect the battery with a resistor lead.

If power source is not taken directly from the battery, the connection has to be checked for being start-up proven and permanent.

2.1. Place of installation

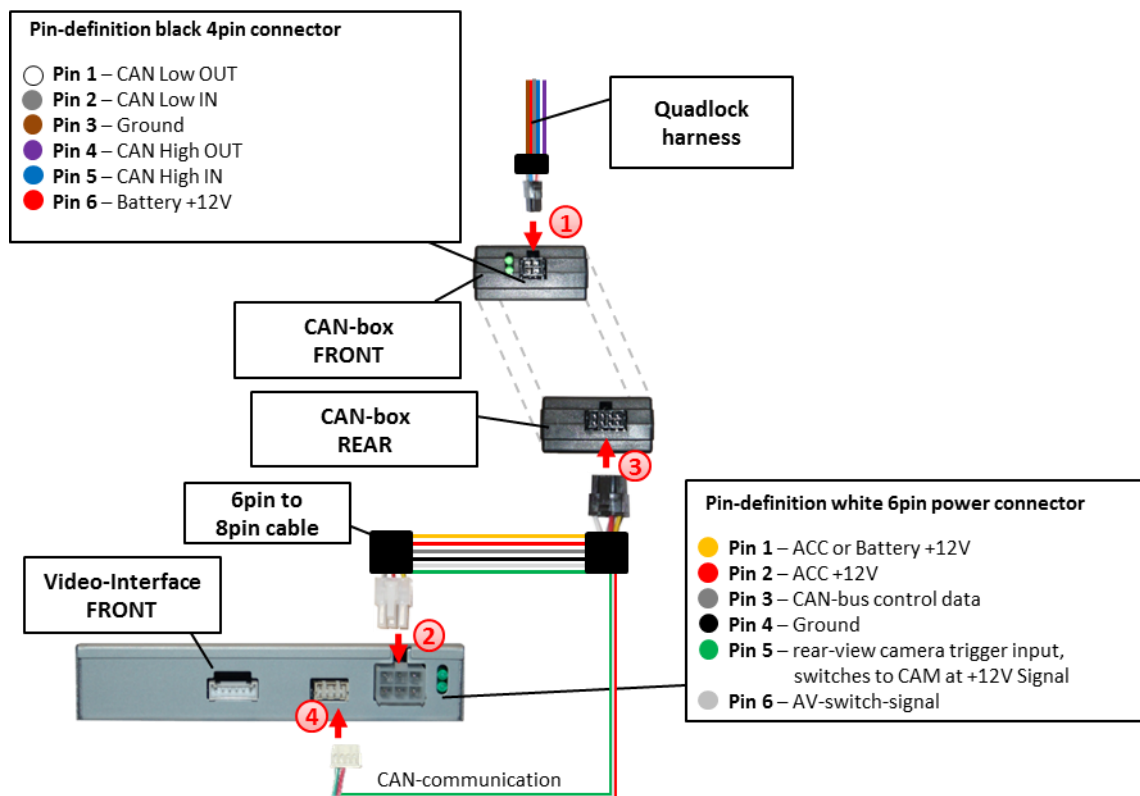
The interface is installed on the backside of the factory monitor and on the backside of the head-unit.

2.2. Connection schema



2.3. Connecting video-interface and CAN-box

The CAN-bus box reads digital signals from the CAN-bus and converts them for the video-interface. ACC +12V max. 0.5A (red of 6pin) and reverse gear +12V max. 0.5A (green of 6pin) constant signal. Video-source switching (white of 6pin) as +12V impulse.



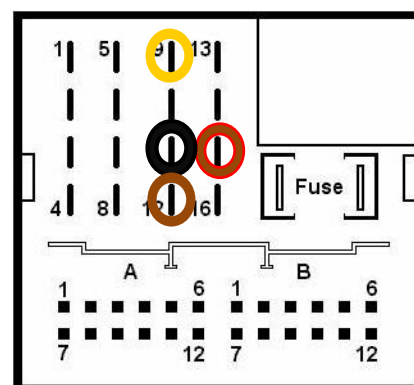
- 1 Connect black female 4pin Micro-Fit connector of the 4pin cable to the male 4pin Micro-Fit connector of the CAN-box.

Note: Check LEDs on CAN-box after reconnecting the battery, one must be on.

Pin-assignment quadlock connector NBT

Cable colour	Assignment
● ● Brown/Red	+12V permanent 15
● Brown	Ground Pin 12
● Black	CAN HIGH Pin 11
● Yellow	CAN LOW Pin 9

No liability for vehicle wire colors and pin definition!
Possible changes by the vehicle manufacturer. The given information must be verified by the installer.



- ② Connect white female 6pin Molex connector of the 6pin to 8pin cable to the male 6pin Molex connector of the video-interface.
- ③ Connect black female 8pin Micro-Fit connector of the 6pin to 8pin cable to male 8pin Micro-Fit connector of the CAN-box.

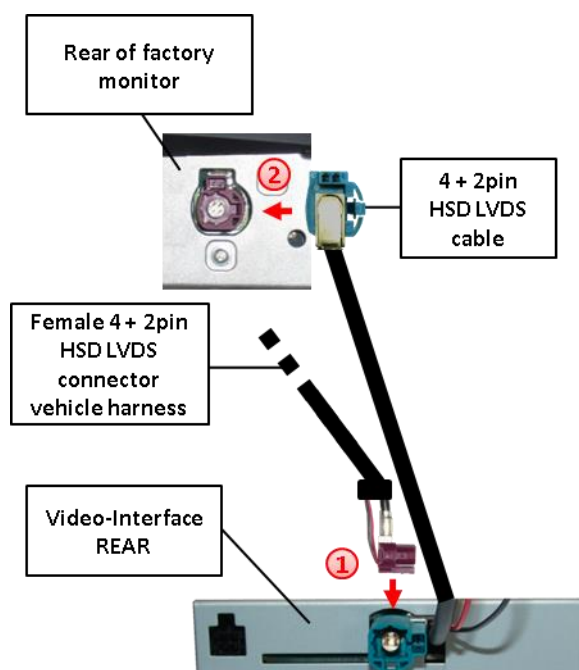
Note: Check LEDs on video-interface after reconnecting the battery, one must be on.

- ④ Connect red-green drilled cable of 6pin of 8pin cable to the male 4pin connector of the video-interface.

Note: The CAN-box is not compatible with all vehicles. If the CAN-box does not deliver ACC to pin2 of the video-interface or blocks the vehicle CAN, it is possible to install without CAN-box. In this case see also note in chapter after-market rear-view camera if one is supposed to be connected.

2.4. Connections to the factory monitor

Remove factory monitor.

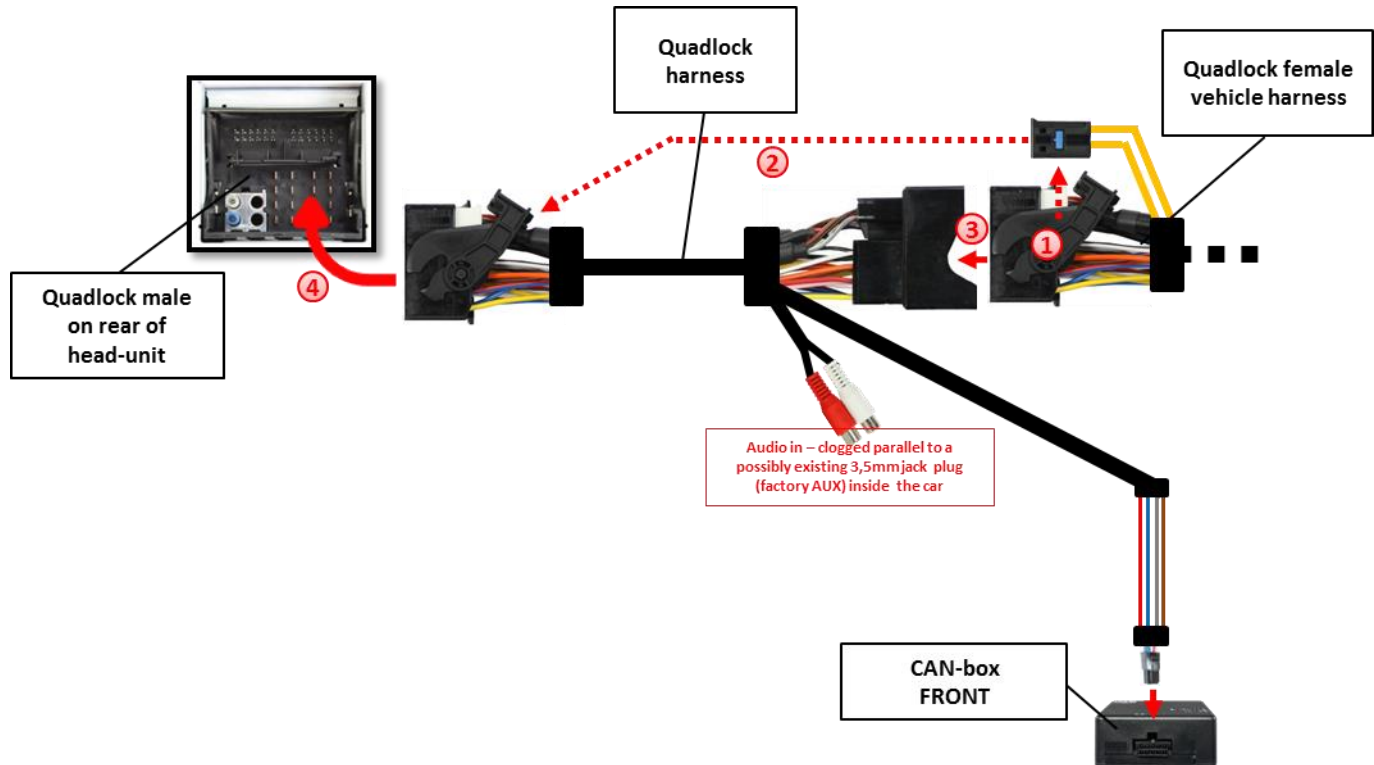


- ① Remove female 4 + 2pin HSD LVDS connector from the rear of the factory monitor and connect it to the male 4 + 2pin HSD LVDS connector of the video-interface.
- ② Connect female 4pin connector of the 4 + 2pin HSD LVDS cable to the male 4pin HSD LVDS connector of the factory monitor.
- ③ Connect female 2pin connector of the 4pin cable to the male 8pin MB connector of the factory monitor.

Note: If the HSD2 image cable of the vehicle harness is too short for the installation, an HSD2 extension can be ordered separately with item number CAB-HSD2-MF100B.

2.5. Connections to the head-unit

Remove head-unit.



- ① Remove the female Quadlock connector of the vehicle harness from the rear of the navigation computer.
- ② Remove optical leads –if existing- from the female Quadlock connector of the vehicle harness and insert them into the female Quadlock connector of Quadlock harness at the same position.
- ③ Connect female Quadlock connector of vehicle harness to the male Quadlock connector of Quadlock harness.
- ④ Connect female Quadlock connector of Quadlock harness to the male Quadlock connector of the head-unit.

2.6. Connecting peripheral devices

It is possible to connect an after-market rear-view camera, an after-market front camera and an after-market AV-source to the video-interface.

Before final installation of the peripheral devices, we recommend a test-run of the interface. Due to changes in the production of the vehicle manufacturer is always the possibility of incompatibility.

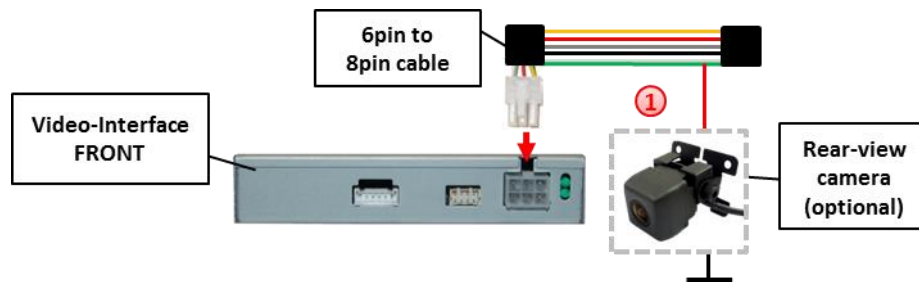
2.6.1 After-Market Rear View Camera

Some vehicles have a different reverse gear code on the Can-Bus, which is not compatible to the CAN-Box included in the scope of delivery. For this reason there are two possibilities of installation. If the Can-Box supports the reverse gear, the green wire of the 6Pin to 8pin cable is occupied by +12V, as long as the reverse gear is engaged.

Note: Before testing, please, don't forget to shift the Dip 5 of the Video Interface to ON.

2.6.1.1 Case 1: CAN-Box supports Reverse Gear

In case the Can-Bus-Box delivers +12V to the green wire 6Pin to 8pin cable while reverse gear is engaged, the Interface switches automatically to CAM input.



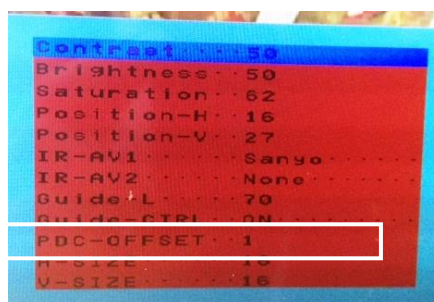
- ① In addition power supply of +12V (500mA max.) of the After-Market Rear View Camera can be realised by the green wire of of 6Pin to 8pin cable

2.6.1.2. Switching of picture formats – Activation PIP

Long press OPTION-button to switch the picture format and to activate/deactivate the PIP display (After-market camera picture incl. factory park distance control display on the right side).



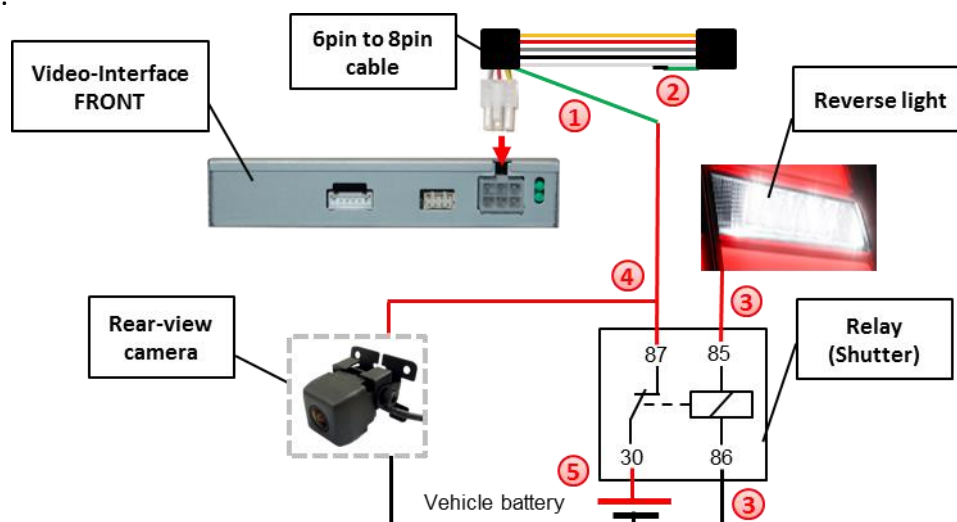
The display of the factory park distance control can be adjusted in the menu item **PDC OFFSET** of the OSD menu.



Note: The OSD menu is only shown when a working video source is connected to the selected video-input of the interface.

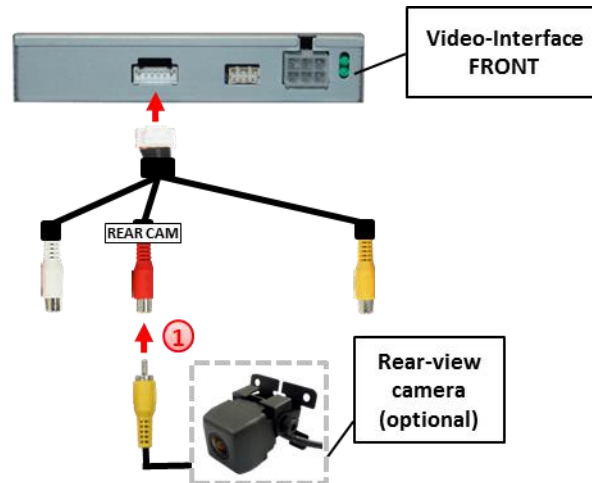
2.6.1.2 Case 2: Can Box does not support reverse gear

In case the Can-Bus-Box does not deliver +12V to the green wire 6Pin to 8pin cable while reverse gear is engaged (not all of the vehicles are compatible) an external switch-over signal of the reverse light will be required. Because of the fact that the reverse light signal is not free from electronic interferences, a relay (eg. AC-RW-1230 with AC RS5 wiring) or an interference filter (e.g. AC-PNF-RVC) will be required. The diagram below shows the use of the relay.



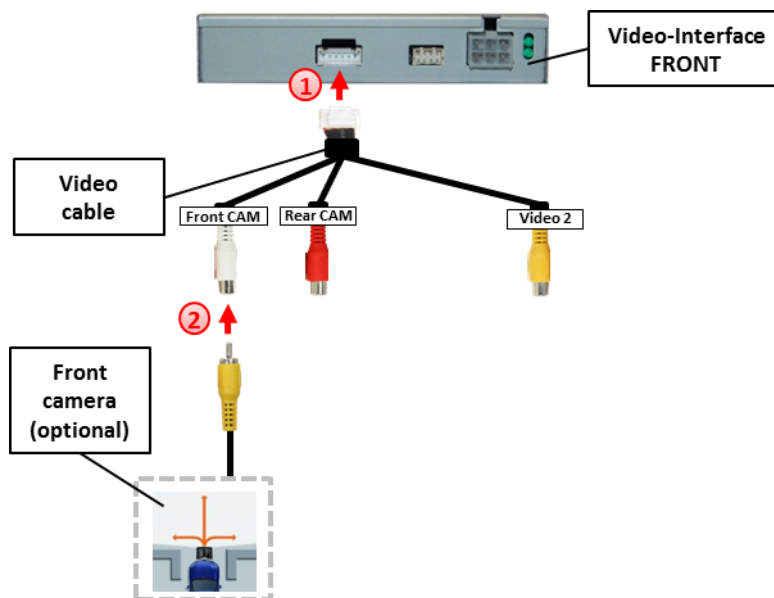
- ① Disconnect green cable of 6pin to 8pin cable near the black 8pin connector .
- ② Isolate short end of the green cable (CAN-Box side).
- ③ Connect Reverselight/Power with Coil (85) and Ground (86) to relay.
- ④ Connect power of rear view camera and the green cable (Video Interface side) of 6pin to 8pin cable with relay output (87)
- ⑤ Connect continuous battery current to relay input (87)

2.6.1.3 Video signal connection of rear-view camera



- ① Connect the video-RCA of the after-market rear-view camera to the female RCA port of the video-interface which is labeled as CAM.

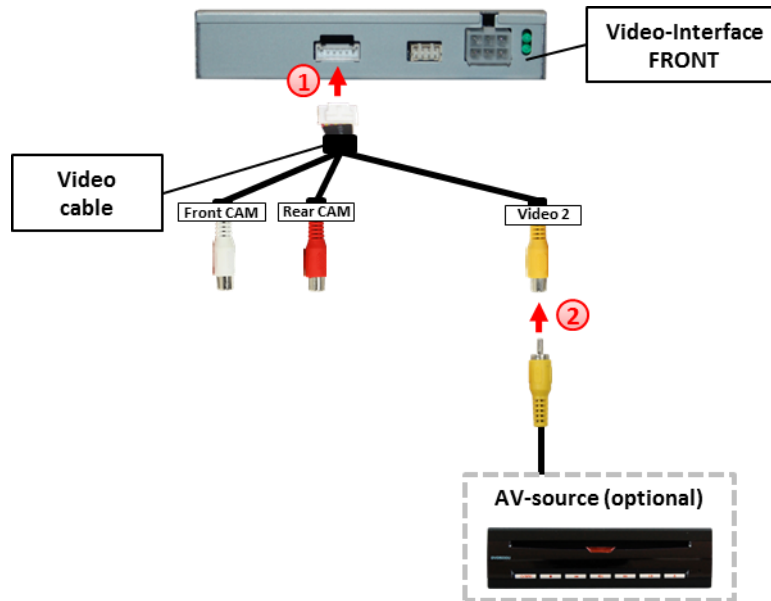
2.6.2 After-market front camera



- ① Connect 6pin male connector of video cable to 6pin female connector of video interface
- ② Connect male RCA of front camera to the white female RCA "Front Cam" of video Cable

Note: There is no automatic switch to front camera. Only manual swiching by keypad or factory button.

2.6.3 After Market Video Source

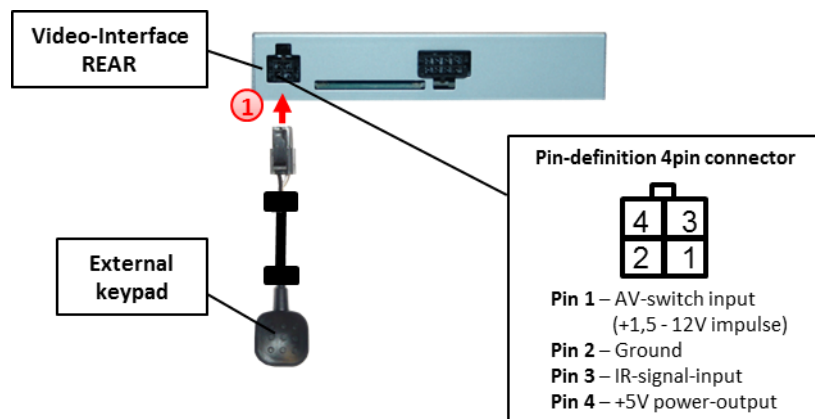


- ① Connect 6pin male connector of video cable to female 6pin connector of video interface
- ② Connect video RCA of video source to yellow RCA "Video2" of video cable.

2.6.4 Audio Insertion

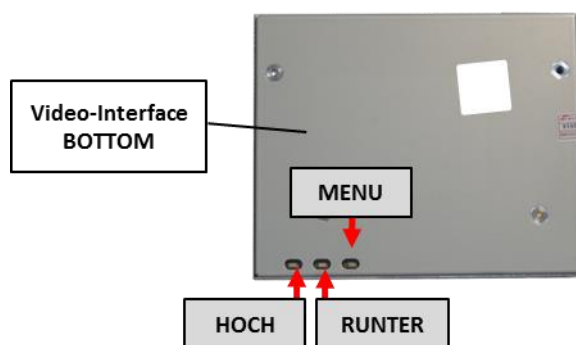
This interface can only insert video signals into the factory infotainment. If an AV-source is connected, audio insertion must be done by factory audio AUX input or FM-modulator. The inserted video-signal can be activated simultaneously to each audio-mode of the factory infotainment.

2.7 Connection Video Interface and external keypad



- ① Connect 4pin female Microfit connector of external keypad to male 4pin Microfit connector of video interface

2.8 Picture settings and guide lines

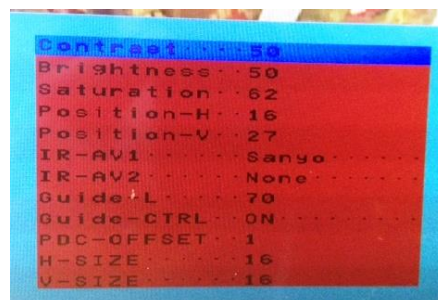


The picture settings are adjusted by the 3 buttons on the video-interface. Press the MENU button to open the OSD settings menu or to switch to the next menu item. Press UP and DOWN change the selected value. The buttons are embedded in the housing to avoid accidental changes during or after installation. Picture settings must be done separately for RGB, AV1 and AV2 while the corresponding input is selected and visible on the monitor. AV2 and CAM share the same settings which must be adjusted in AV2.

Note: The OSD menu is only shown when a working video source is connected to the selected video-input of the interface.

The following settings are available:

Brightness
 Contrast
 Saturation
 Position H (horizontal)
 Position V (vertical)
 Guide CNTRL (ON/OFF) = Guide lines for rear-view camera



Note: If the CAN-box does not support the very vehicle, the guide-lines cannot be used. PDC function is only available in a few cars.

3. Interface operation

3.6. By iDrive-buttons

Some of the iDrive-buttons can be used to execute interface functions.

Long press MENU-button to switch the video source. Each repetition will switch to the next enabled input. If all inputs are enabled the order is:

Factory video → RGB-in → video IN1 → video IN2 → factory video →...

Inputs which are not enabled are skipped. If the audio cable is connected, when switching from video IN1 to video IN2, also the sound will be switched.



Press **CD- or RADIO-button** (AUDIO-button of the small iDrive) to return to the factory-video.

Long press OPTION-button to switch the picture format 16:9 (split-screen) and 24:9 (only available for ultra-wide screens 8.8"/10.2").

Switchover by vehicle buttons isn't possible in all vehicles. In some vehicles the external keypad must be used.

3.7. By keypad

Alternatively or additionally to the MENU-button the interface's keypad can be used to switch the enabled inputs.

Note: The white wire of the 6pin cable can be used with a +5-12V pulse to switch the video-sources alternatively.

4. Specifications

BATT/ACC range	7V - 25V
Stand-by power drain	<10mA
Video input formats	0.7V - 1V
Video input formats	PAL/NTSC
Temperature range	-40°C to +85°C
Dimensions video-box	113 x 22 x 92 mm (W x H x D)
Dimensions CAN-box	87 x 27 x 65 mm (W x H x D)

3. FAQ – Trouble shooting Interface functions

For any troubles which may occur, check the following table for a solution before requesting support from your vendor.

Symptom	Reason	Possible solution
No picture/black picture (factory picture).	Not all connectors have been reconnected to factory head-unit or monitor after installation.	Connect missing connectors.
	No power on CAN-bus box (all LED CAN-bus box are off).	Check power supply of CAN-bus box. Check CAN-bus connection of CAN-bus box.
	CAN-bus box connected to CAN-bus in wrong place.	Refer to the manual where to connected to the CAN-bus. If not mentioned, try another place to connect to the CAN-bus.
	No power on video-interface (all LED video-interface are off).	Check whether CAN-bus box delivers +12V ACC on red wire output of 8pin to 6pin cable. If not cut wire and supply ACC +12V directly to video-interface.
No picture/black picture/white picture (inserted picture) but factory picture is OK.	No picture from video source.	Check on other monitor whether video source is OK.
	No video-source connected to the selected interface input.	Check settings dips 1 to 3 of video interface which inputs are activated and switch to corresponding input(s).
	LVDS cables plugged in wrong place.	Double-check whether order of LVDS cables is exactly connected according to manual. Plugging into head-unit does not work when the manual says to plug into monitor and vice versa.
	Wrong monitor settings of video-interface.	Try different combinations of dips 7 and 8 of video-interface. Unplug 6pin power after each change.
Inserted picture totally wrong size or position.		
Inserted picture double or 4 times on monitor.		
Inserted picture distorted, flickering or running vertically.	Video sources output set to AUTO or MULTI which causes a conflict with the interfaces auto detection.	Set video source output fixed to PAL or NTSC. It is best to set all video sources to the same standard.
	If error occurs only after source switching: Connected sources are not set to the same TV standard.	Set all video sources to the same standard.
	Some interfaces can only handle NTSC input.	Check manual whether there is a limitation to NTSC mentioned. If yes, set source fixed to NTSC output.
Inserted picture b/w.		
Inserted picture qual. bad.		
Inserted picture size slightly wrong.	Picture settings have not been adjusted.	Use the 3 buttons and the interface's OSD to adjust the picture settings for the corresponding video input.
Inserted picture position wrong.		
Camera input picture flickers.	Camera is being tested under fluorescent light which shines directly into the camera.	Test camera under natural light outside the garage.
Camera input picture is bluish.	Protection sticker not removed from camera lens.	Remove protection sticker from lens.

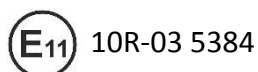
Symptom	Reason	Possible solution
Camera input picture black.	Camera power taken directly from reverse gear lamp.	Use relay or electronics to "clean" reverse gear lamp power. Alternatively, if CAN-bus box is compatible with the vehicle, camera power can be taken from green wire of 6pin to 8pin cable.
Camera input picture has distortion.		
Camera input picture settings cannot be adjusted.	Camera input picture settings can only be adjusted in AV2 mode.	Set dip 3 of video-interface to ON (if not input AV2 is not already activated) and connect the camera to AV2. Switch to AV2 and adjust settings. Reconnect camera to camera input and deactivate AV2 if not used for other source.
Graphics of a car in camera input picture.	Function PDC is ON in the interface OSD.	In compatible vehicles, the graphics will display the factory PDC distance. If not working or not wanted, set interface OSD menu item UI-CNTRL to ALLOFF.
Chinese signs in camera input picture	Function RET or ALL is ON (function for Asian market) in the interface OSD.	Set interface OSD menu item UI-CNTRL to ALLOFF or PDCON.
Not possible to switch video sources by OEM button.	CAN-bus interface does not support this function for vehicle.	Use external keypad or cut white wire of 6pin to 8pin cable and apply +12V impulses for AV-switching.
Not possible to switch video sources by external keypad.	Pressed too short.	For video source switching a longer press of about 2.5 seconds is required.
	SW-version of interface does not support external keypad.	Use OEM-button or cut white wire of 6pin to 8pin cable and apply +12V impulses for AV-switching.
Interface does not switch to camera input when reverse gear is engaged.	CAN-bus interface does not support this function for the vehicles.	Cut the green wire of the 6pin to 8pin cable and apply +12V constant from reverse gear-lamp signal. Use relay to "clean" R-gear lamp power.
Interface switches video-sources by itself.	CAN-bus interface compatibility to vehicle is limited.	Cut the grey wire of 6pin to 8pin and isolate both ends. If problem still occurs, additionally cut the white wire of 6pin to 8pin cable and isolate both ends.

4. Technical Support

Please note that direct technical support is only available for products purchased directly from NavLinkz GmbH. For products bought from other sources, contact your vendor for technical support.

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