v.LiNK Video-inserter
VL3-MBN51

Examples NTG-5

**Compatible with Mercedes Benz vehicles
with Comand Online NTG5/NTG5.1
Audio20 CD NTG5/NTG5.1
Audio20 USB NTG5/NTG5.1
with 4pin HSD LVDS connector on the monitor**

**Video-inserter with 2 video inputs + rear-view camera input
and CAN control**

Product features

- **Video-inserter for factory infotainment monitors**
- **2 CVBS video-inputs for after-market devices (e.g. DVD-Player, DVB-T tuner, …)**
- **CVBS 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 all vehicles)**
- **Video-in-motion (ONLY for connected video-sources)**
- **Compatible with factory rear-view camera**
- **Video-inputs only NTSC compatible**

# Contents

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. Apart from using this product in an unmoved vehicle, it should only be used 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. Up to one year after purchase we offer free software-updates for our interfaces. To receive a free update, the interface has to be sent in at own cost. Wages for de-and reinstallation and other expenditures 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
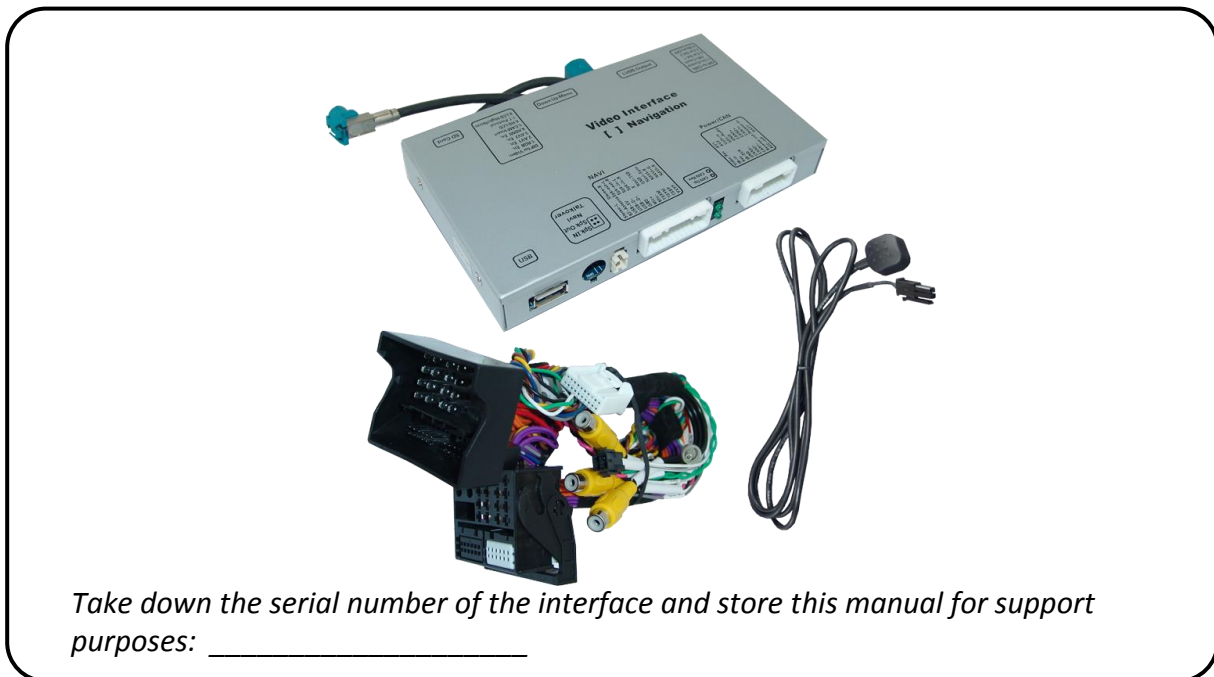
*Take down the serial number of the interface and store this manual for support purposes: _____*

If the HSD image cable of the vehicle harness is too short for the installation, an HSD extension can be ordered separately with item number CAB-HSD-ML100.

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1.2. Checking the compatibility of vehicle and accessories

Compatibility

Brand	Compatible vehicles	Compatible systems
Mercedes Benz	A-class (W176) from 09/2015, B-class (W246) from 11/2014, C-class (W205), C-class Coupé (C205) from 2015, CLA-Coupé (C117) from ca. 10/2014, CLA-Shooting B (X117) from 03/2015, CLS-Coupé (W218) from ca. 08/2014, CLS Shooting B (X218) from ca. 08/2014, E-class (S/W212) from ca. 11/2014, E-class Coupé (C207) from about 06/2015, G-model (W463) from 10/2016, GL-class (X166) from ca.09/2016, GLA-class (X156) from 09/2015, GLC-class (X253), GLE-class (C292), GLS-class (X166) from about 11/2015, GT AMG (C190), ML-class (W166) from 08/2015, SLC-class (R172) from 2016, V-class (W447) from 2014	Comand Online NTG5-205 Audio20 CD NTG5-205 Audio20 USB NTG5-205 Comand Online NTG5.1 Audio20 NTG5.1

Limitations

Video only — The interface inserts ONLY video signals into the infotainment. For sound use an FM-modulator. Only for Comand Online NTG5-205, the optional OBD-coder for factory audio-AUX is available (OBD-N5-X-01).

Connecting 2 AV-sources — If 2 AV-sources shall be connected to the infotainment the optional audio switch SW-A2X1 is available, which is controlled by the video interface.

Video sources — NTSC video sources compatible only.

Factory rear-view camera — Automatically switching-back from inserted video to factory rear-view camera is only possible while the reverse gear is engaged. To delay the switch-back, an additional electronic part is required.

1.3. Connection Video-Interface

The video-interface converts the connected after-market sources video signals into a LVDS signal which is inserted in the factory monitor using separate trigger options and it reads vehicle's digital signals out of the vehicle's CAN-bus and converts them for the video interface.
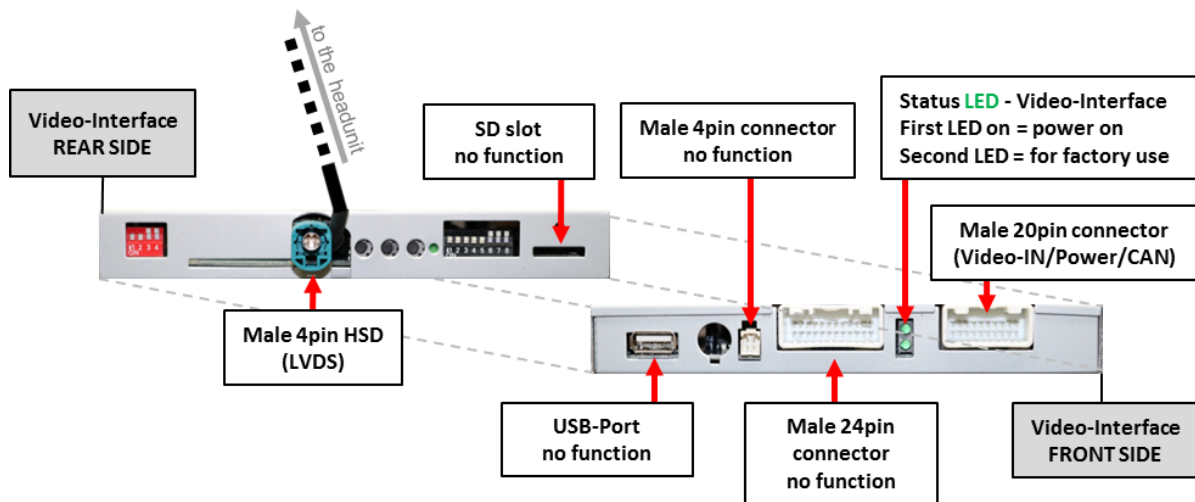
1.4. Settings of the 8 Dip switches (black)

Some settings have to be selected by the 8 dip-switches at the video-interface. Dip position down is ON and position up is OFF.

Dip	Function	ON (down)	OFF (up)
1	No function	-	set to OFF
2	CVBS AV1-input	enabled	disabled
3	CVBS AV2-input	enabled	disabled
4	No function	-	set to OFF
5	Rear-view cam type	after-market	factory or none
6	No function	-	set to OFF
7	No function		set to OFF
8	Monitor selection	7" monitor	8.4" HD monitor

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`s 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 "Camera-IN" while the reverse gear is engaged.

1.4.3. Monitor selection (dip 8)

Dip 8 customizes the monitor-specific video settings. The "ON" position corresponds to the 7" monitor, while the "OFF" position belongs to the 8.4" monitor. If the right picture still doesn't appear after changing the dip switch, retry and after each dip switch change disconnect the Power supply for a few seconds (Power-reset).

1.5. Settings of the 4 Dip switches (CAN function - red)

Dip position down is ON and position up is OFF.

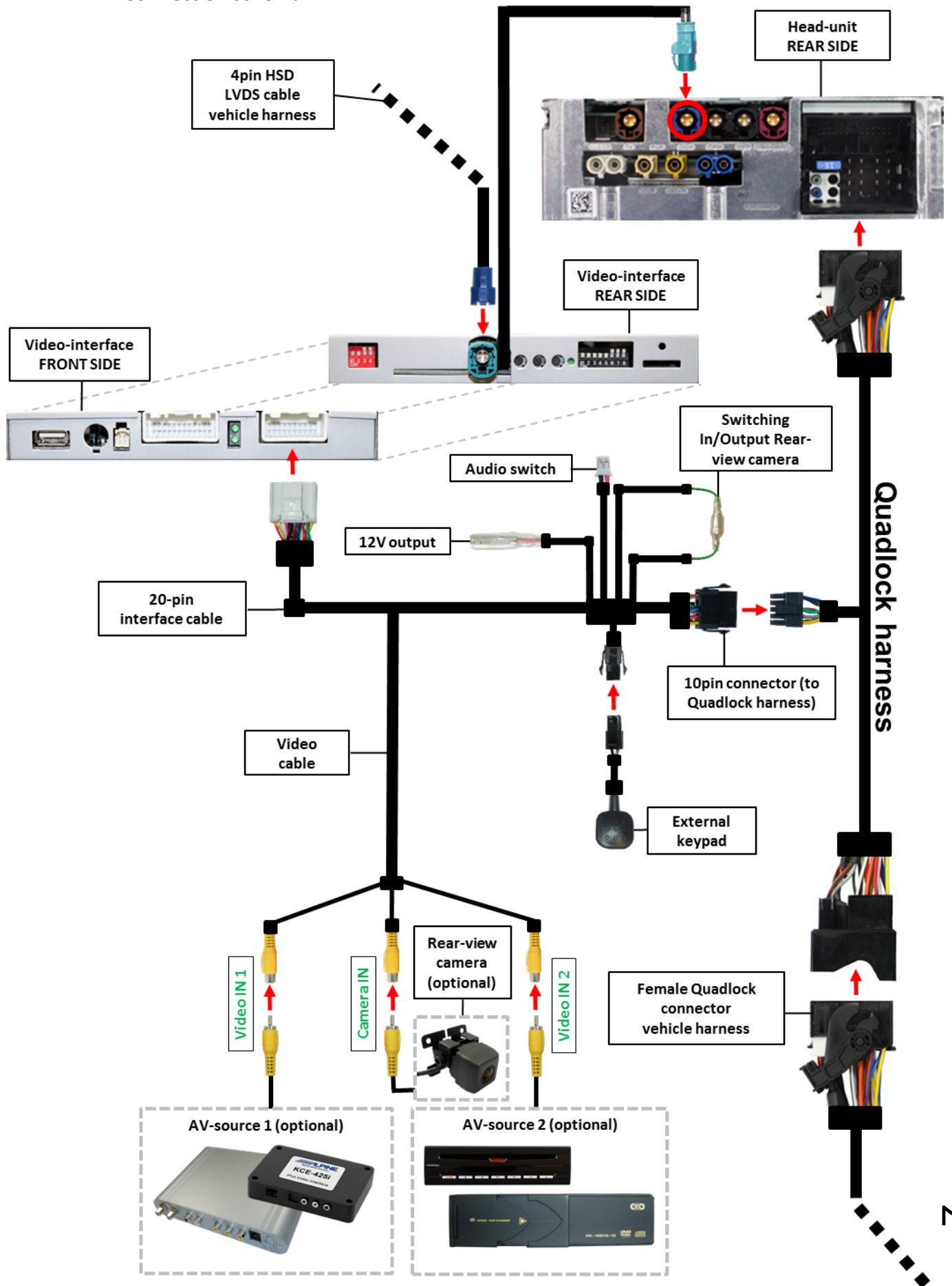| Vehicle/Navigation	Dip 1	Dip 2	Dip 3	Dip 4
Vehicles with NTG5	OFF	ON	**ON**	OFF
Vehicles with NTG5.1	OFF	ON	**OFF**	OFF

2. Installation

Switch off the ignition and disconnect the vehicle's battery! The interface needs a permanent 12V source. If -according to factory rules- a disconnection of the battery has to be avoided, it should be sufficient to use the vehicle's sleep-mode. In case, the sleep-mode doesn't succeed, the battery has to be disconnected with a resistor lead.
The Interface needs a permanent power supply! If power isn't directly taken from the battery, the connection's power 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 head-unit.

2.2 Connection schema

4pin HSD LVDS cable vehicle harness

Head-unit REAR SIDE

Video-interface REAR SIDE

Video-interface FRONT SIDE

Audio switch

Switching In/Output Rear-view camera

12V output

Quadlock harness

20-pin interface cable

10pin connector (to Quadlock harness)

Video cable

External keypad

Video IN 1

Camera IN

Rear-view camera (optional)

Video IN 2

Female Quadlock connector vehicle harness

AV-source 1 (optional)

AV-source 2 (optional)

### 2.3. Connections to the head-unit - LVDS

Remove the Comand head-unit.
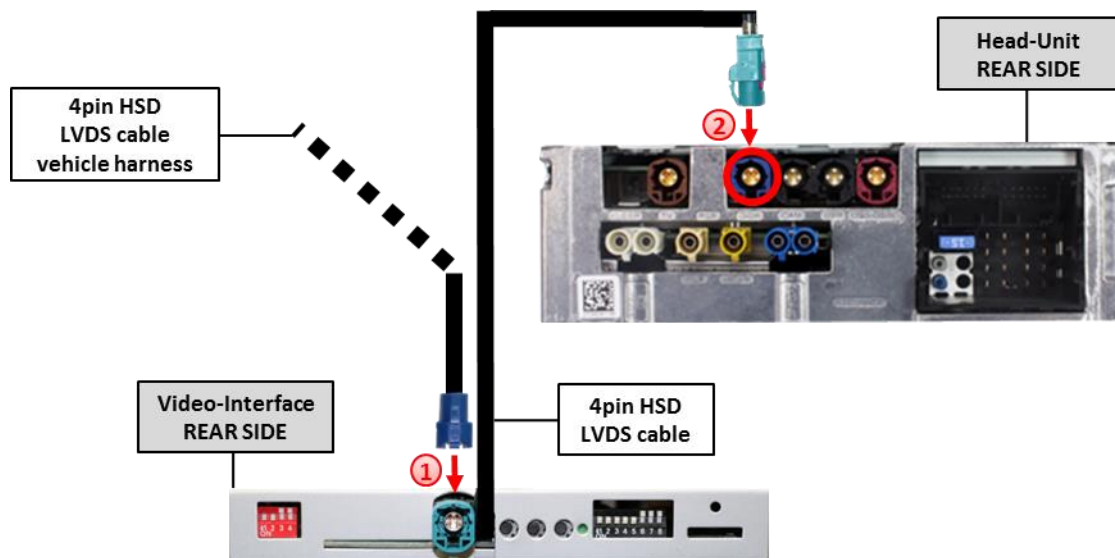
① Remove **blue** female 4pin HSD LVDS connector from the rear of the head-unit and connect it to the **waterblue**-coloured male 4pin HSD LVDS connector of the interface-box.

② Connect the **waterblue**-coloured female 4pin HSD LVDS connector of the 4pin HSD LVDS cable to the **blue** male 4pin HSD LVDS connector of the head-unit.

Note: Depending on place of installation and mounting space, the included 4pin HSD extension-cable (CAB-HSD-ML100) can be used

Note: If the HSD image cable of the vehicle harness is too short for the installation, an HSD extension can be ordered separately with item number CAB-HSD-ML100.

2.4.   Connections to the head-unit - Quadlock
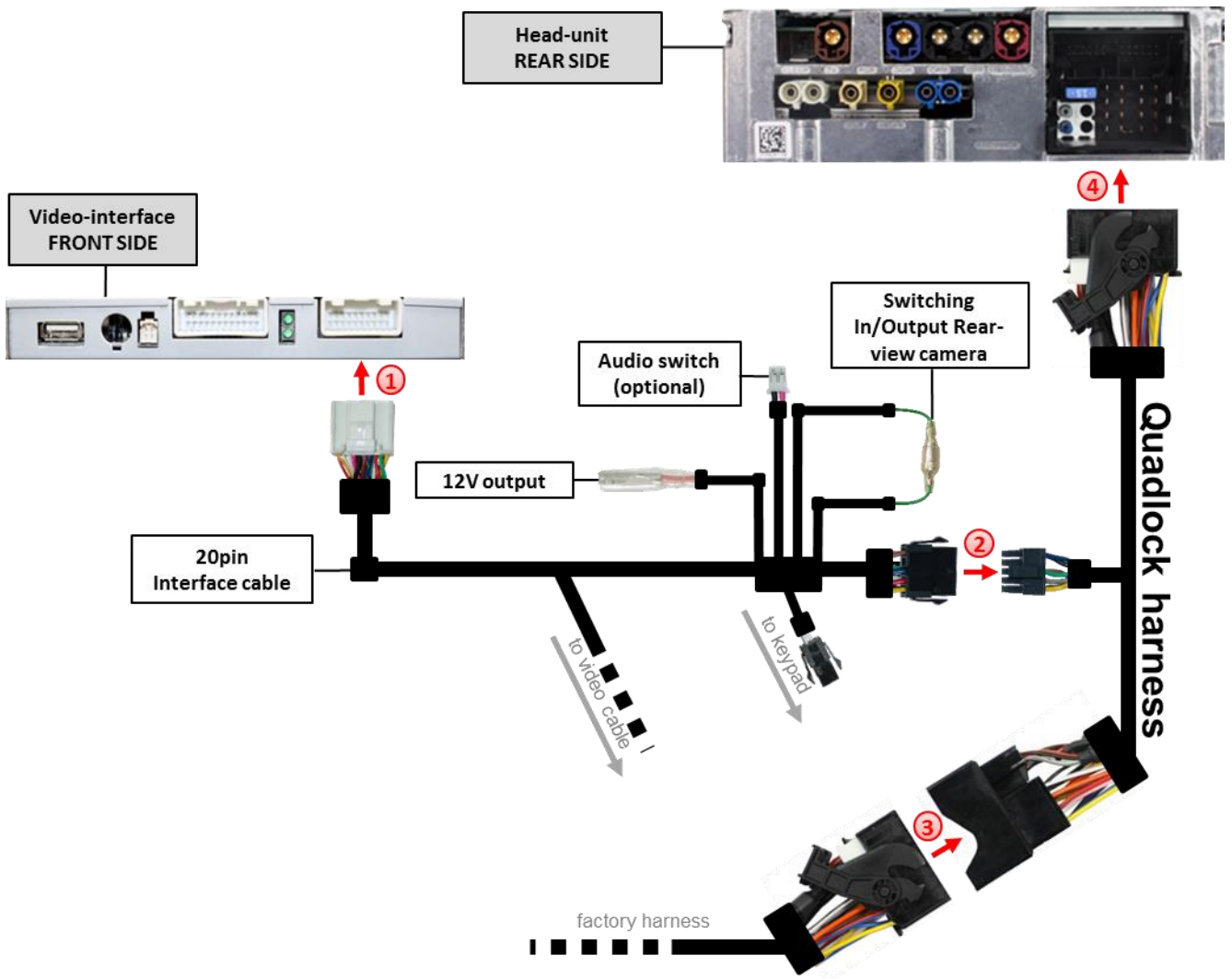
① Connect the interface cable's female 20pin connector to the male 20pin connector of the video-interface.

② Connect the female 10pin connector of the Quadlock cable to the male 8pin connector of the interface cable

③ Remove the female Quadlock connector of the vehicle harness from the rear of the head-unit and connect it to the male Quadlock connector of the Quadlock cable.

④ Connect the female Quadlock connector of Quadlock harness to the male Quadlock connector of the head-unit.

2.5. Connecting peripheral devices

It is possible to connect two after-market AV-sources and an after-market rear-view camera 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.

Note: The single grey wire and the single white wire are out of function and should be isolated.
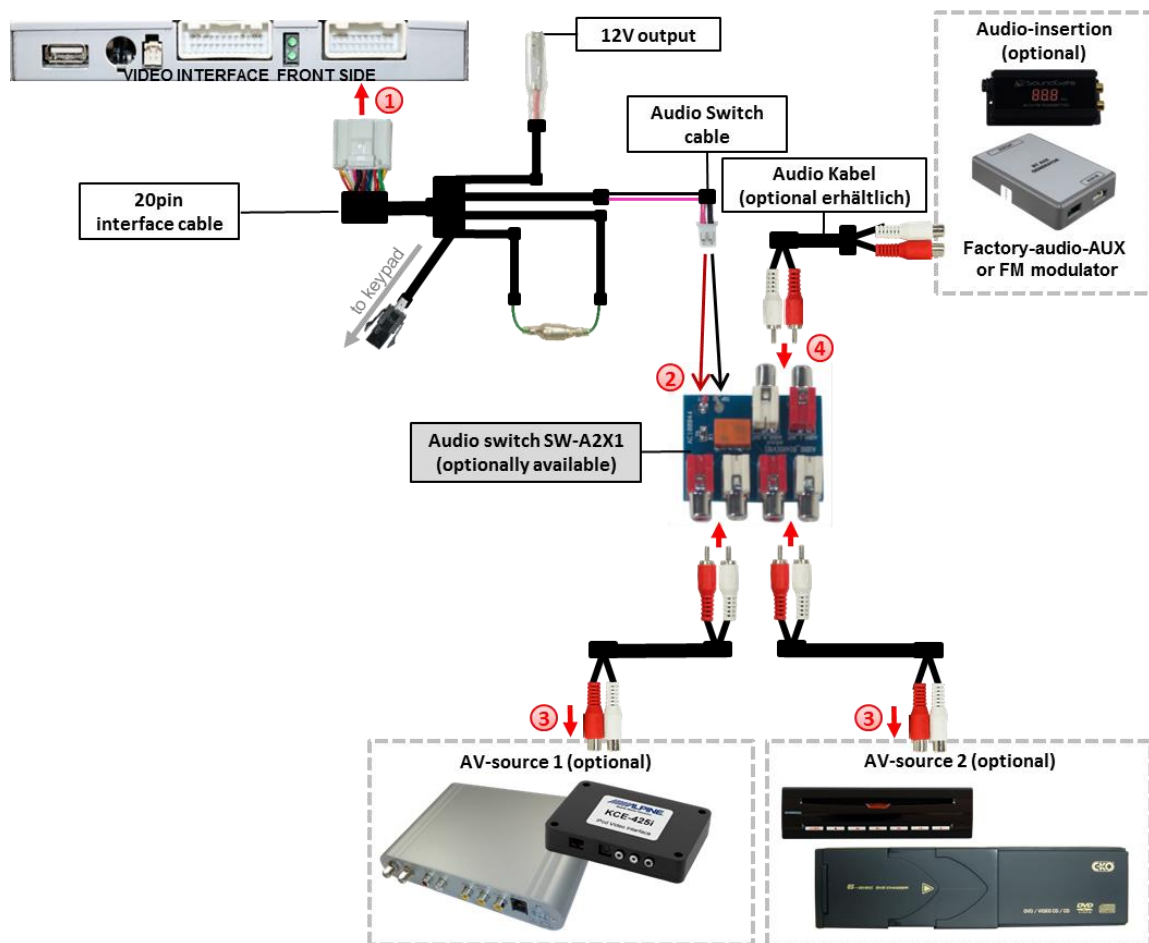
2.5.1. Video-sources to AV1 and AV2
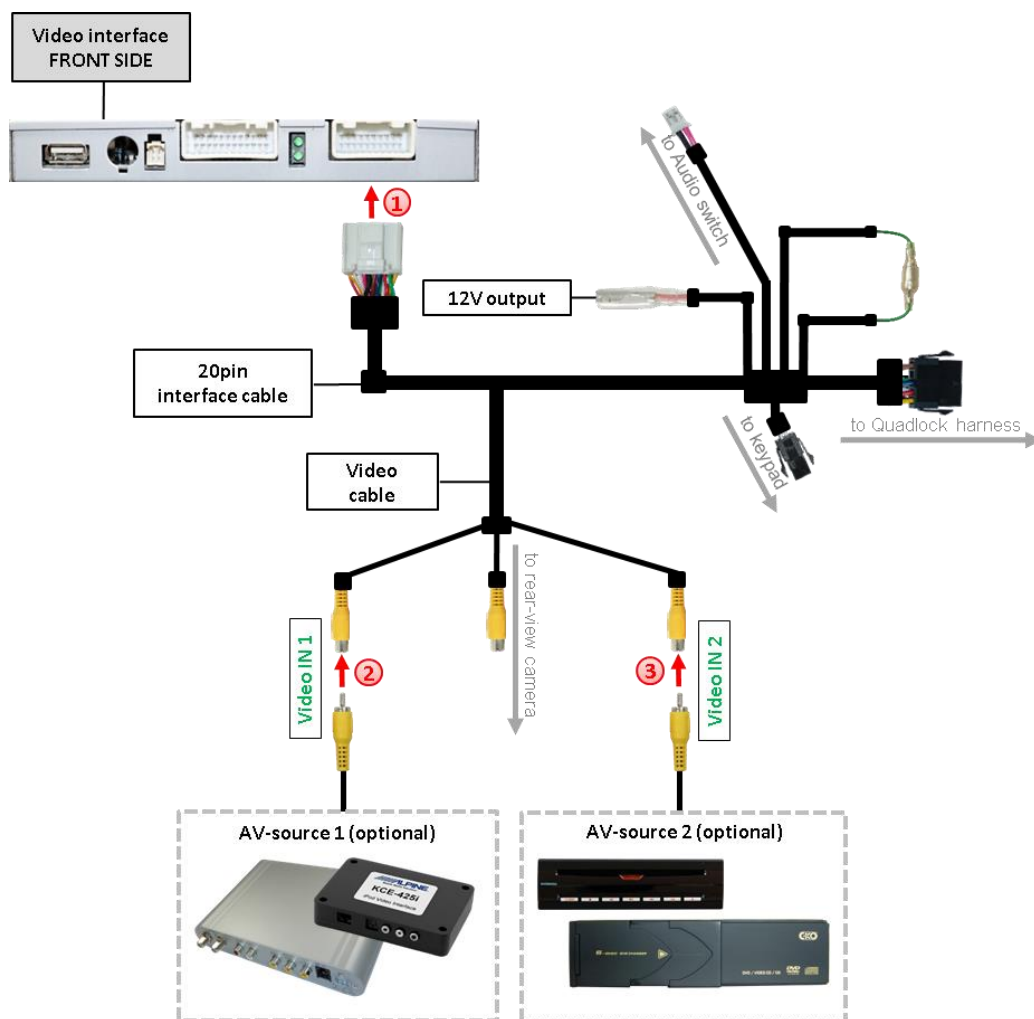
① Connect the interface cable's female 20pin connector to the interface's male 20pin connector.

② Connect the video RCA of the AV-source 1 to the female RCA connector "VideoIN1" of the video cable.

③ Connect the video RCA of the AV-source 2 to the female RCA connector "Video -IN2" of the video cable.

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2.5.2. Audio-switch and audio insertion

This interface can only insert video signals into the factory infotainment and switch audio signals. If an AV-source is connected to AV1 or AV2, the audio insertion has to be done by the factory audio AUX input or a FM-modulator to which the interface's sound-switch output is connected. When the interface is switched from AV1 to AV2, the audio signal is switched parallel to the corresponding video signal by the interface's built-in audio-switch. The inserted video-signal can be activated simultaneously to each audio-mode of the factory infotainment.

Note: If 2 AV sources shall be connected, the optionally available audio switch SW-A2X1 has to be connected. While the interface is switched from AV 1 to AV 2, the audio signal will automatically be switched to the right source.

① Connect the interface cable's female 20pin connector to the male 20pin connector of the video-interface.

② Connect the interface cable's drilled pink- and black-coloured wires to the audo switches power input. Connect the pink wire to the input "BATT" and the black one to the grey wire beside.

③ Connect the audio-RCA of the AV-source 1 and the AV source 2 to the female RCA port "AUDIO-IN1" and "AUDIO-IN2" of the audio switch.

④ Connect the audio-RCA of the factory-audio-AUX-input or the FM-modulator to the female RCA port "AUDIO-OUT" of the audio switch.

2.5.3. After-market rear-view camera

Some vehicles have a different reverse gear code on the CAN-bus which the video-interface is not compatible with. Therefore, there are two different ways of installation. If the video interface receives a signal of the reverse gear, the green wire "Reverse-OUT" of the 20pin cable should carry +12V while the reverse gear is engaged.

Note: Do not forget to set dip5 of the video-interface to ON before testing.

2.5.3.1. Case 1: CAN-box detects reverse gear

If the CAN-bus interface delivers +12V on the green wire of the 20pin cable when reverse gear is engaged, it will automatically be switched to the rear-view camera input CAM while reverse gear is engaged.
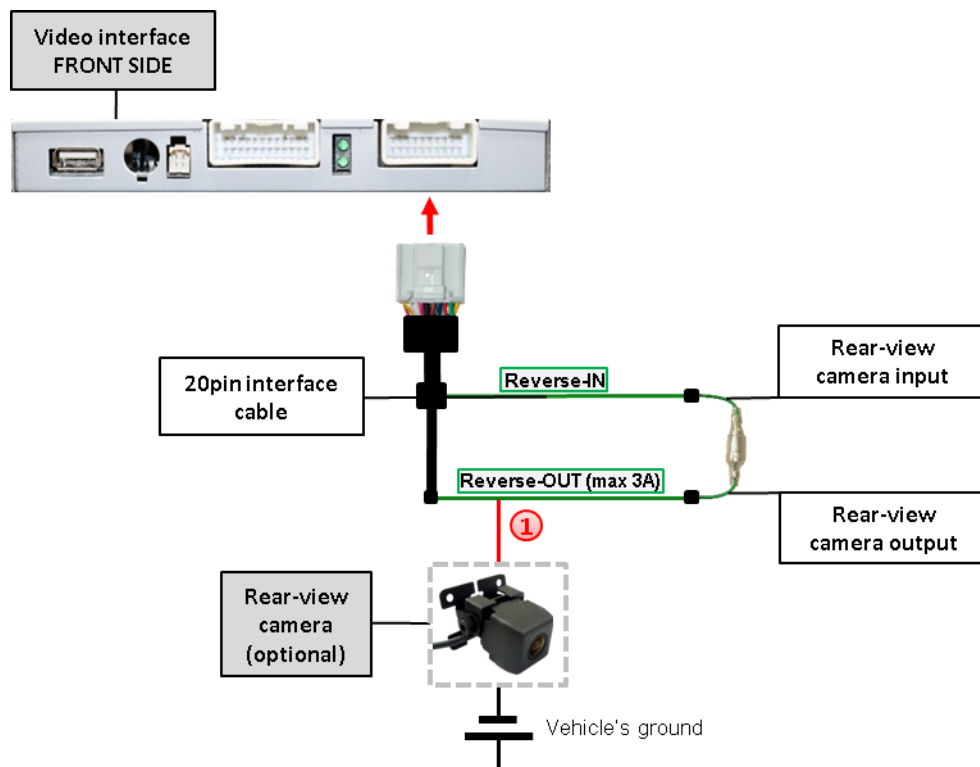

① The 12 V power supply for the rear-view camera (max 3A) has to be taken from the green wire of the 20pin cable to avoid an unnecessary permanent power supply to the camera electronic.
For the operation, both green cables have to stay connected

2.5.3.2.   Case 2: Interface does not receive any reverse gear signal

If the video interface does <u>not</u> deliver +12V on the green wire of the 20pin cable when reverse gear is engaged (not all vehicles are compatible), an external switching signal from the reverse gear light is required. As the reverse gear light's power supply isn't voltage-stable all the time, an ordinary open relay (e.g AC-RW-1230 with wiring AC-RS5) or filter (e.g. AC-PNF-RVC) is required. The diagram below shows the connection type of the relay.
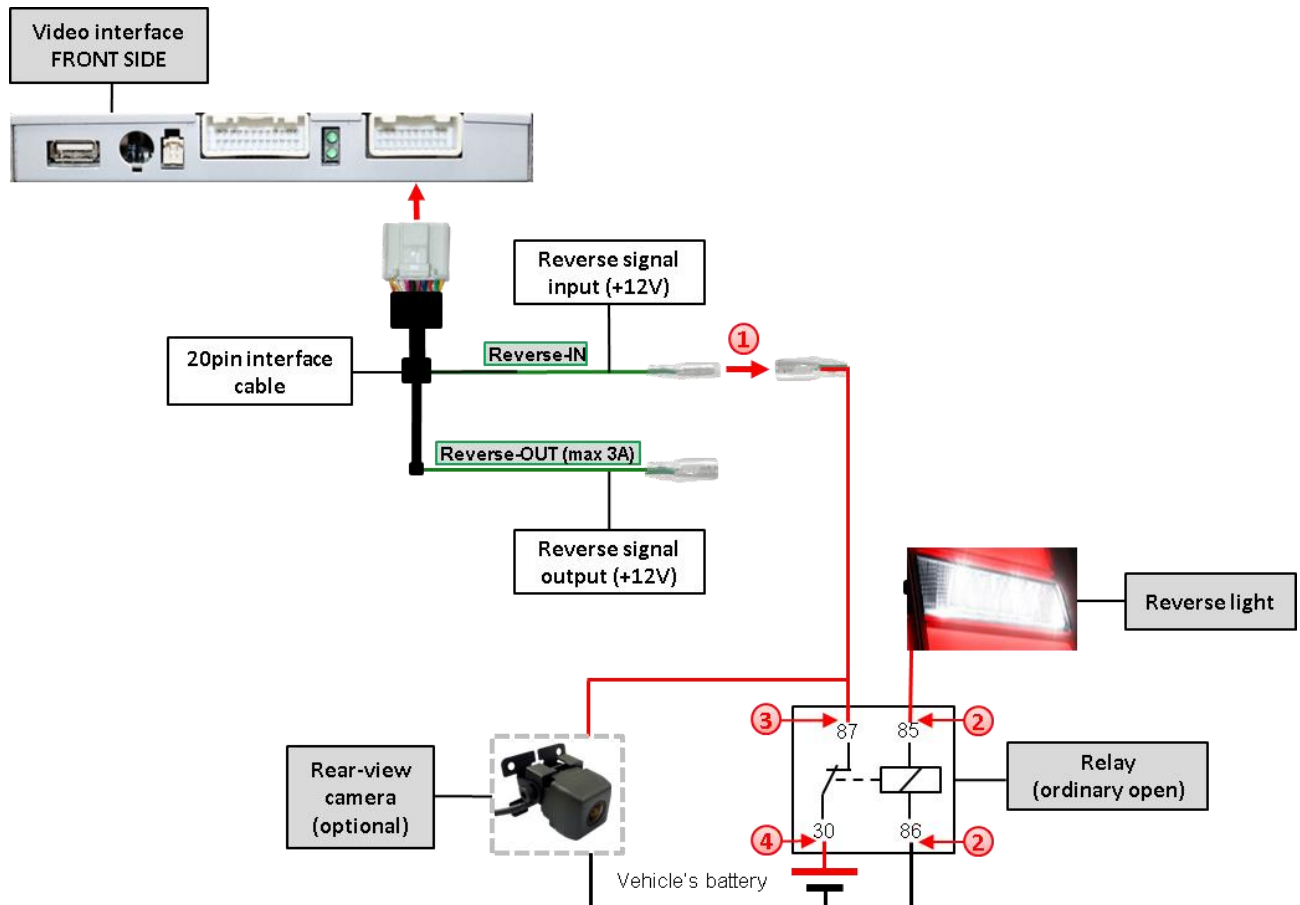

① Disconnect the green cable's preconnected male- and female connectors of the 20pin cable and connect the green input cable "Reverse-IN" to the output connector (87) of the relay.

Note: Not least to avoid short circuits, the best solution should be, to crimp a male 4mm connector to the relay's output cable and connect it to the green cable's female 4mm connector. The output-cable "Reverse-OUT" remains disconnected as it's out of function.

② Connect the Reverse light's power-cable to coil (85) and the vehicle's ground to coil (86) of the relay.

③ Connect the output connector (87) of the relay to the rear-view camera's power-cable, like you did it to the green "Reverse-IN" cable before.

④ Connect permanent power / 12V to the relay's input connector (30).

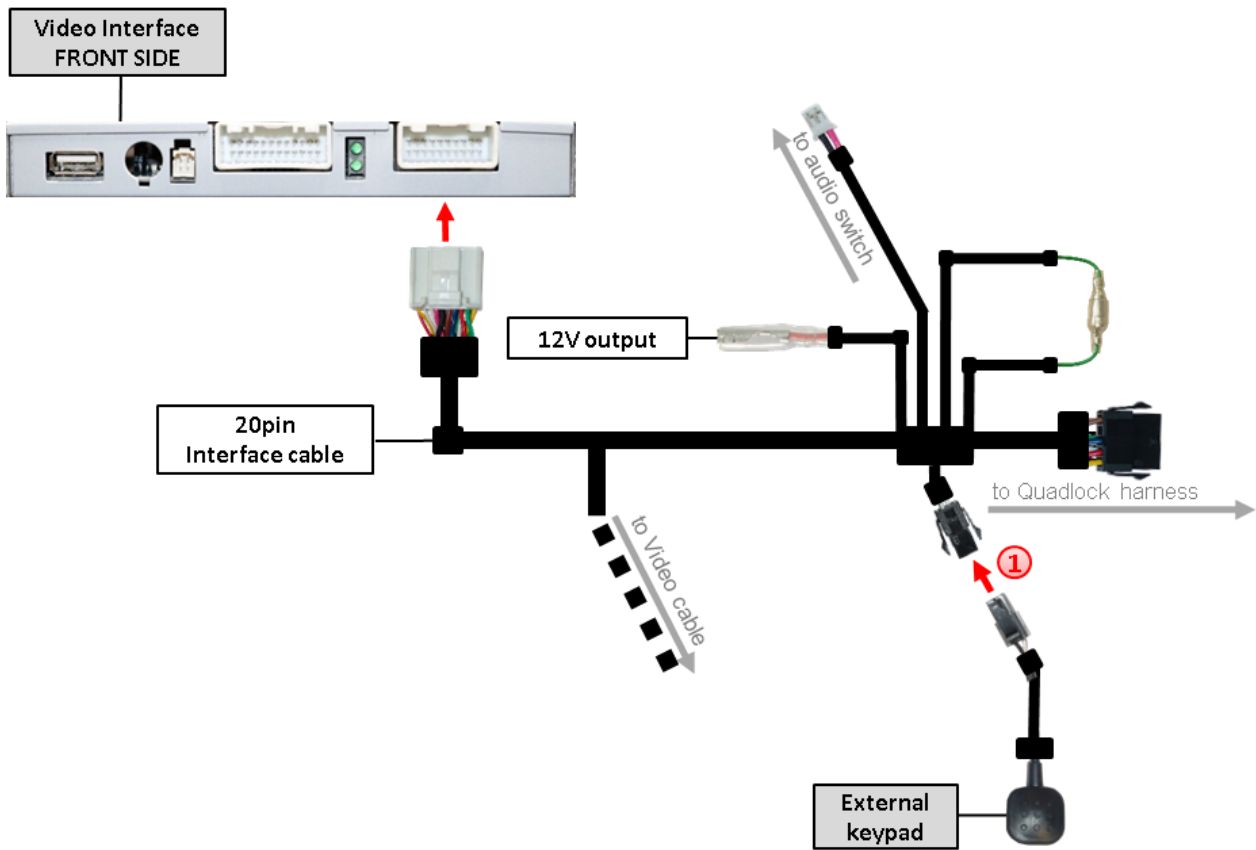### 2.5.3.3. Video signal connection for the rear-view camera
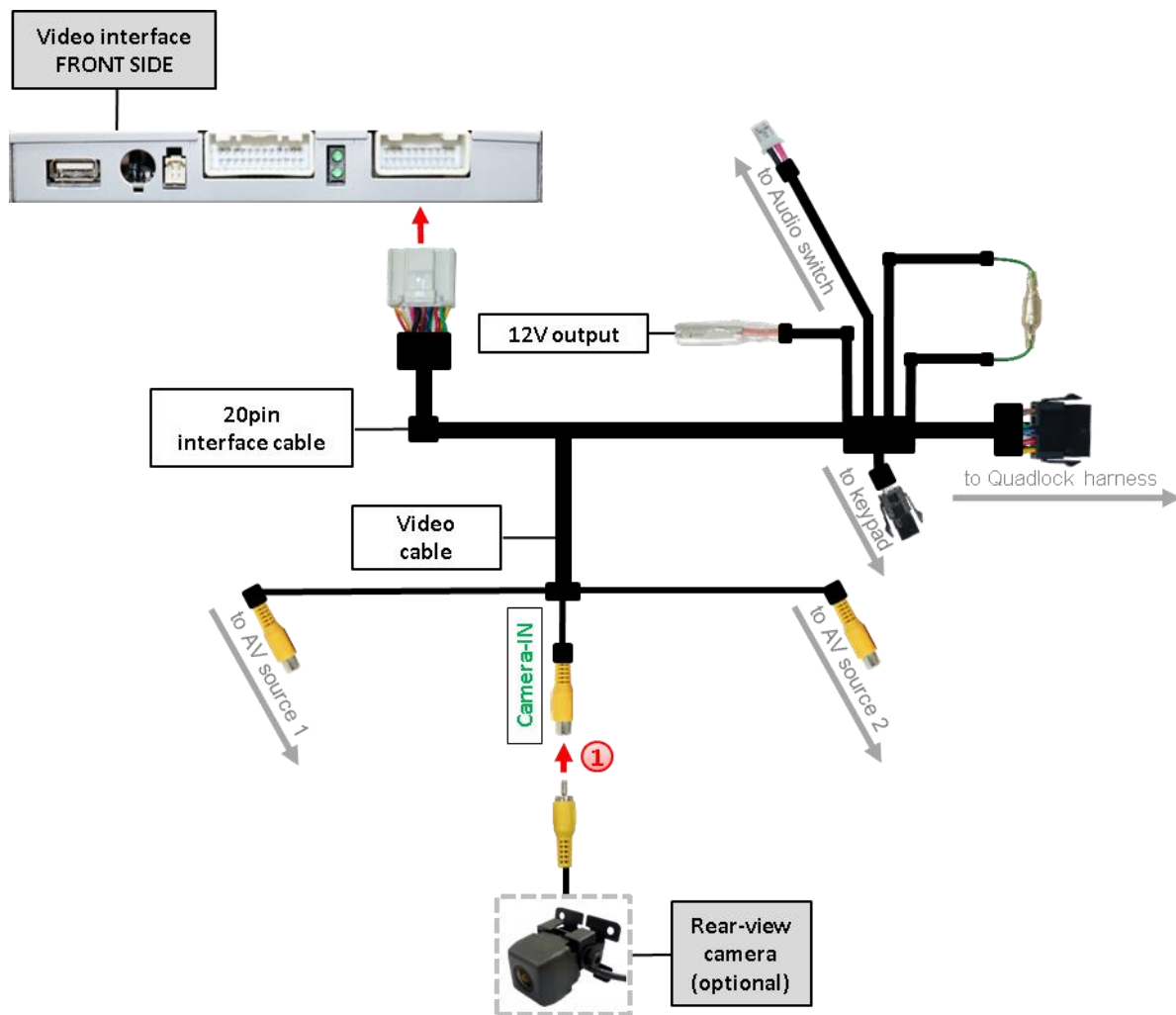
① Connect the video-RCA of the after-market rear-view camera to the female RCA port "Camera-IN" of the video-cable.
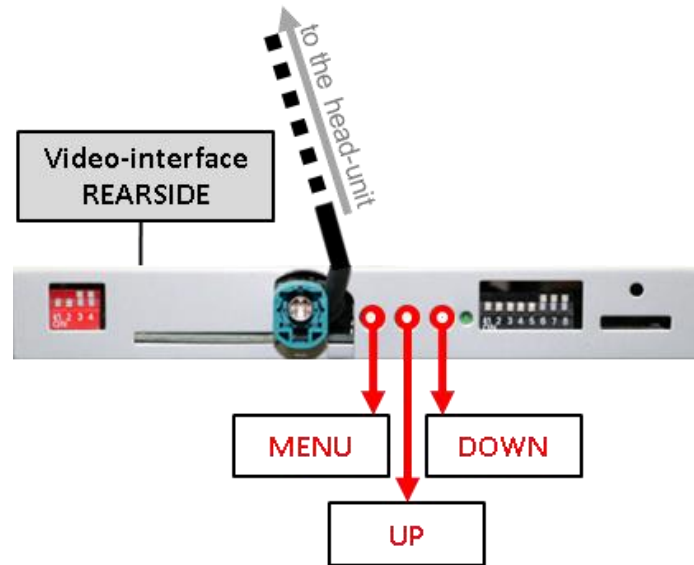
Note: The picture settings for "Camera-IN" input have to be done in AV2.

2.6. Connecting video-interface and keypad

① Connect the keypad's female 4pin connector to the video-interface's male 4pin connector.

2.7. 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 will change the selected value. The buttons are embedded in the housing to avoid accidental changes during or after installation. The picture settings have to be done separately for RGB, AV1 and AV2 while the corresponding input is selected and visible on the monitor. AV2 and Camera-IN 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:

Contrast
Brightness
Saturation
Position H (horizontal)
Position V (vertical)
 For the rearIR-AV1 (out of function)
IR-AV2 (out of function)
Guide-lines left
Guide-lines right
Guide lines (ON/OFF)
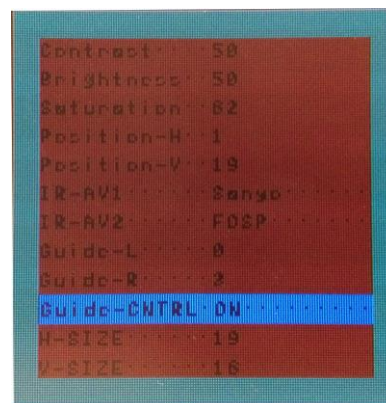
Note: If the CAN-box does not support the vehicle, the guide-lines cannot be used. If supported and activated, the guide-lines also show the steering wheel position dependant driving path.

3. Interface operation

3.1. By Comand-buttons

A short press of the NAVI button or the Menu button switches the input from factory mode to the inserted video sources. If (by dip switch setting) all inputs are enabled, the order is the following:

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

By dip switch deactivated inputs will be skipped skipped. If an audio switch has been connected in the system, also the sound will be switched when switching from video IN1 to video IN2

Immediate back-switching to defined factory inputs can be done by the buttons „RADIO", „MEDIA" or „TEL".

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

3.2. By keypad

Alternatively or additionally to the factory infotainment buttons, the interface's enabled inputs can also be switched by the external keypad.

4. Specifications

BATT/ACC range	7V - 25V
Stand-by power drain	<10mA
Power	0.3A @12V
Video input	0.7V – 1V
Video input formats	NTSC
RGB-video amplitude	0.7V with 75 Ohm impedance
Temperature range	-40°C to +85°C
Dimensions Video-Box	158 x 23 x 91 mm (W x H x D)

5. FAQ – Trouble shooting Interface functions

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

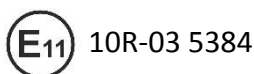| Symptom	Reason	Possible solution
No picture/black picture (factory picture).	Not all connectors have been reconnected to factory head-unit or monitor after installation.	Connect missing connectors.
	No power on CAN-bus box (all LED CAN-bus box are off).	Check power supply of CAN-bus box. Check CAN-bus 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.
Inserted picture totally wrong size or position.	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 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.
Inserted picture b/w.	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 qual. bad.	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 size slightly wrong.		
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.

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" 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.

6. 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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