

## Video-inserter VL1-CCC

### BMW vehicles

with Professional navigation CCC,  
Business navigation M-ASK or radio  
Monitor sizes: 6.5inch or 8.8inch

### Mini vehicles

with Professional navigation CCC infotainment  
Monitor size: 6.5inch monitor



example

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

### Product features

- Video-inserter for factory-infotainment systems
- 1 CVBS Rear-view camera video-input
- 2 CVBS video-inputs for after-market devices (e.g. USB-Player, DVB-T2 tuner, ...)
- Automatic switching to rear-view camera input on engagement of the reverse gear
- Video-in-motion (ONLY for connected video-sources)
- Video-inputs NTSC compatible
- Ultra-wide picture mode 24:9 (only with ultra-wide screen 8.8")

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## 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.

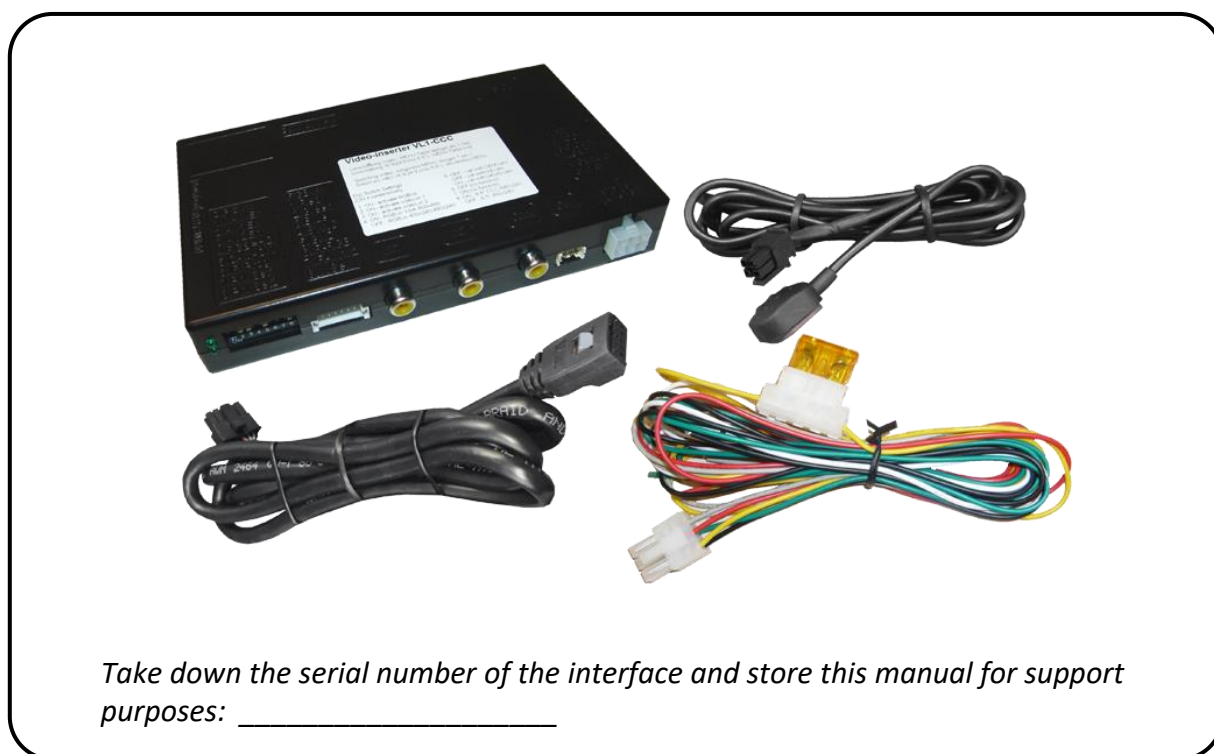
No liability for vehicle wire colours and pin definition!

Changes by the vehicle manufacturer are possible. The given information has to be verified by the installer.

## 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



## 1.2. Checking the compatibility of vehicle and accessories

### Requirements

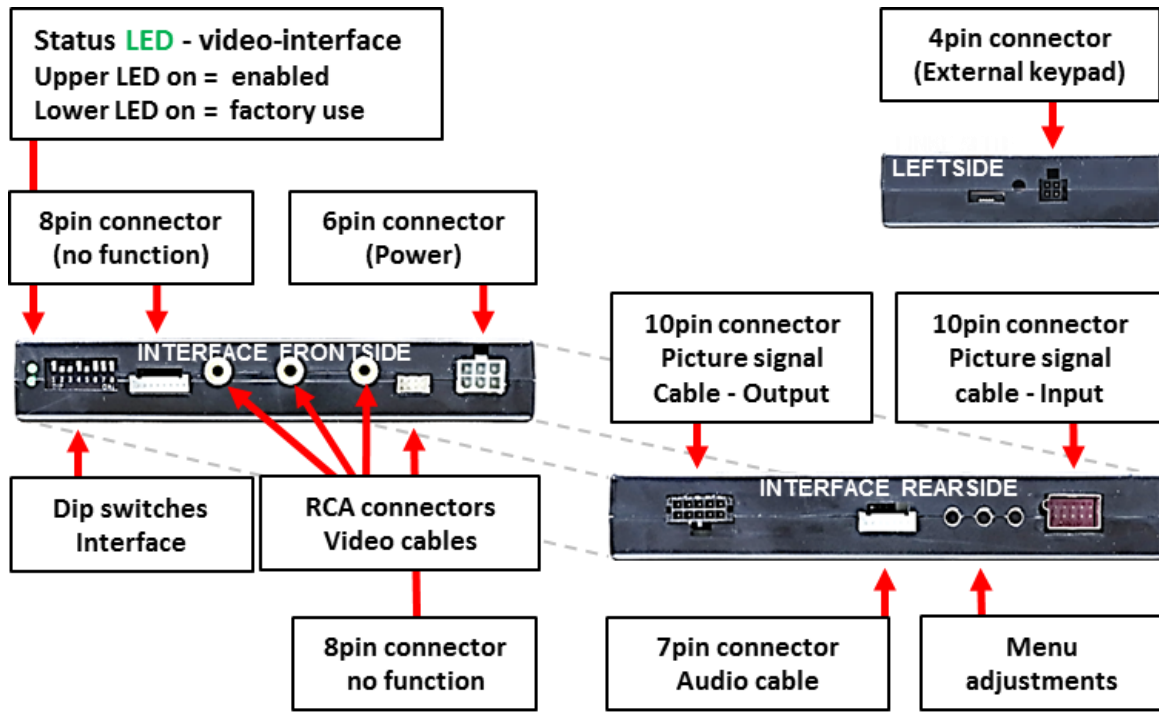
Brand	Compatible vehicles	Compatible systems
<b>BMW</b>	3series (E90/E91/E92/E93) 5series (E60/E61) 6series (E63/E64) X5 (E70) X6 (E71)	Professional navigation CCC, Business navigation M-ASK, radios - with 6.5inch or 8.8inch monitor
<b>Mini</b>	From about 10/2006 until about 08/2010	Professional navigation CCC with 6.5inch monitor <i>Send VIN and picture of main-menu for identification</i>

### Limitations:

<i>Video only</i>	The interface inserts ONLY video signals into the infotainment. For inserting Audio signals either the possibly existing factory audio AUX input, a FM-modulator or the AUX-In Interface AUX-110 (BMW only) can be used. The factory audio AUX input can be coded by dealership, too. If 2 AV sources shall be connected, the CAB-FV-AUDIO audio cable is optionally available for audio switching.
<i>Factory rear-view camera</i>	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.
Factory-OPS-display	While reverse gear is engaged ONLY the picture of the after-market rear-view camera is visible!
Ultra-wide mode	Only available for ultra-wide screens 8.8"
<i>Video input signal</i>	NTSC video sources compatible only.

## 1.3. Connectors – Video interface

The video-interface converts the video signals of connected after-market sources in a factory monitor compatible picture signal which is inserted in the factory monitor, by using separate trigger options.



## 1.4. Dip-switch settings – interface

Some settings have to 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	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 adjustments	8.8inchmonitor	6.5inchmonitor

**After each Dip-switch-change a power-reset of the Can-box has to be performed!**

See the following chapters for detailed information.

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

Only the enabled video inputs can be accessed by switching through the interface's video sources. It is recommended to enable only the required inputs, because the disabled inputs will be skipped while switching through the video interfaces inputs.

## 1.4.1.2. 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 while the reverse gear is engaged.

## 1.4.1.3. Monitor specific settings (dip 8)

Dip 8 customizes the monitor-specific video settings.

- Dip switch setting **ON** will support the 8.8inch monitor.
- Dip switch setting **OFF** will support the 6.5inch monitor.

**Note:** Dip 1, 4, 6 and 7 are out of function and have to be set to **OFF**.

## 2. Installation

**To install the interface, first switch off the ignition and disconnect the vehicle's battery. Please read the owner's manual of the car, regarding the battery's disconnection! If required, enable the car's Sleep-mode (hibernation mode)**

**In case the sleep-mode does not succeed, the disconnection of the battery can be done with a resistor lead.**

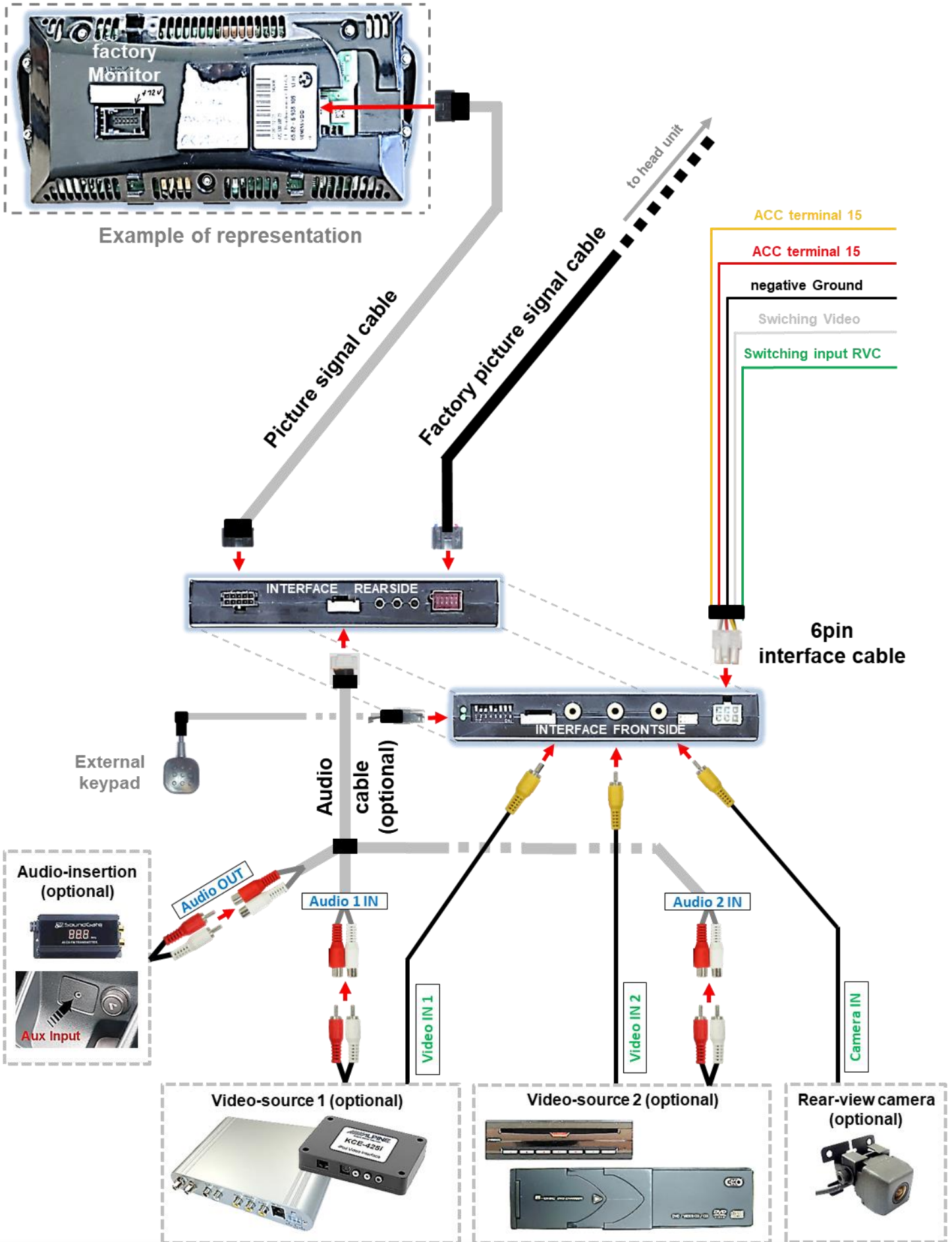
**If the necessary stabilized power supply for the interface is not taken directly from the battery, the chosen connection has to be checked for being constantly stable.**

**The interface needs a permanent 12V source!**

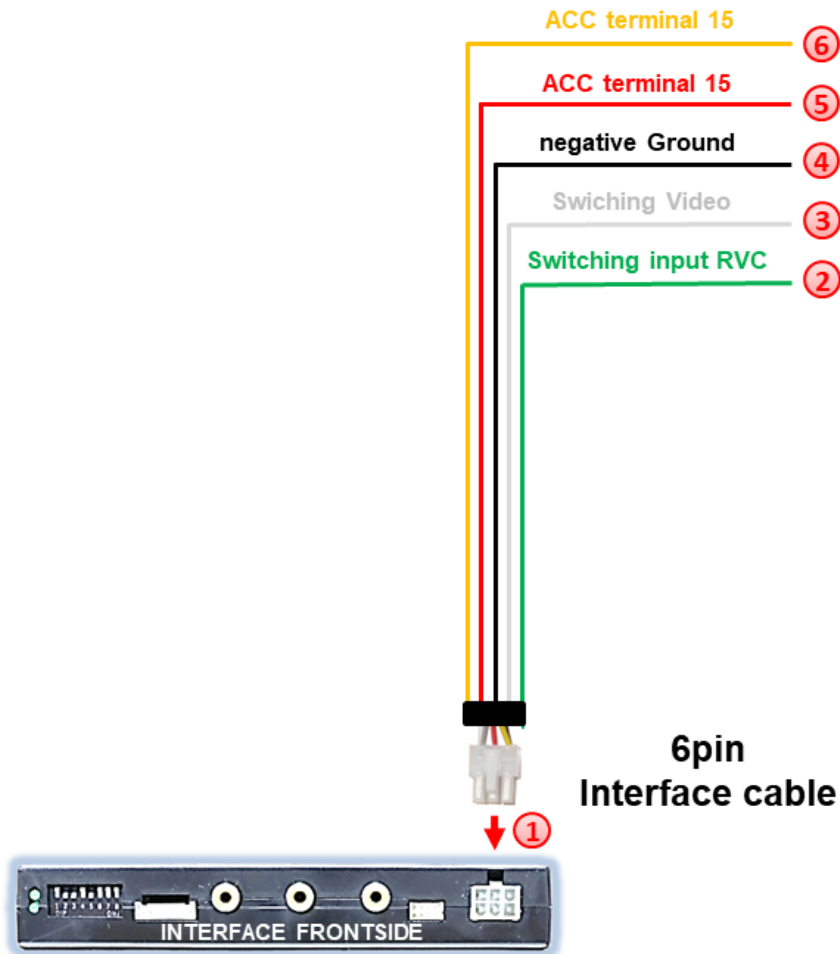
### 2.1. Place of installation

The interface box is prepared to be connected behind the vehicle's monitor. The monitor has to be removed for the installation

## 2.2. Connection schema



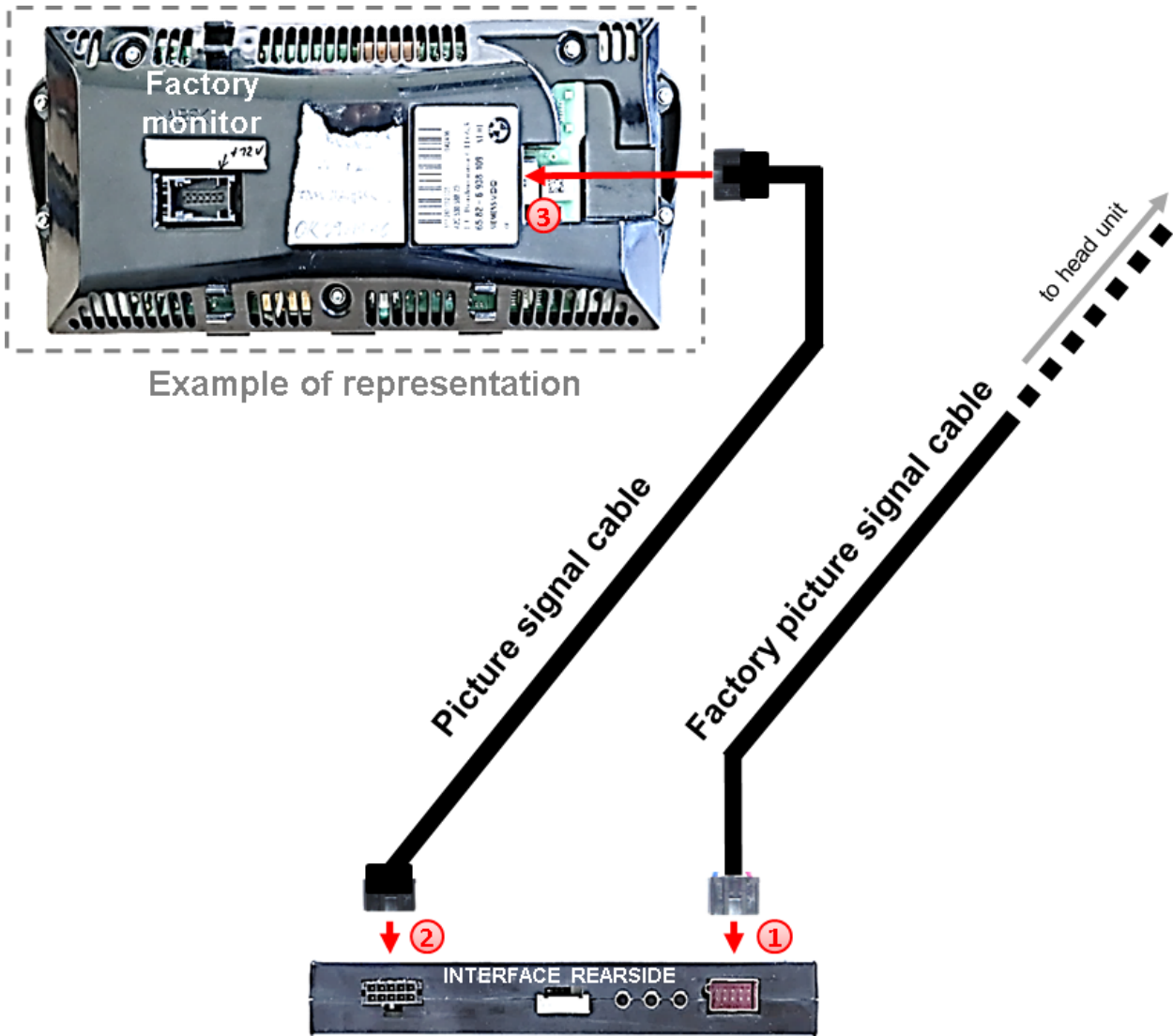
## 2.3. Connection – 6pin interface cable



- ① Connect the white female 6pin connector of the 6pin interface cable to the male 6pin connector of the video interface.
- ② Connect the green wire of the 6pin interface cable to +12V of the reverse gear signal. (e.g. reversing light).
- ③ If desired, the white wire of the 6pin interface cable can be used alternatively to the external button to switch the video sources (12V pulse for 2-3 seconds).
- ④ Connect the black wire of the 6pin interface cable to vehicle ground.
- ⑤ Connect the red wire of the 6pin interface cable to +12V ACC terminal 15.
- ⑥ Connect the yellow wire of the 6pin interface cable to +12V ACC terminal 15.

**Note:** The connection of the green wire (Reverse signal) will be described in chapter “After-market rear-view camera”. The white wire, can be used by +12V impulse to switch the enabled video sources , same as the keypad (see chapter “video interface-operation”).

## 2.4. Connection - picture signal cable



- 1 Disconnect the factory picture signal cable's female 10pin connector which is coming from the head unit at the **rear side of the factory monitor** and connect it to the male 10pin HSD connector (LVDS OUT) of the video interface.



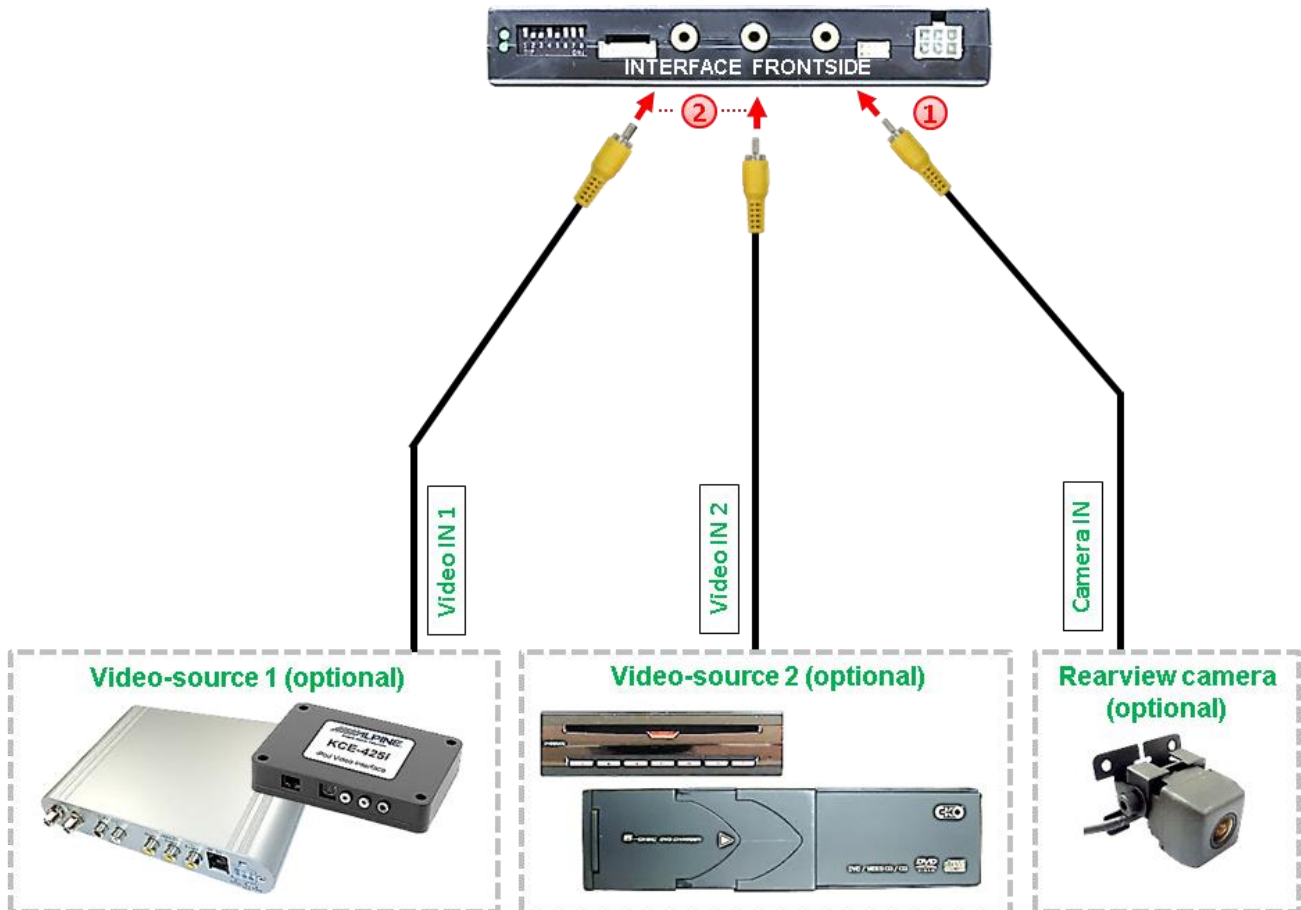
**Attention:** The factory picture signal cable mustn't be disconnected for the installation!

- 2 Connect the enclosed picture signal cable's female 10 pin connector to the male 10pin connector of the video interface.
- 3 Connect the picture signal cable's opposite female 10pin connector to the previously become free male 10pin connector of the video interface.

## 2.5. Connection - Video-sources

It is possible to connect one after-market rear-view camera and two after-market video sources to the video-interface.

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



- 1 Connect the rear-view camera's male RCA to the video interface's female RCA „Camera IN”.
- 2 Connect the male RCAs of possibly existing video sources 1 and 2 to the video interface's female RCAs „Video IN1” and „Video IN2”.

## 2.6. Audio-switch and audio-insertion

This interface is only able to insert video signals into the factory infotainment and switch audio signals. If an AV-source is connected, audio insertion must be done by factory audio AUX input, FM-modulator or the AUX-in interface AUX-110 (BMW only). The inserted video-signal can be activated simultaneously to each audio-mode of the factory infotainment.

### Connection of 1 AV source

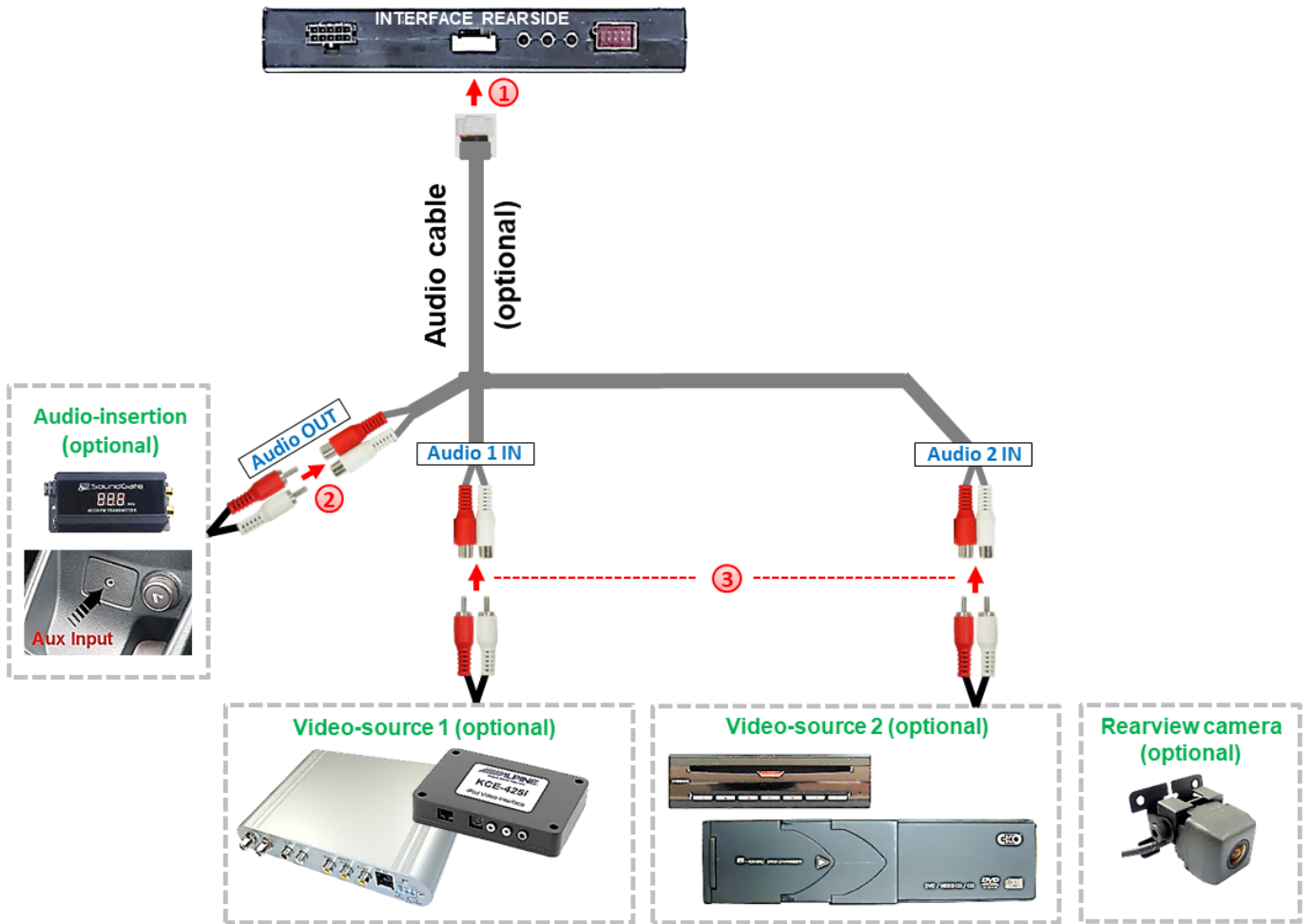
If only one AV-source shall be connected, it is possible to connect the audio output of the AV-source directly to the point of audio-insertion (e.g. to the factory AUX input).

### Connection of 2 AV sources

This interface has an integrated audio switch for switching the audio signals. If two AV sources are connected, the audio output of the AV sources is connected to the point of audio-insertion via the optionally available audio cable CAB-FV-AUDIO (e.g. to the factory AUX input). When switching the video interface from AV1 to AV2, the audio signal is also switched automatically.



**Attention:** The audio cable CAB-FV-AUDIO shown in the diagram is not included in the delivery contents and is optionally available!



- ① Connect the audio cable's female 7pin connector to the male 7pin connector of the video-interface.
- ② Connect the audio-RCA connectors of possibly existing factory AUX-input or FM-modulator to the audio cable's female RCA "Audio OUT".
- ③ Connect the audio-RCA connectors of possibly existing AV-sources 1 and 2 to the female RCAs of the audio cable's „Audio 1 IN“ und „Audio 2 IN“.

### Pin definition 7pin connector

Audio pins	Definition
1/2	Audio input signal R/L of source AV2
3/4	Audio input signal R/L of source AV1
5/6	Audio output signal R/L for factory audio AUX or FM-modulator
7	Ground

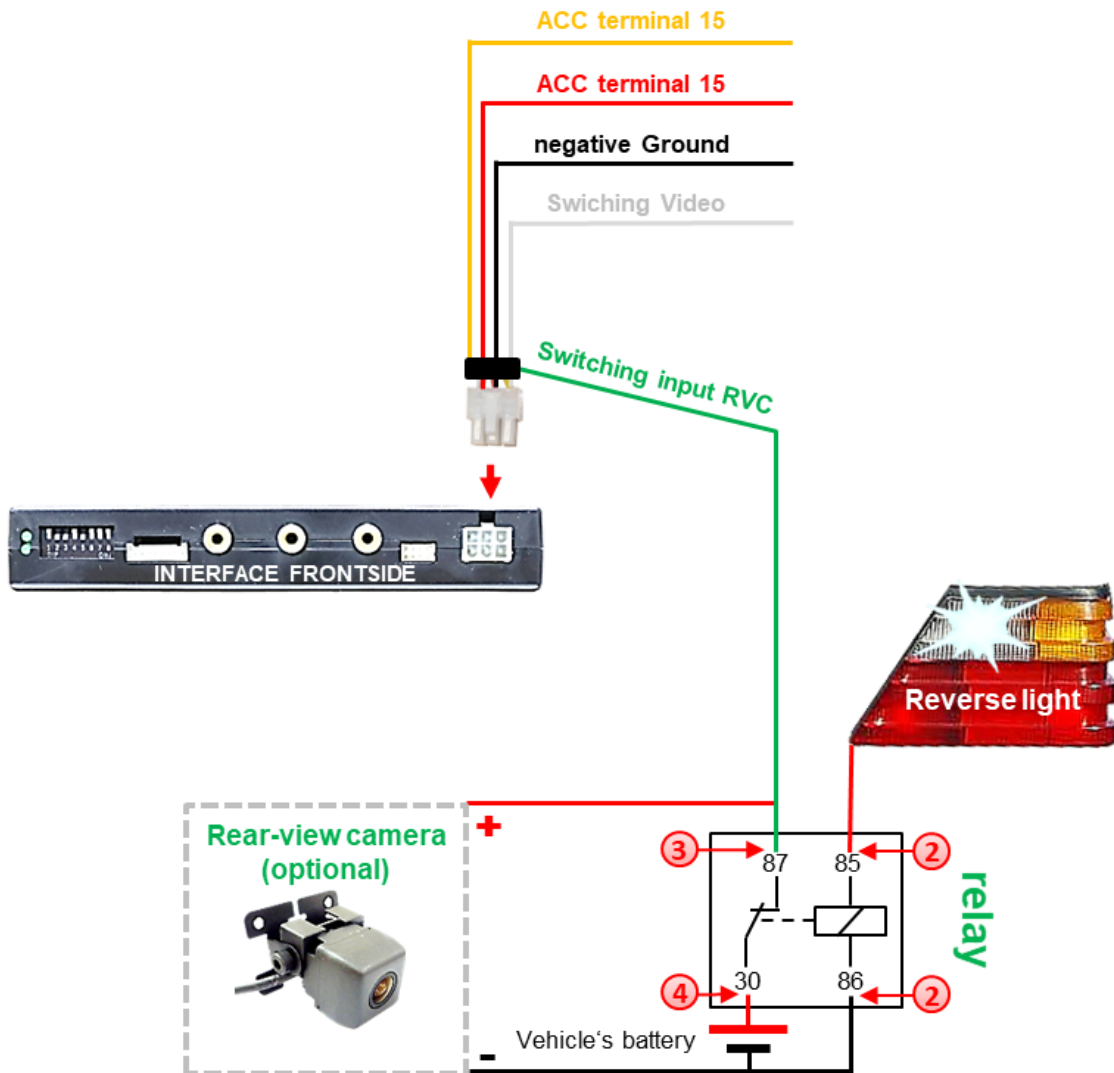


**Attention:** The audio cable CAB-FV-AUDIO shown in the diagram is not included in the delivery contents and is optionally available!

## 2.7. After-market rear-view camera

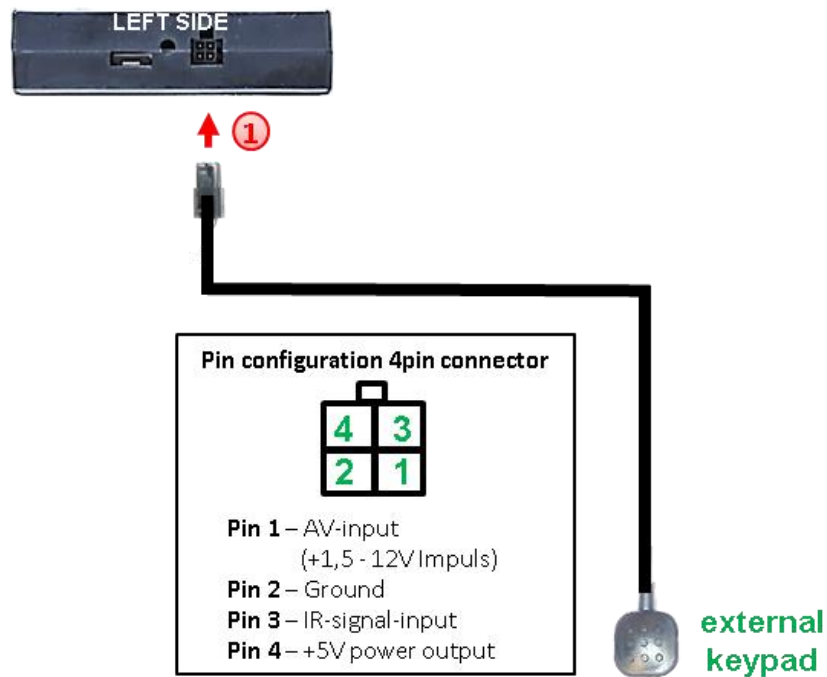
**Note:** Do not forget to set dip5 of video-interface to ON before testing.

To switch to the rear-view camera when reverse gear is engaged, an external switching signal from the reverse gear light is required. As the reverse gear light signal contains electronic interference, a traditional open relay (e.g AC-RW-1230 with wiring AC-RS5) or filter (e.g. AC-PNF-RVC) is required. Below schema shows the use of a relay (normally open).



- ① Connect the green **switching input cable** to the output connector (87) of the relay.
- 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 **switching input cable** before.
- ④ Connect stabile and permanent +12V to the relay's input connector (30).

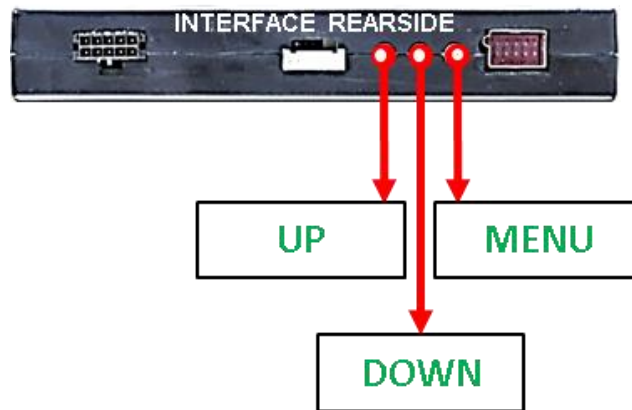
## 2.8. Connection - video-interface to external keypad



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

**Note:** Even if the switching through several video sources by the keypad mightn't be required, the invisible connection and availability is strongly recommended.

## 2.9. Picture settings

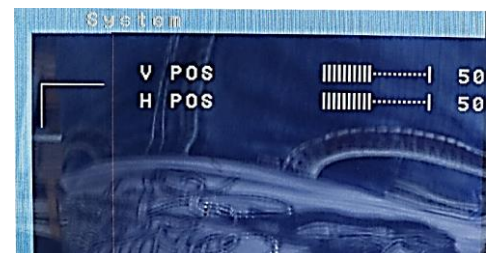
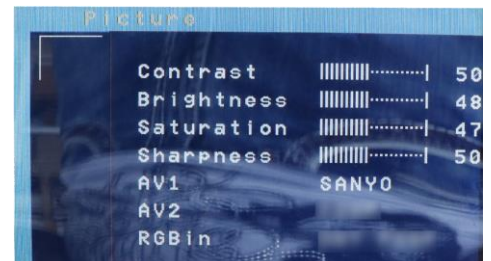


The picture settings are adjustable by the 3 push-buttons on the video-interface. Press the MENU button to open the OSD settings menu or to switch to the next menu item. Press UP and DOWN to change the selected value. The buttons are placed inside in the housing to avoid accidental changes during or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

**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		
Sharpness		
AV1/2	=	no function
RGB in		no function
V POS	=	vertical picture position
H POS	=	horizontal picture position



## 3. Video interface operation

The interface's external keypad can be used to switch the enabled inputs.

A **long press** (2-3 seconds) of the key switches to the next activated video input. If all inputs are enabled the order is:

*Factory video → video IN1 → video IN2 → factory video →...*

Disabled inputs will be skipped. While switching from **Video IN1** to **Video IN2** the audio-source will be switched too, assuming the sources have also been connected to the audio cable.

### 3.1. By white wire of the 6pin cable

Alternatively or additionally to the external keypad, the 6pin cable's white wire can be used to switch the enabled inputs (with +5V or +12V impulse).

## 4. Specifications

BATT/ACC range	7V - 25V
Stand-by power drain	6mA
Power	160mA
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	157 x 26 x 100 mm (B x H x T)

## 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.
	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.	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 qual. bad.		
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 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.

## 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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