

Video-inserter CI-RL2-SC14



example

**Compatible with
Volvo vehicles with Sensus Connect Infotainment and internet button
with 7 inch monitor**

**Video-inserter for front- and rear-view camera
and one additional video source**

Product features

- Video-inserter for factory-infotainment systems
- 1 CVBS Input for rear-view camera
- 1 CVBS Input for front camera
- 1 CVBS Video-input for after-market Video sources (e.g. USB-Player, DVB-T2 Tuner)
- Automatic switching to rear-view camera input on engagement of the reverse gear
- Automatic front camera switching after reverse gear for 10 seconds
- Picture-in-picture (PIP) mode combining after-market rear-view camera picture with factory parking sensor graphic (not for all vehicles)
- Video-in-motion in drive mode (ONLY for connected video-sources)
- Video-inputs NTSC and PAL compatible

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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. 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.

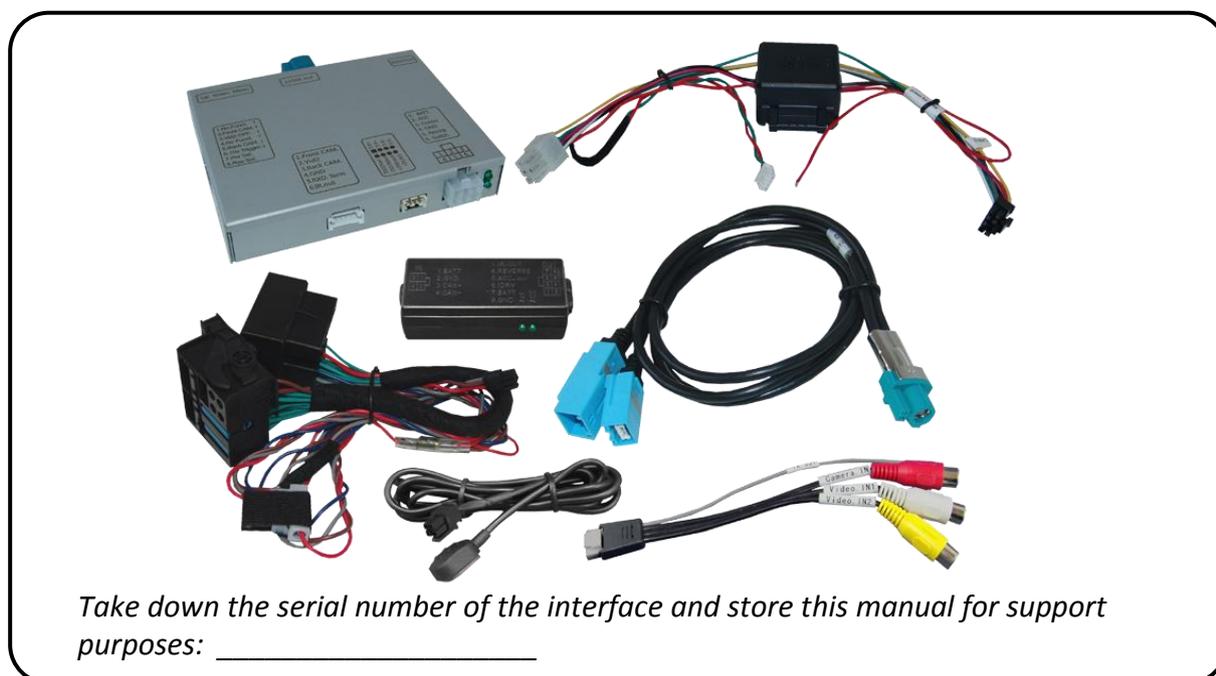
Changes/updates of the vehicle's software can cause malfunctions of the interface. We offer free software-updates for our interfaces for one year after purchase. To receive a free update, the interface must be sent in at own cost. Labor cost for and other expenses involved with the software-updates will 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

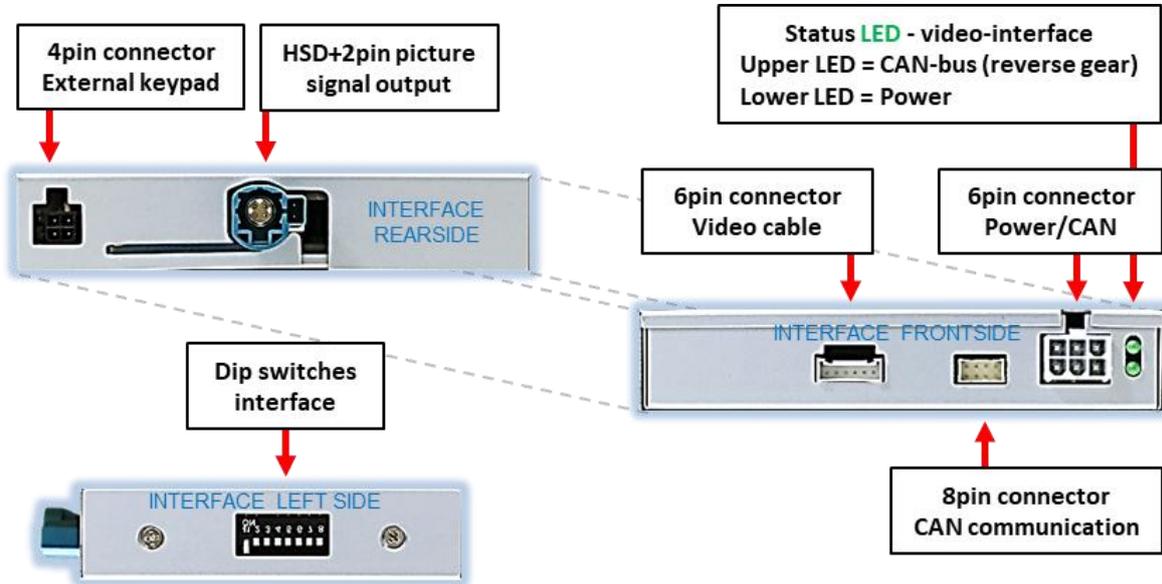


1.2. Checking the compatibility of vehicle and accessories

Requirements		
Brand	Compatible vehicles	Compatible systems
Volvo	Vehicles since model year 2014	Sensus Connect with 7 inch monitor and internet button.
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 or a FM-modulator can be used. If 2 audio sources shall be connected to the infotainment, an additional electronic is necessary to switch them.	
<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.	
<i>After market front camera</i>	The front camera will automatically be switched for 10 seconds after disengaging the reverse gear. A manually front camera switching is possible by external keypad.	

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

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	No function	-	set to OFF
2	Front camera/Video IN 1 input	enabled	disabled
3	Video IN 2-input	enabled	disabled
4	No function	-	set to OFF
5	Rear-view cam type	after-market	factory or none
6	Front camera	enabled*	disabled
7	No function		set to OFF
8	Factory PDC	enabled	disabled

*The front camera will automatically be switched for 10 seconds after disengaging the reverse gear.

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

See following chapters for detailed information.

1.4.1.1. Enabling the video input "Front camera/Video IN 1" (dip 2)

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.

If an after-market front camera is connected and Dip-2 is activated, it can also be switched by external keypad, in addition to the automatic switch-back.

1.4.1.2. Enabling the video input "Video IN 2" (dip3)

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 picture while the reverse gear is engaged to display factory rear-view camera.

If set to **ON**, the interface switches to its rear-view camera input „**Camera-IN**“ while the reverse gear is engaged.

1.4.3. Activating the front camera input (dip 6)

If set to **ON**, the interface switches for 10 seconds from the rear-view camera input to the front camera input after having disengaged the reverse gear.

If the front camera/V1 video input is activated by Dip-2, it is also possible to switch manually from any picture mode to the front camera input, by pressing the button of the external keypad (2-3 seconds).

1.4.4. Factory PDC settings (dip 8)

If set to **ON** while the reverse gage is enabled, the display shows a smaller reverse picture and for that the factory PDC representation additionally appears on its right side. If set to **OFF** while the reverse gage is enabled, the reverse picture will be shown in full size and the PDC representation is disabled.

Note: Dip 1, 4 und 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!

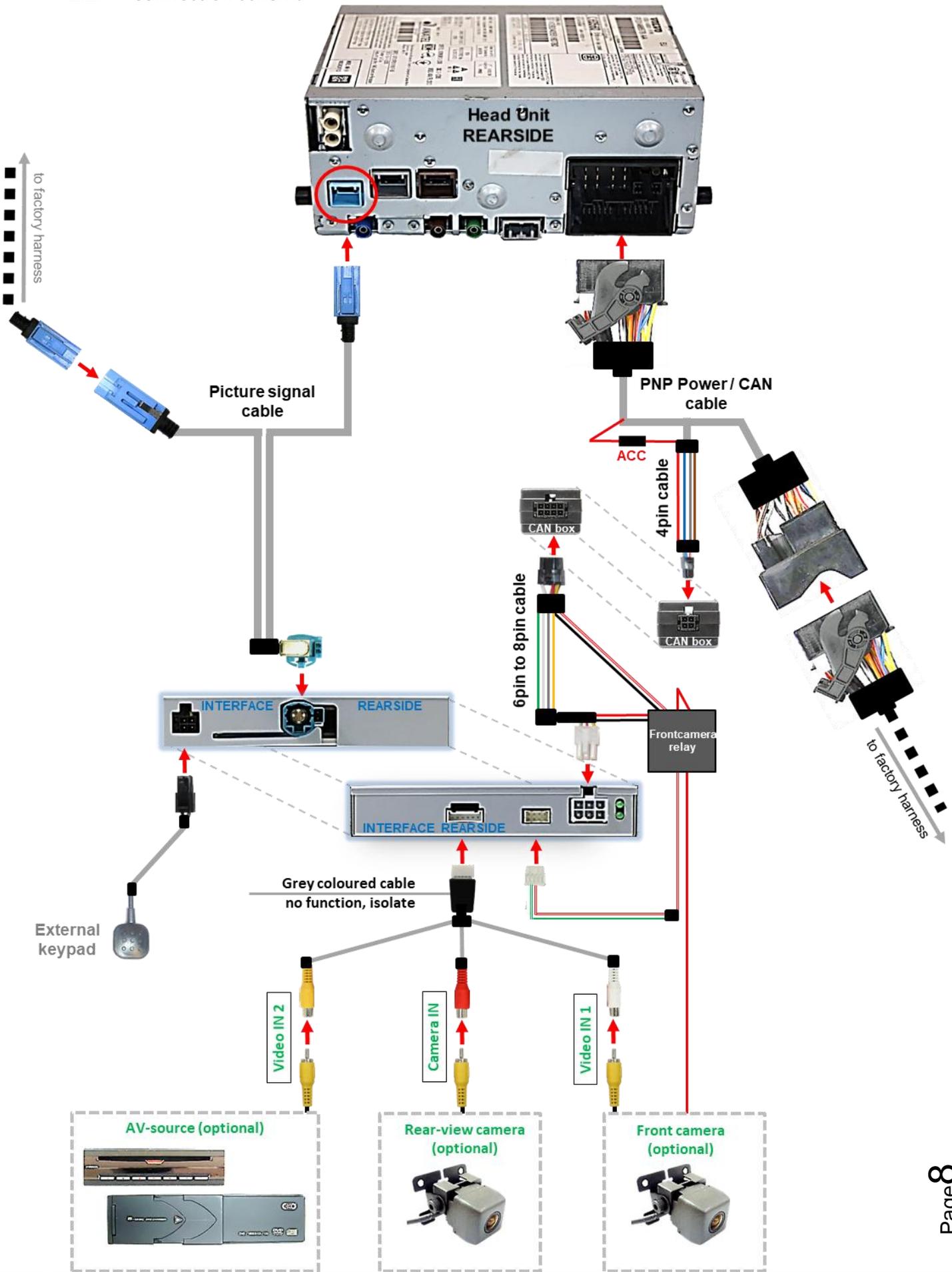
Note: Before a final installation, we recommend a test-run to ensure the compatibility of the vehicle and the interface. Due to changes in the production of the vehicle manufacturer there's always a possibility of incompatibility.

2.1. Place of installation

The interface should be installed on the backside of the head unit.

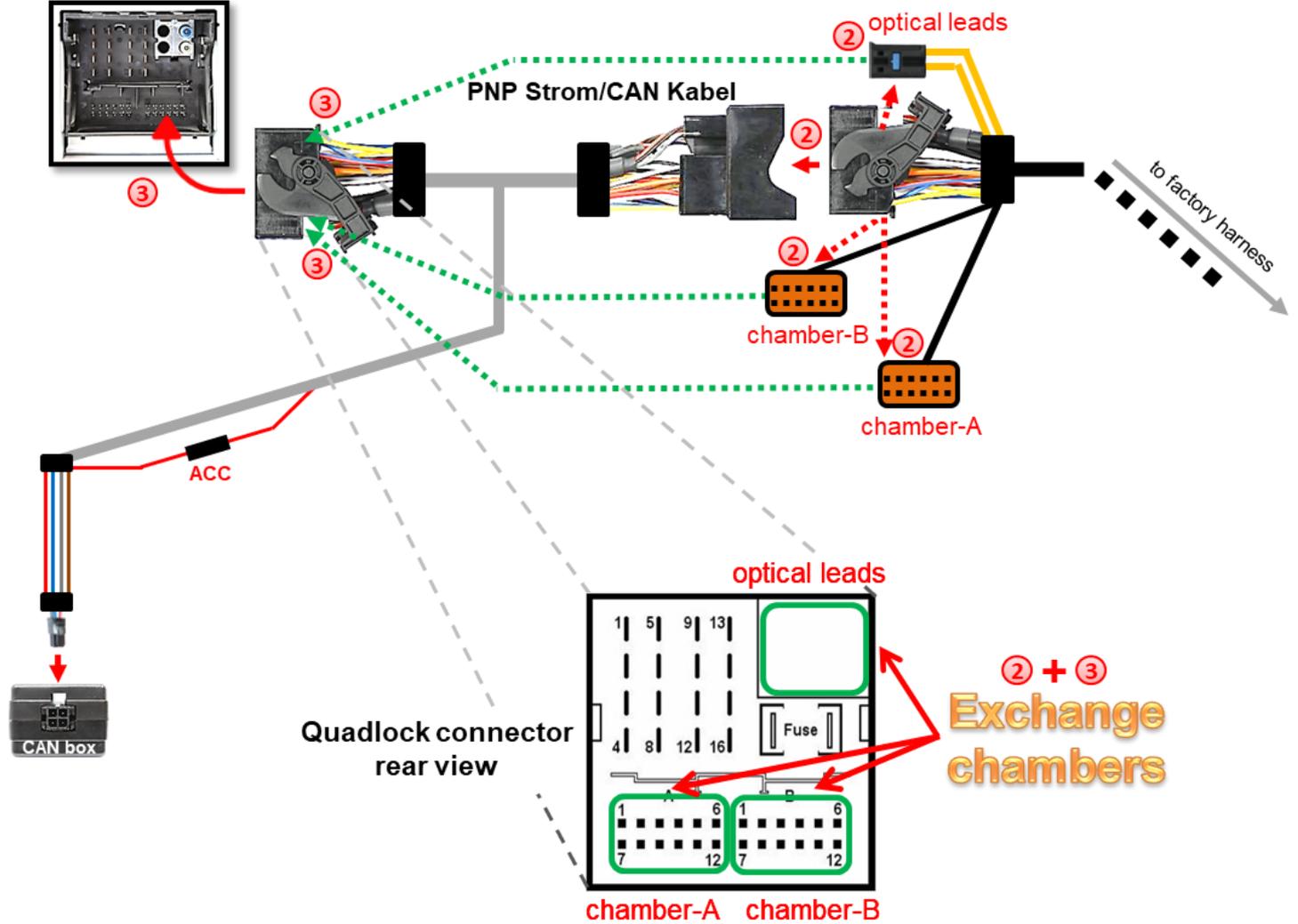
Because in some cars the space available may be very limited, special care must be taken with regard to cable crushing, etc.

2.2. Connection schema



2.3.1. Exchange of Quadlock chambers

Quadlock connector
Head Unit



Check 1
 Exceptionally, the power supply to the video interfaces may not be interrupted after switching to the vehicle's sleep mode. If the interface LEDs continue to shine even in the vehicle's sleep mode, separate the red wire's connection and connect the male connector to ACC or S-contact (terminal 86s)

Check 2
 Exceptionally, the CAN communication may not succeed in all vehicles! If, after connecting the PNP harness, no interface LED lightens up while the ignition is turned on, the analog power supply needs to be done! (see following chapter)

2.4. Analogue connecting - video-interface

If the communication between the CAN box and the vehicle's CAN bus does not succeed (not all vehicles are compatible), an analogue connection is required by connecting the 6pin to 8pin cable without the CAN box.

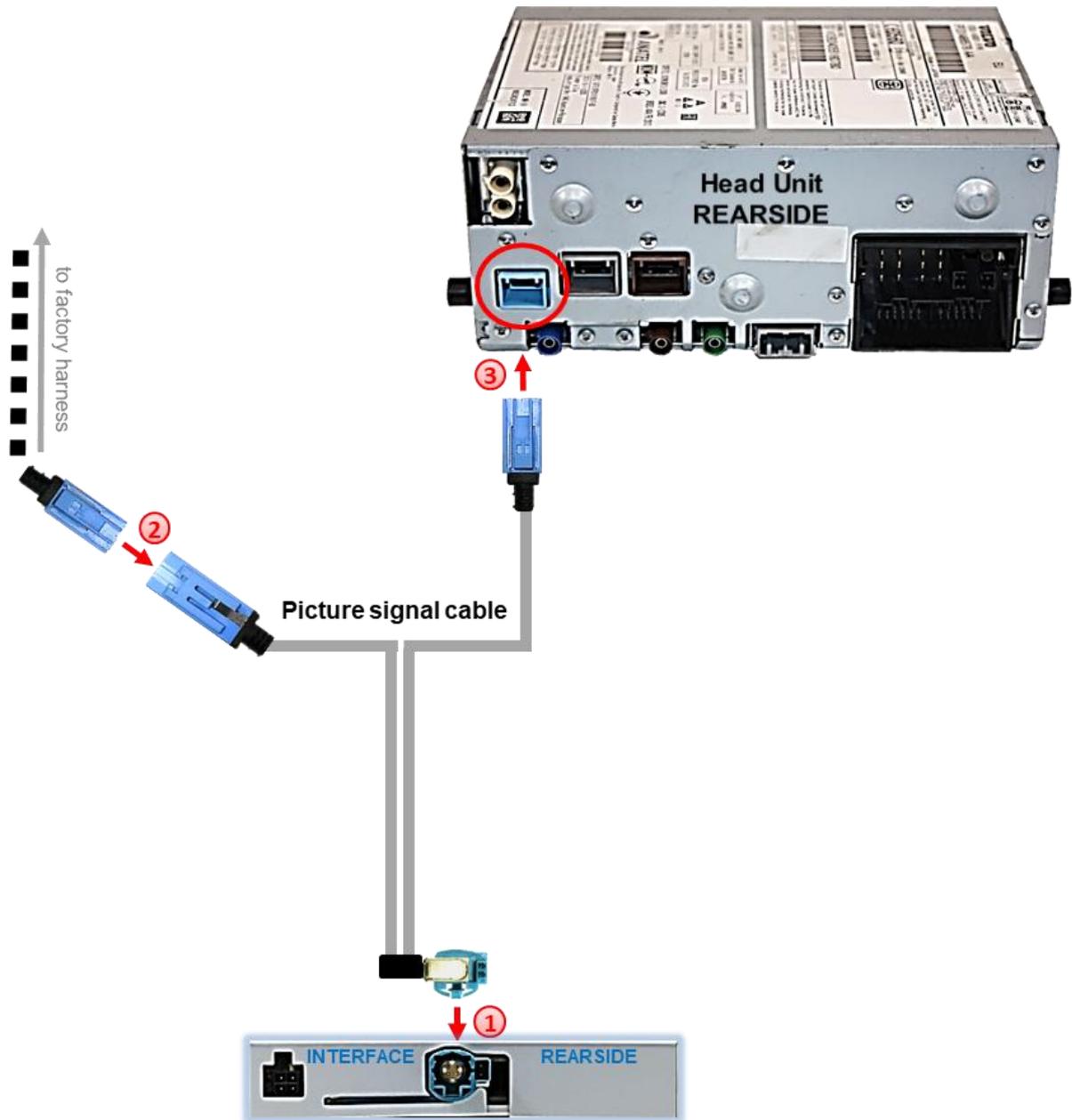
Pin-assignment – white 6pin power connector	
● Pin 1 (yellow)	- ACC or battery +12V
● Pin 2 (red-white)	- ACC +12V
● Pin 3 (grey)	- ohne Funktion
● Pin 4 (black)	- Masse
● Pin 5 (green)	- input rear view camera switches to CAMERA-IN when +12V Signal
○ Pin 6 (white)	- AV-Switch-Signal +5-12V Impuls



- 1 Connect the female 6pin connector of the 6pin to 8pin cable to the 6pin connector of the video interface.
- 2 Connect the yellow, the red-white and the black wire of the 6pin to 8pin cable to the vehicle's power and ground.

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 to switch the enabled video sources, same as the keypad (see chapter "video interface-operation"). The grey wire stays unconnected.

2.5. Connection – picture signal cable

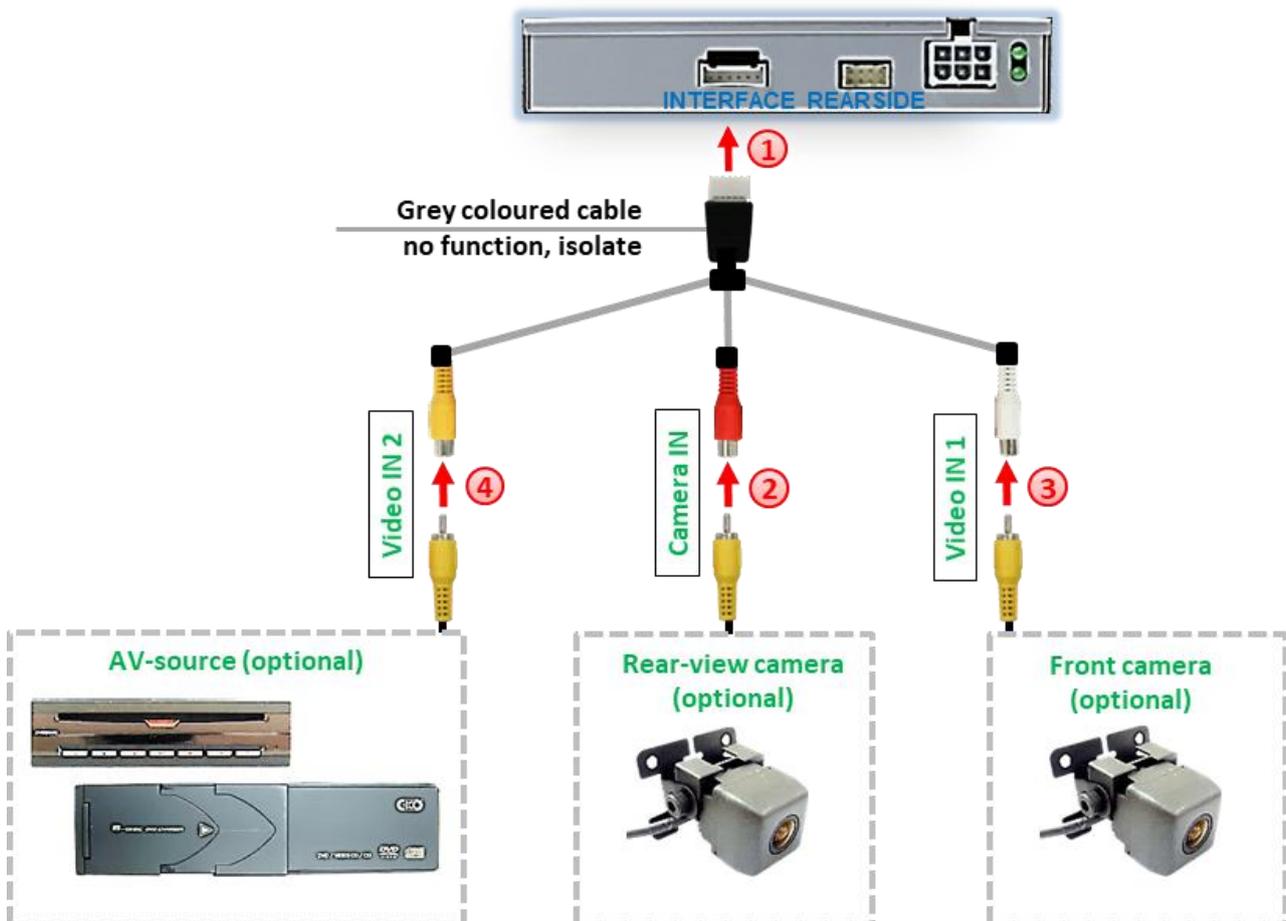


- 1 Connect the waterblue coloured female HSD+2pin connector of the picture signal cable to the male waterblue coloured HSD+2pin connector at the rear-side of the interface.
- 2 Remove the male lightblue coloured GVIF connector from the rear-side of the head unit and connect it to the female lightblue coloured GVIF connector of the picture signal cable.
- 3 Connect the male lightblue coloured GVIF connector of the picture signal cable to the female lightblue colored GVIF connector of the head unit.

2.6. Connecting video sources

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

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



- 1 Connect the female 6pin connector of the video cable to the male 6pin connector of the video-interface.
- 2 Connect the video RCA connector of the rear-view camera to the female RCA connector "Camera-IN" of the video cable.
- 3 Connect the video RCA connector of the front camera (or an additional video source) to the female RCA connector "Video-IN 1" of the video cable.
- 4 Connect the video RCA connector of an additional video sources to the female RCA connectors "Video IN 2".

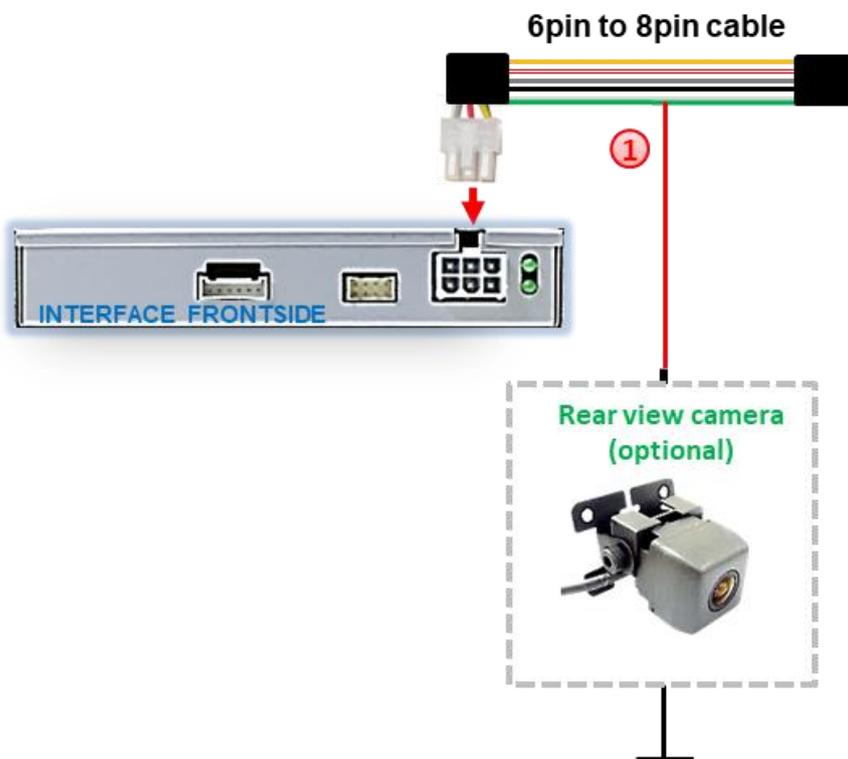
2.6.1. After-market rear-view camera

Some vehicles have a different reverse gear code on the CAN-bus which the included CAN-box is not compatible with. In this case there are two different ways of installation. If the CAN-box is able to detect an enabled vehicle's reverse gear, the green wire of the 6pin to 8pin cable should carry +12V while the reverse gear is engaged.

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

2.6.1.1. Case 1: CAN-box receives the reverse gear signal

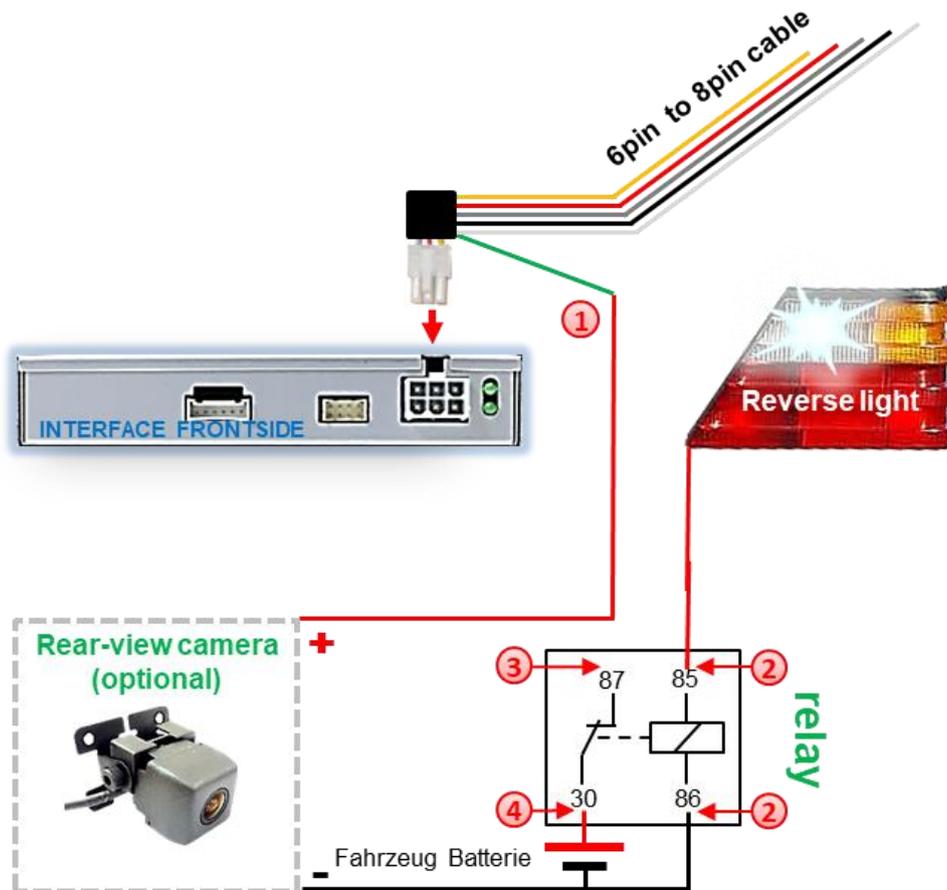
If the CAN-bus box delivers +12V on the green wire of the 6pin to 8pin cable while reverse gear is engaged, the video interface will automatically switch to the rear-view camera input **"CAMERA-IN"** while the reverse gear is engaged.



- ① Additionally, the +12V (max. 500mA) power supply for the rear-view camera can be taken from the green wire of the 6pin to 8pin cable.

2.6.1.2. Case 2: CAN-box does not receive the reverse gear signal

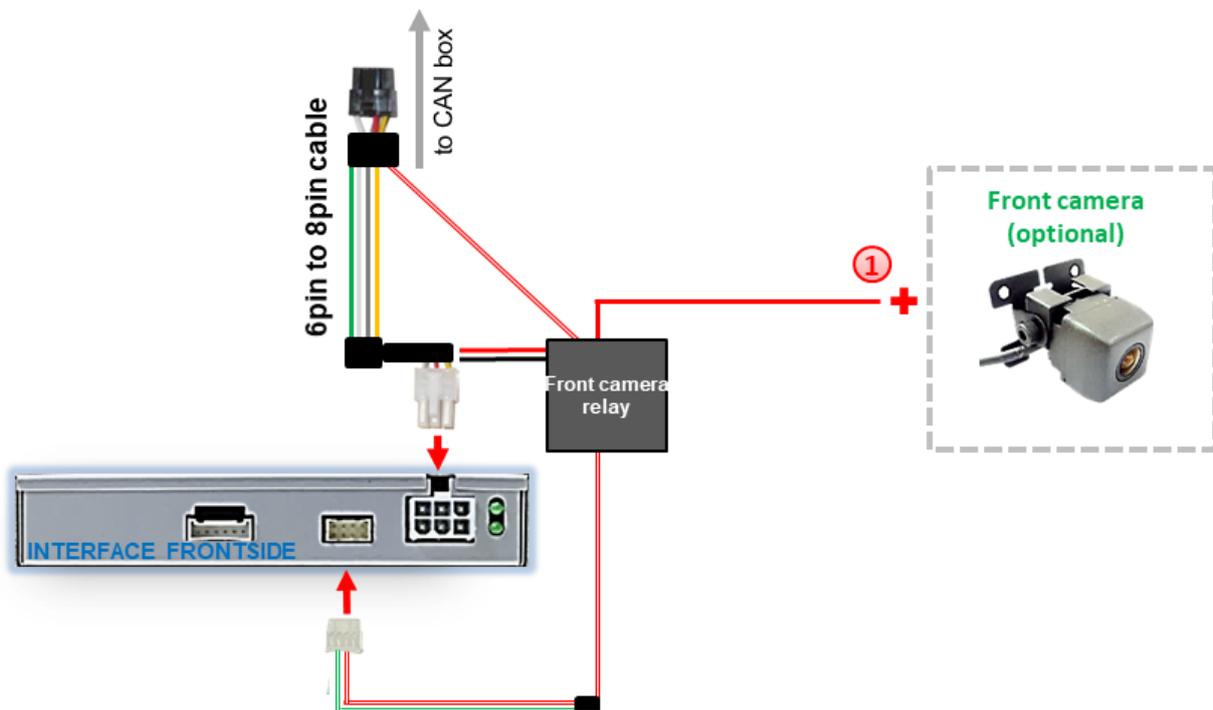
If the CAN-bus interface does not receive +12V on the green wire of the 6pin to 8pin cable when reverse gear is engaged (not all vehicles are compatible) an external switching signal from the reverse gear light is required. As the reverse gear light signal contains electronic interference, a traditional 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 Cut the green cable of the 6pin to 8pin cable close to the black 8pin connector and isolate the shorter end of the green cable near to the 8pin connector (CAN-box side).
- ② Connect the reverse gear light signal/power to coil terminal (85) and vehicle's ground to coil terminal (86) of relay.
- ③ Connect the rear-view camera power wire and the green wire (video interface side) of the 6pin to 8pin cable both to output terminal (87) of the relay.
- ④ Connect permanent battery power to input terminal (30) of relay.

Note: If, due to a missing CAN communication, the 6pin to 8pin cable has been connected the analogue way instead of the Can box, the green wire's connection has also to be done as shown in the picture above.

2.6.2. After-market front camera



1

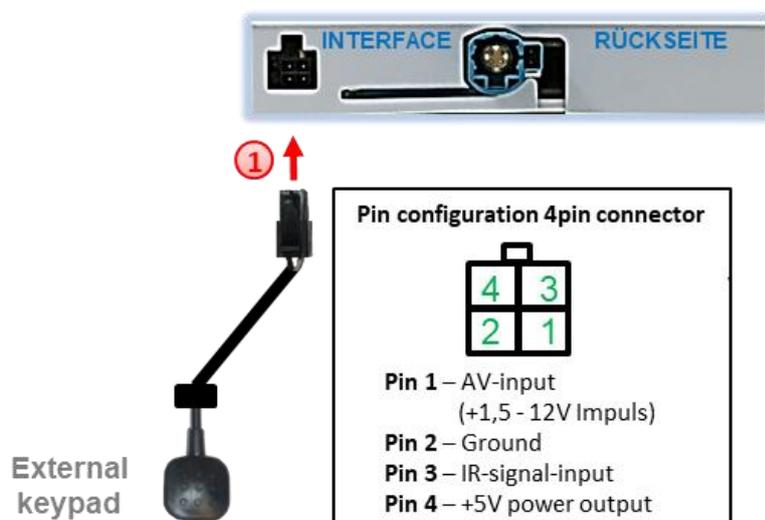
The red coloured power supply output „**Power for front**“ which is coming from the front camera relay can be used to power a front camera. If Dip 6 is set to ON, the power supply output gives +12V (max 3A) when reverse gear is engaged incl. 10 seconds delay after reverse gear is disengaged.

Note: If the front camera/V1 video input „**Video IN 1**“ is activated by Dip-2, it is also possible to switch manually from any picture mode to the front camera input, by pressing the button of the external keypad (2-3 seconds).

2.6.3. 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.

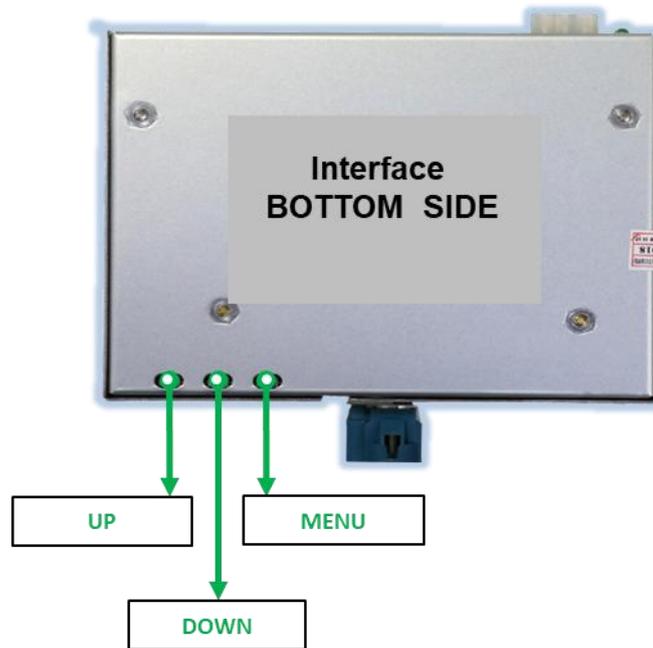
2.7. Connection Video Interface and external keypad



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

Note: Regardless if it'll be used or not, the external keypad should always be connected! In case of non-using, it should be invisibly hidden together with the video interface.

2.8. Picture settings



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 have to be done separately for AV1 and for 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:

- Contrast
- Brightness
- Saturation
- Position H (horizontal)
- Position V (vertical)
- UI-CNT no function
- IR-AV1 no function
- IR-AV2 no function
- Guide-L no function
- Guide-R no function
- Guide-CNTRL no function
- PDC-H-POS PDC no function
- AV1/2-MAIN no function



3. Interface operation

The interface's **keypad** can be used to execute interface functions.

Short press keypad to switch the video-source.

Each repetition will switch to the next enabled input. Inputs which are not enabled are skipped. If all inputs are activated by dip switch settings, the order is the following:

Factory video → Front camera (Video IN1) → Video source (Video IN2) → Factory video

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

4. Specifications

BATT/ACC range	7V - 25V
Stand-by power drain	30mA
Power consumption	240mA
Video input	0.7V - 1V
Video input formats	NTSC / PAL
Temperature range	-40°C to +85°C
Dimensions video-box	111 x 25 x 113 mm (W x H x D)
Dimensions CAN-box	73 x 22 x 30 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.
	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.



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