# r.LiNK Video-inserter
# CI-RL3-A15



Example: Audio 15, RNS 6000, RSD 4000

**Compatible with**
**Mercedes Fahrzeuge mit Audio15 NTG2.5 / NTG5-447 Systemen**
**VW Fahrzeuge mit RNS6000 / RSD 4000 Systemen**

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

**Product features**

- **Video-inserter for factory infotainment monitors**
- **2 CVBS video-inputs for after-market devices (e.g. DVD-Player, DVB-T tuner, …)**
- **Rear-view camera video-input**
- **Automatic switching to rear-view camera input on engagement of reverse gear**
- **Video-in-motion in drive mode (ONLY for connected video-sources)**
- **Compatible with factory rear-view camera**
- **AV-inputs PAL und NTSC compatible**

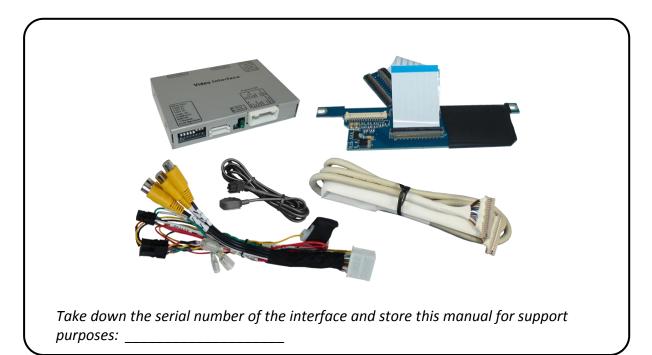# Contents

## 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: _____*

## 1.2. Checking the compatibility of vehicle and accessories

**Compatibility**

| vehicle | Compatible vehicles | Infotainment systems |
|---------|---------------------|----------------------|
| Mercedes | Sprinter (W906) since. 2015-, Vito (W447) about 2015 | Audio15 NTG2.5/NTG5-447 **Only version with full DIN cage behind front panel** |
| VW | Crafter about 2015-2016 | RNS6000 **Only version with full DIN cage behind front panel** |

**Limitations**

*Video only*                The interface inserts ONLY video signals into the infotainment.
For audio inserting, use the possibly existing factory audio-AUX-input or a FM-modulator.

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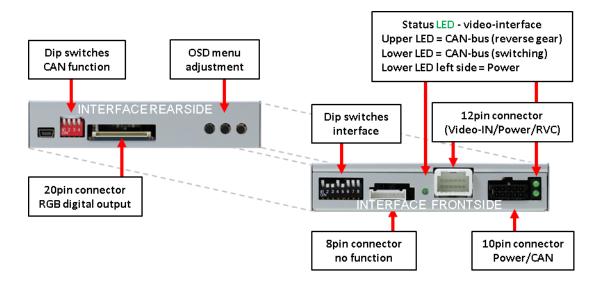
*Factory rear-view camera*  Automatically switching-back from inserted video to factory rear-view camera is only possible while the reverse gear is engaged. To delay the switch-back, an additional electronic part is required.
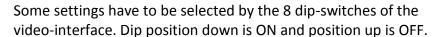
## 1.3. Connection Video-Interface

The video-interface converts the connected after-market sources video signals into an RGB digital 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.

Dip switches
CAN function

OSD menu
adjustment

Status LED - video-interface
Upper LED = CAN-bus (reverse gear)
Lower LED = CAN-bus (switching)
Lower LED left side = Power

INTERFACE REARSIDE

Dip switches
interface

12pin connector
(Video-IN/Power/RVC)

20pin connector
RGB digital output

INTERFACE FRONTSIDE

8pin connector
no function

10pin connector
Power/CAN

## 1.4. Settings of the 8 Dip switches (black)

Some settings have to be selected by the 8 dip-switches of 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 | Video 1 | enabled | disabled |
| 3 | Video 2 | 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 | No function | | Set to OFF |

See the 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 RGB digital 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.

**Note:** Dip 1, 4, 6, 7 and 8 are out of function and have to be set to **OFF**.

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

Dip position down is **ON** and position up is **OFF**.

| Navigation / system | Dip 1 | Dip 2 | Dip 3 | Dip 4 |
|---|---|---|---|---|
| Mercedes Audio15 NTG2.5/NTG5-447 | OFF | OFF | OFF | OFF |
| VW RNS6000 | OFF | OFF | 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 – video-interface

The video-interface shall be installed on the backside of the head-unit.

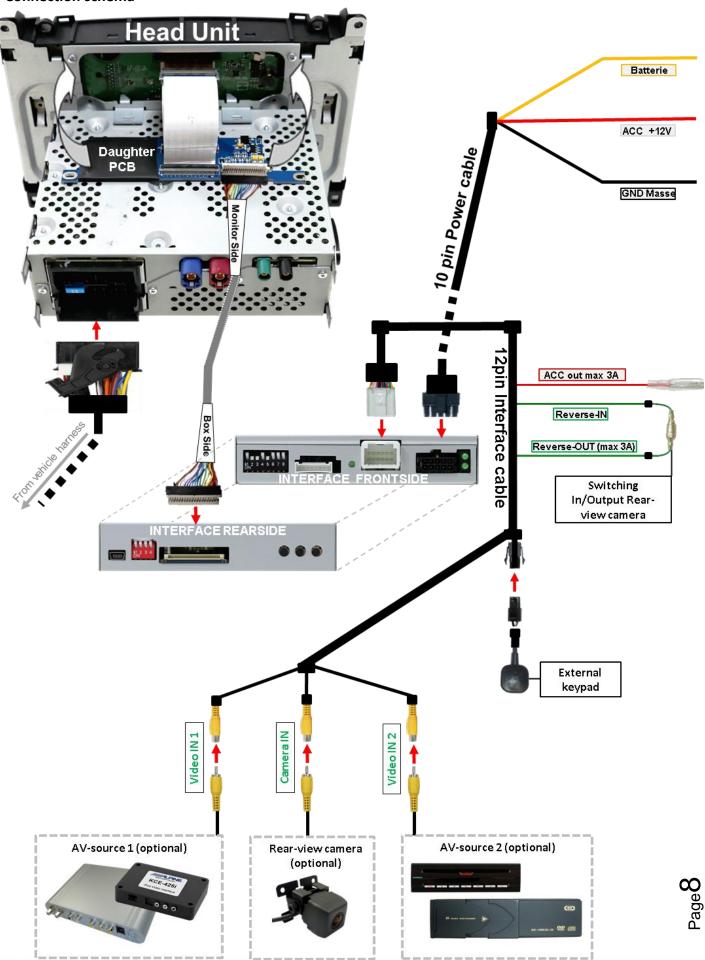### 2.2. Place of installation – daughter PCB

The daughter PCB is performed to be installed on the rear side of the head unit's monitor instead of the original base plate

## 2.3. Connection schema

Head Unit

Daughter PCB

Monitor Side

Box Side

From vehicle harness

10 pin Power cable

Batterie

ACC +12V

GND Masse

12pin Interface cable

INTERFACE FRONTSIDE

INTERFACE REARSIDE

ACC out max 3A

Reverse-IN

Reverse-OUT (max 3A)

Switching In/Output Rear-view camera

External keypad

Video IN 1

Camera IN

Video IN 2

AV-source 1 (optional)

KCE-425i

Rear-view camera (optional)
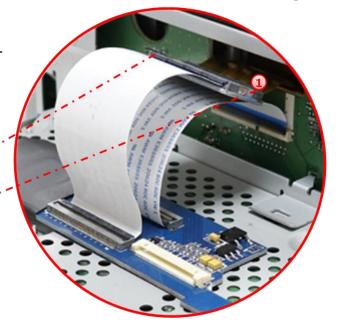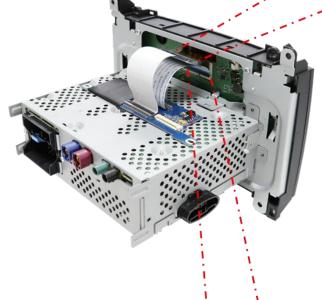
AV-source 2 (optional)

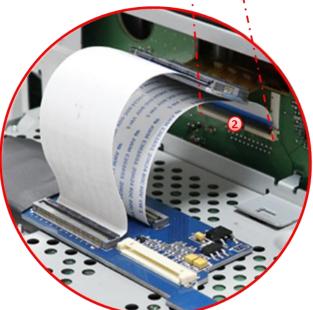### 2.4. Connections to the head-unit – ribbon cables

Remove the head-unit and further remove the original housing base plate on the rear side of the monitor (4screws), to set free the 40pin ribbon cable.

Copper coloured ribbon cable to outer PCB ribbon cable merger

(1) Clip out the monitor's original copper coloured 40pin ribbon cable which is connected at the head-unit mainboard's ribbon cable base and connect it to the PCB's outer 40pin ribbon cable merger.



(2) Connect the daughter PCB's pre-assembeled inner 40pin ribbon cable to the previously become free ribbon cable base of the monitor mainboard.

**Note:** Heed the following warning notes concerning installation of ribbon cables!

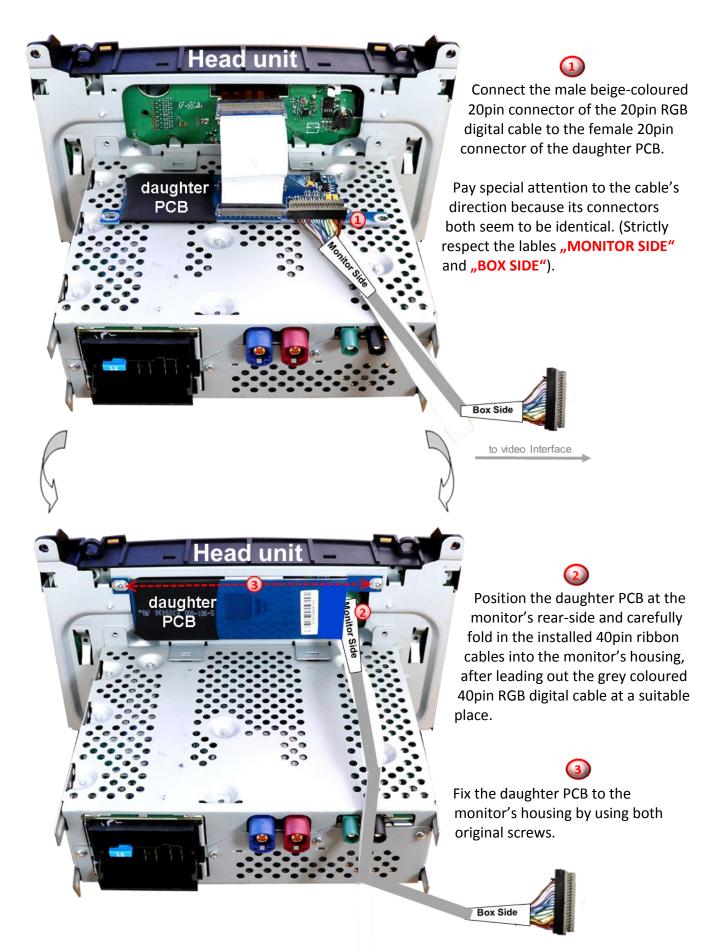Inner short PCB ribbon cable to monitor ribbon cable base

### 2.4.1. Warning notes, concerning the installation of ribbon cables:

**1) The contacting ends of ribbon cables always have to be installed in a straight and precise 180° position to the connector. Each deviation from a perfect contact position will curse faulty contact and even danger of short circuit**

**2) The ribbon cable's contacting sides always have to correspond to the contacting sides of the connectors, concerning the mounting position.**

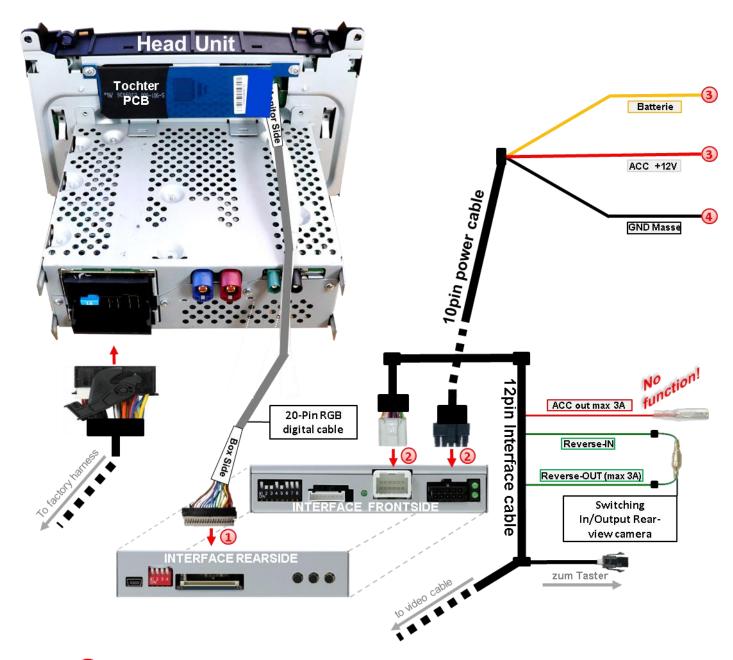**3) Avoid cable contusion or cable injury caused by sharp-edged metal.**

## 2.5.   20pin RGB digital cable – connection and wiring



**1** Connect the male beige-coloured 20pin connector of the 20pin RGB digital cable to the female 20pin connector of the daughter PCB.

Pay special attention to the cable's direction because its connectors both seem to be identical. (Strictly respect the lables **„MONITOR SIDE"** and **„BOX SIDE"**).



**2** Position the daughter PCB at the monitor's rear-side and carefully fold in the installed 40pin ribbon cables into the monitor's housing, after leading out the grey coloured 40pin RGB digital cable at a suitable place.

**3** Fix the daughter PCB to the monitor's housing by using both original screws.

## 2.6.     Connection to the head-unit and Power connection



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

**②** Connect the female 12pin connector of the 12pin interface cable to the 12pin connector of the video interface and the 10pin connector beside to the female 10pin connector of the 10pin power cable.

**③** Connect the yellow and the red wire of the 10pin power cable both to **+12V ACC** (Accessory power) or **+12V  S-contact terminal 86s** (e.g. glove compartment illumination).

**④** Connect the single black wire of the 10pin power cable to vehicle's negative ground.
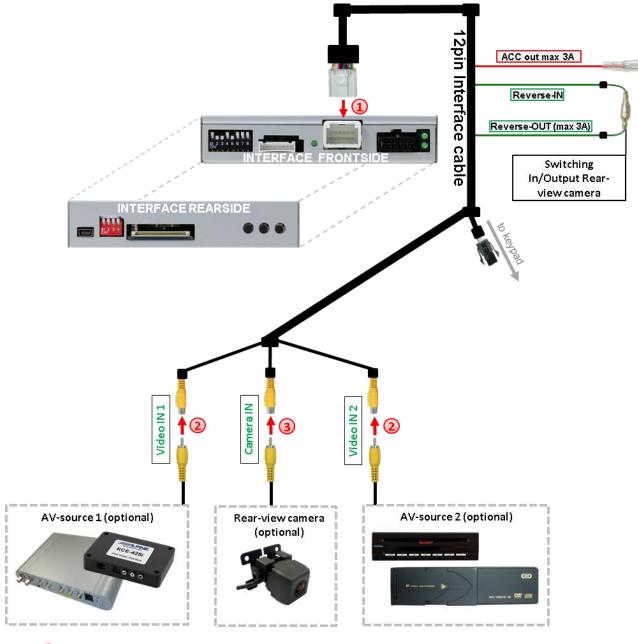
### 2.7.    Connecting the video sources

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

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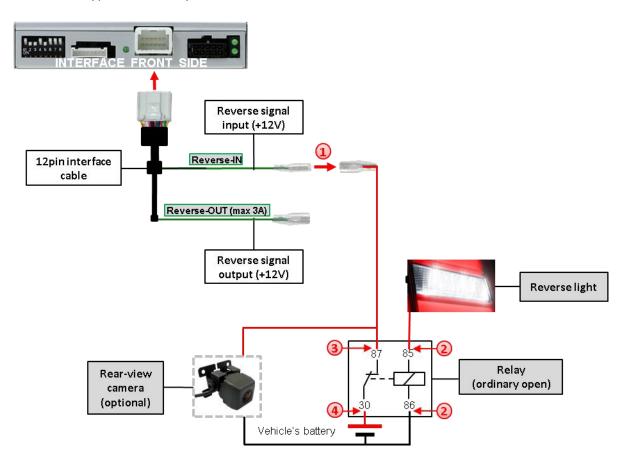


① Connect the 12pin interface cable's female 12pin connector to the interface's male 12pin connector.

② Connect the video RCAs of the AV-source 1 and AV source 2 to the female RCA connectors **"Video IN1"** and **"Video IN2"** of the 12pin interface cable.
"

③ Connect the video RCA of the rearview camera to the female RCA connector **"Camera IN"** of the video cable.

### 2.7.1. After-market rear-view camera

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

To automatically switch to the rear-view camera input while the reverse gear is engaged, 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 pre-connected male- and female connectors of the 12pin cable and connect the green input cable **"Reverse-IN"** to the output connector (87) of the relay.
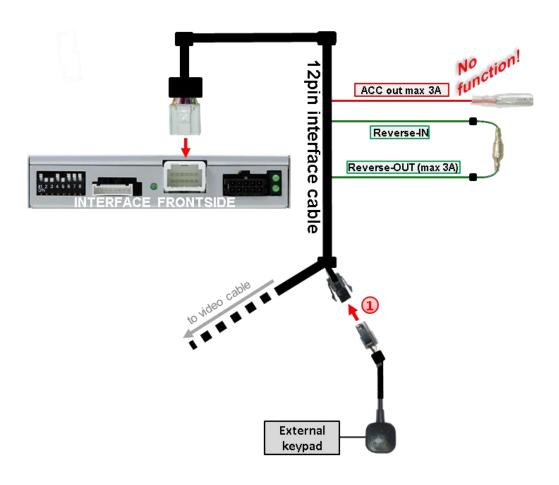
> **Note:** Not least to avoid short circuits, the best solution should be, to crimp a male 4mm connector to the relay's output cable and connect it to the green cable's female 4mm connector. The output-cable **"Reverse-OUT"** remains disconnected as it's out of function.

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

③ Connect the output terminal (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 terminal (30).
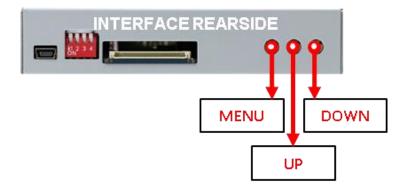
## 2.8. Connecting video-interface and keypad



**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.
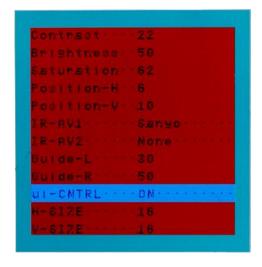
## 2.9. Picture settings and guide lines



The picture settings adjustment can be done by the 3 buttons of the video-interface. Press the **MENU** button to open the OSD settings menu. To switch to the next menu item, pressing **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 AV1 and AV2 while the corresponding input is selected and visible on the monitor.

**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 (out of function)
Guide-lines right (out of function)
Guide lines (out of function)



**Note:** As the system doesn't support the vehicle's CAN, the guide-lines cannot be used.

## 3. Interface operation – external keypad

The switching of video sources is done by the external keypad. If, by dip switch setting, all inputs are enabled, the order is the following:

*Factory video → video IN1 → video IN2 → factory video → …*

By dip switch deactivated inputs will be skipped.

## 4. Specifications

| | |
|---|---|
| BATT/ACC range | 7V - 25V |
| Stand-by power drain | 135mA |
| Power | 135mA @12V |
| Video input | 0.7V – 1V |
| Video input formats | PAL/NTSC |
| RGB-video amplitude | 0.7V with 75 Ohm impedance |
| Temperature range | -40°C to +85°C |
| Dimensions Video-Box | 118 x 23 x 86 mm (W x H x D) |

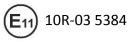## 5.    FAQ – Trouble shooting Interface functions

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. |
| | Pressed too short. | For video source switching a longer press of about 2.5 seconds is required. |
| Not possible to switch video sources by external keypad. | 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. |

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